FUJITSU

Fujitsu Technology and Service Vision 2016

Book 1

shaping tomorrow with you

A conversation with the President

How does the evolution of digital technology impact on business and society?

The evolution of technology is transforming the world. Digital technologies such as the Internet of Things and Artificial Intelligence are changing the way people work, making processes more efficient and helping create innovative new products and services. This is digital transformation. These technologies connect businesses with new partners, enabling them to collaborate and innovate across existing boundaries. If they want to outperform the competition, today's business leaders must make digital transformation a key part of their strategy.

How can Fujitsu help our customers achieve digital transformation?

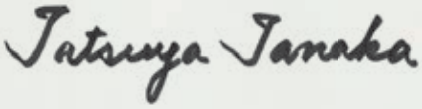
We want to be our customer's business partner, and help their journey of transformation. Last year, Fujitsu began providing a digital business platform, called MetaArc. This is a cloud-based platform that enables customers to use digital technologies to grow their businesses. We also deliver services which integrate the latest technologies on this platform, to help realize digital transformation. We always focus on our customers' business goals and work together to achieve them. This approach is what makes Fujitsu different.

What kind of company is Fujitsu striving to be? What value do you believe is the most important?

Fujitsu has been working towards our "Human Centric" vision for some time. This means putting people at the center of everything. Advances in artificial intelligence are accelerating, which means more and more of what we do can be automated. In this digital era, we have to think about how technology empowers people to work more creatively and maximize their potential. Fujitsu's technology and services support everyday life, helping all of us live happier and fuller lives.

April 2016

Fujitsu Limited
President and Representative Director
Tatsuya Tanaka



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What is the Fujitsu Technology and Service Vision?

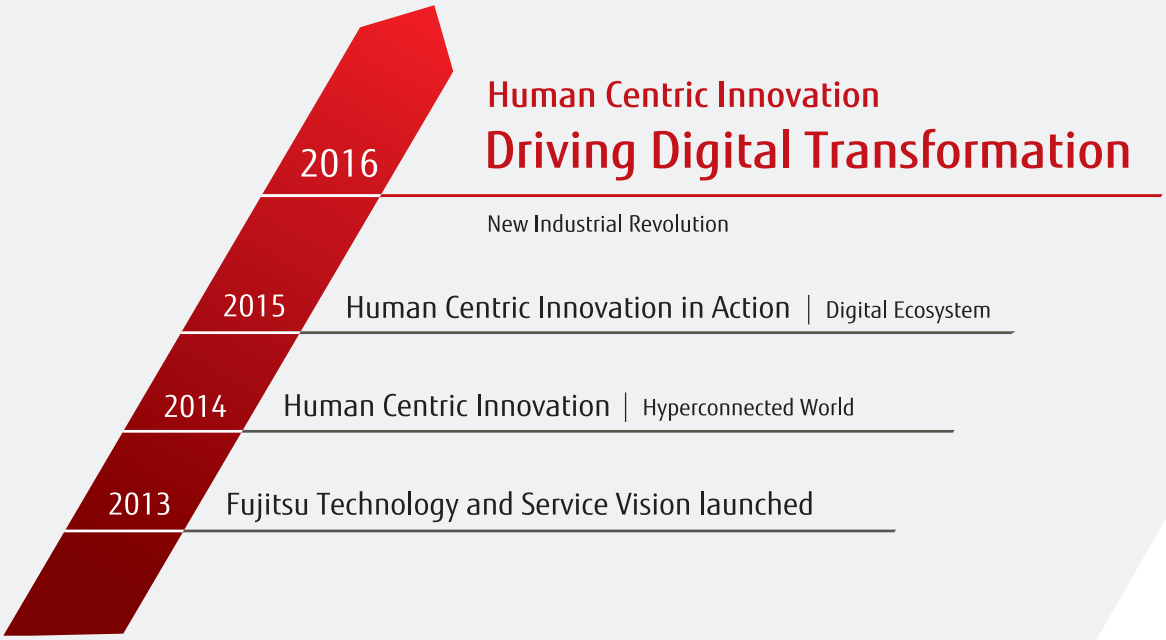
We first launched the Fujitsu Technology and Service Vision in April 2013, and have updated it annually ever since. It sets out our vision and provides insights to leaders of business and the public sector about how they can use ICT*1 to create innovation and build a different future. Our vision underpins all of our operations, from research and development to customer engagement and delivery.

Fujitsu's key proposition is Human Centric Innovation. We first expressed this central idea in our vision in 2014, to describe Fujitsu's unique approach to creating business and social innovation by empowering people with advanced technology. Human Centric Innovation is also a journey. It is how we have been working together with customers and partners from all around the world to deliver innovation.

The theme of this year is Human Centric Innovation: Driving Digital Transformation. New digital technology is becoming incorporated into the heart of business and society. Digital is not a single technology, rather a set of connected technologies such as cloud, mobile, Internet of Things (IoT), analytics, Artificial Intelligence (AI) and supporting security technologies. The promise of digital technology is to transform the everyday lives of people, businesses and communities, bringing about a new industrial revolution.

We believe a human centric approach is the only way to deliver on the promise of digital. We passionately believe this is the approach you need to drive your successful digital transformation. We want to show you how. We hope this booklet will give you the insights you need to thrive in this revolutionary period.

*1 ICT : Information and Communication Technology



Related Information and Website

The Fujitsu Technology and Service Vision 2016 is created by a team of Fujitsu people from around the world. We are communicating it in these formats:

- Book 1 (this booklet) sets out our vision along with some insights on how business leaders can leverage digital transformation.
- Book 2 provides insights on how IT leaders can provide digital leadership. It also features our customers' stories of their digital transformations as well as Fujitsu's portfolio of services, solutions and products.
- Executive summary
- Website : http://www.fujitsu.com/global/vision/
- Contact : +81-3-6252-2220

The Business Agenda

We are at the beginning of a new chapter in the story of technology. The world is undergoing a new industrial revolution, triggered by the evolution of digital technology. The prizes are huge, but so are the risks.

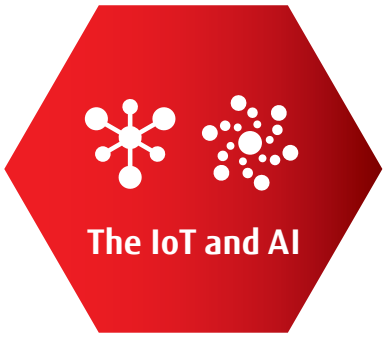
Today's business leaders are aware of the impact of information technology and what it can do. Many of today's CEOs have seen the march of technology at first hand, from mainframes, the PC and the internet revolution, to the smartphone explosion.

But in 2016, digital technology will begin to play a more fundamental part in the way businesses function. As a result, it is driving a new business agenda. This will come to underpin the way businesses grow and innovate, and define the way they create value for customers. In a digital era, it will determine the businesses that thrive and the ones that die.

The change that businesses must contemplate making, is not cosmetic nor is it about gadgets and gimmicks. The implications of this business agenda go to the heart and soul of any organization.

The Business Agenda

By bringing connected, digital technologies into their core operations, businesses can undergo a metamorphosis. Transforming themselves to a higher-value level of working. They have the ability to become dynamic and agile: more efficient, more intelligent and more responsive to their customers. There are no limits. Businesses in any industry have the opportunity to leverage digital to transform the value of their products and services.



Two technology trends will be particularly transformative and disruptive for businesses. The Internet of Things (IoT) will enable the bringing together of digital and physical worlds, with profound implications for how organizations create new services and engage with their customers. The potential of AI is greater still. It promises a new level of automation, enabling technology to learn, solve problems and create new insights with the minimum of human effort.

Digital transformation has the potential to impact the structure of industries. In the digital era, value is created in three ways. From the creativity of people, from intelligence and from connectedness. New digital arenas – like 'wellbeing', 'mobility', or 'smart cites' - will emerge across traditional industry structures, to bring about a new industrial revolution. As a result, organizations will need to question and redefine the role of their businesses in this digitalized economy.

How to Choose Your Future?

Digital technology is influencing our lives more completely than we ever could have imagined. From the trivial: where can I park my car? To the fundamental: how can we stop people dying from heart disease? Increasingly we look to information and technology to provide the answers.

But there's a problem. Becoming more digital requires change and change we know is difficult and uncertain.

Digital does not of itself guarantee a better future. It is for us to choose, and we have to live with the consequences. To show what we mean, let's consider how an everyday scene plays out in four different scenarios...

Lucy is making a business trip abroad and her flight just landed at its destination. She disembarks the aircraft and heads into the terminal building. It is peak season and the airport is packed. Lucy hopes it won't take too long. At the forefront of her mind is the short stopover she made en-route to change planes. Did her bag make it onto her flight?

Scenario 1:
Digital technology is... undeveloped

Lucy arrives at the back of a long queue for immigration. She looks around, but there is no way to avoid it. After a long wait, her passport is checked and stamped by an official.

All the while she was waiting, Lucy has been anxious about her bag. She arrives in the baggage hall, and is relieved to finally see her bag appear on the carousel.

Lucy thinks how much better her experience would have been if the airport invested in more technology.

Scenario 2:
Digital technology is... uneven

The airport has implemented biometric palm vein and face recognition technologies for immigration control. But when Lucy tries to use a gate, the system is not able to validate her. She discovers it has not been integrated with the system of her local passport authority. So Lucy has to go back and join the long queue for the manual passport check.

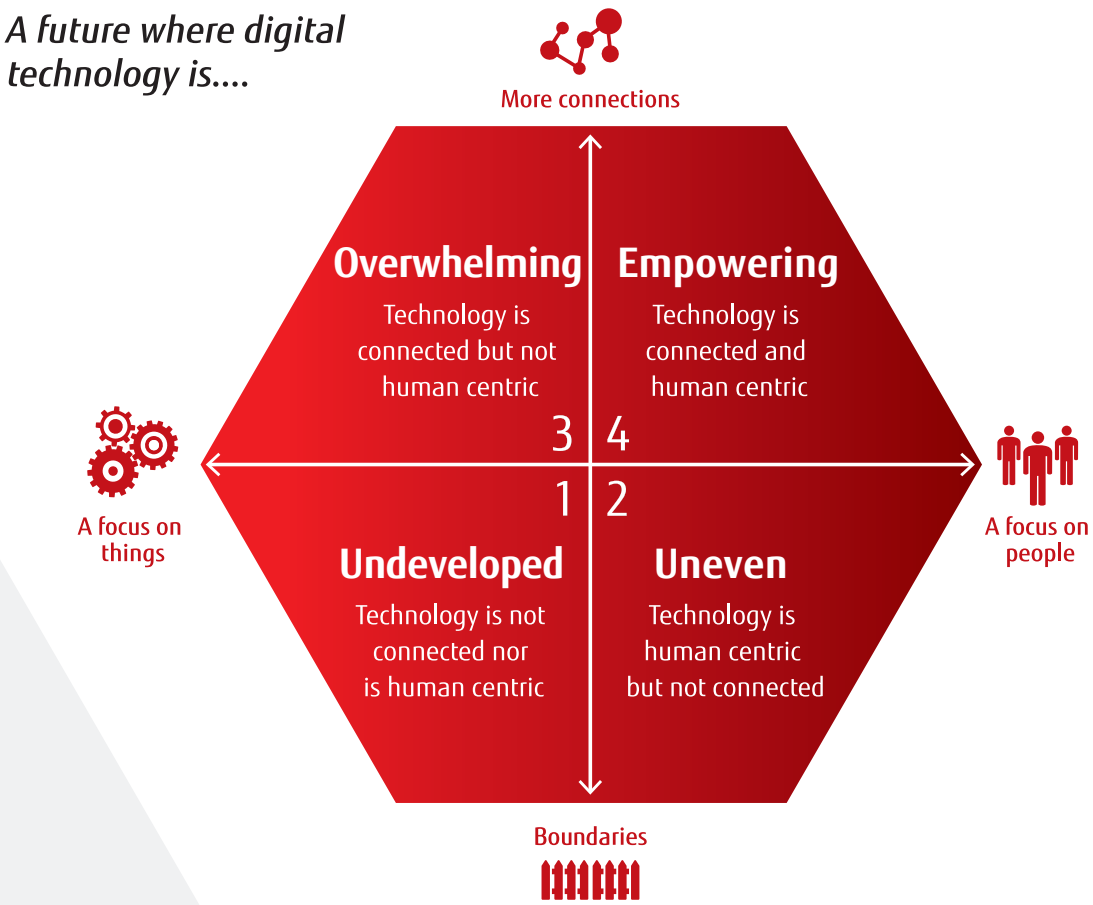
Lucy would like to use her airline's smart bag tracking system to check her bag has arrived. Unfortunately she discovers it has not been integrated with the airport's baggage handling system. So she has an anxious wait for her bag to appear.

Later, as she leaves the airport, Lucy considers how much better her experience would be if the airport could connect its technologies better.

Scenario 3:
Digital technology is... overwhelming

At the automatic immigration gate, a computerized voice interrogates Lucy about previous trips she has made abroad. The system is clearly well integrated with other sources of data but Lucy cannot remember the exact details of previous trips and who she travelled with. She feels uncomfortable about how much the system seems to know about her.

A text arrives from the airline announcing it has important information regarding the arrival of her



baggage. It directs her to a login page for the airport's baggage tracking system. However Lucy has no clue what username and password she needs to enter.

Later, as she leaves the airport, Lucy reflects on the impersonal nature of the technologies and the intrusion into her privacy.

Scenario 4:
Digital technology is... empowering

Lucy uses the biometric palm vein and face recognition authentication gate at immigration. The system is so efficient she barely needs to stop. "Welcome back, Lucy" says a friendly avatar, directing her through to the baggage hall.

A text arrives at Lucy's smart phone, informing her bag is in transit between her plane and the baggage hall. A few minutes later a second text arrives announcing her bag will be on the carousel in a few seconds. And sure enough, there it is.

Lucy thinks to herself how well the processes have been connected and what a great experience she has had. She must travel more often!

Solving the Digital Paradox

We may believe digital technology has the key to a better future, but if we take the wrong approach, 'digital heaven' may quickly turn into 'digital hell'. We may have high expectations for digital technology, but success is by no means assured. This is the digital paradox.

How do you secure systems that are more connected and open than before? How can you keep up with such an unremitting pace without creating instability?

And, can you be sure you will be better off by adopting digital technology? Will people accept having our lives controlled by intelligent machines?

But we can solve this paradox. We have the power to determine which path we go down.

Taking value from digital starts by having the right approach. We believe the best way to achieve this is by building connections and putting people at the center. This is how we can leverage digital in a way that secures value for businesses and society as a whole. We call this Human Centric Innovation. This is the central idea of our vision. We will develop it through this booklet.

Chapter 1

Digital Transformation

Powerful results come from bringing digital technology into the heart of business and society.

The key is to put people at the center of everything.

Digital Transformation

It might seem unusual for a financial organization to want to improve the experience of school lunches. But that is exactly what Sberbank, a leading Russian bank, has achieved with a new digital solution for children. The company turned to Fujitsu PalmSecure, a contactless, intuitive ID platform that captures unique palm-vein signatures.

The technology reduces queues and ensures that everyone gets fed within a tight daily timeframe. Students no longer need to carry cash into school, which can be problematic and even lead to bullying. And parents get visibility over what food their children are having.*2

It is a simple example, but it shows how digital can be applied in any walk of life. It can radically transform how the world works – from school lunch queues to complex industrial production lines. In the latter case, for instance, a manufacturer can leverage a connected, digitalized production line to gain a real time view of its operations, and make changes more quickly, transforming its efficiency. Connectivity greatly reduces transaction costs, and therefore improves the bottom line.

But digital technology can also impact the top line of a business. How the organization attracts - and delights - its customers. It can allow a company to innovate in its business models, driving and accelerating growth, opening it up to new markets.

These technologies fundamentally change an organization, how it operates and how it creates value. Digital transformation is metamorphosis. A core change, not a cosmetic change or an extension. A reconfiguring of a business to provide higher value products or services.

Many business leaders are already aware of the potential of digital. According to Gartner, private sector CEOs expect that 41% of their revenue will be digital by 2020. The public sector is even more bullish, Gartner cite public sector CIOs anticipating 77% of their processes to be digital in 5 years.*3

Fujitsu's own research of business and IT leaders in Europe supports a similar conclusion. However we found beneath this optimism lay uncertainty. Only 25% of business leaders classed themselves as 'extremely confident' in their ability to deliver digital, and only one in three agreed that their digital priorities are aligned.*4

Furthermore, business leaders can see the real and present risk that others can use these very same digital technologies as a means of taking market share from them. These may not be traditional competitors, but start-up businesses or even companies from different industries.

Making the lunch payment cashless and smarter in a school

*2 For detail please see Book 2 page 18, Customer Stories, "Transforming the school canteen helps increase security and safety" Sberbank

*3 Gartner : Gartner Symposium ITxpo 2015 "The 2016 CIO Agenda Building the Digital Platform" Dave Aron, 28th October 2015, Global Survey, Private Sector: CEO Survey (n=400), Public Sector: CIO Survey (n=344)

*4 Fujitsu : A Fujitsu Report "Walking the digital tightrope", 2016

Waves of digital technology

To understand digital it is important to see the context of the continuing evolution of technology. The story of digital is the story of four waves.

The Internet

The internet established a new shared platform which people and businesses have been using ever since. It gave rise to technology innovations and new business models too numerous to name, from e-commerce to social networking.

But from an economic point of view, perhaps the greatest impact has been on transaction costs. Wherever business has been able to substitute physical transactions with digital transactions, they have enjoyed huge reductions in costs.

And this has brought benefits to consumers beyond only cost savings. The so-called 'long tail' effect has enabled suppliers to cater for unique and specialized customer demands without any corresponding increase in price. If you are looking for an obscure book or an unusual clothes size, the internet can provide it. The emergence of the internet has also started a process of disruption to established industries that continues today. For example, the media, retail and financial sectors have already experienced radical change.

The digital story starts with the internet but doesn't end there.

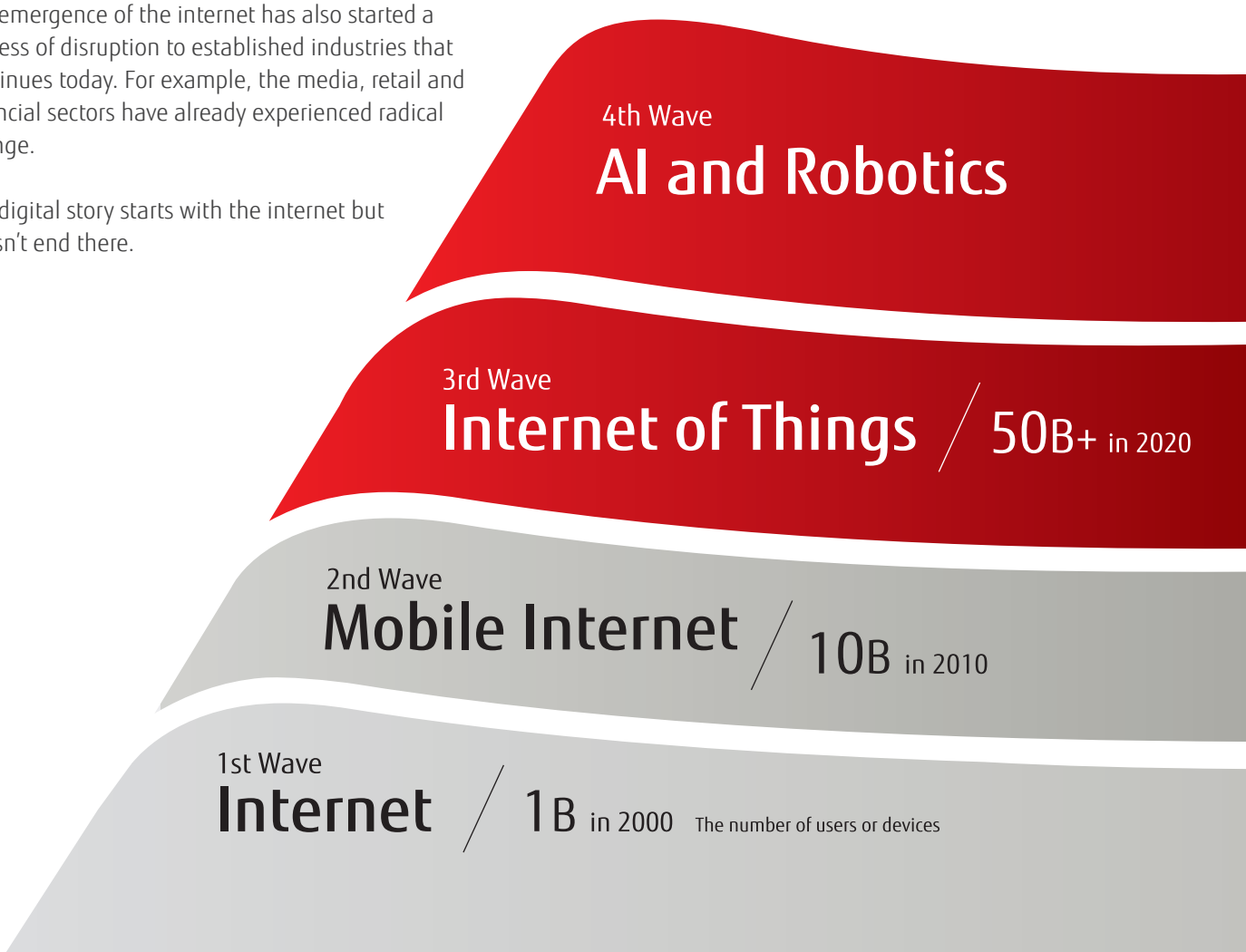
The Mobile Internet

The internet has given rise to a second, larger wave. Consumers have been attracted to mobile phones on a scale that no computing technology has generated before. They have become essential items that everyone must own.

Even in developing parts of the world like Sub-Saharan Africa, 70% of people have access to cellular coverage,*5 which is more than plumbed water or grid electricity. Today, 2 billion people have smartphones – powerful, network connected mobile computing devices.*6 By 2018 this will have risen to 2.5 billion.*6

The implication of this second wave is that computing is no longer anchored in physical locations, like offices and homes. Digital services and experiences can be delivered and consumed anywhere that people go.

*5 Ericsson "Sub-Saharan Africa, Ericsson mobility report appendix", 2014
*6 eMarketer"2 Billion Consumers Worldwide to Get Smart(phones) by 2016" 2014



The Internet of Things (IoT)

If the mobile wave extended the internet into people's everyday lives, the IoT extends it into the physical world around us.

A conservative estimate indicates there will be 50 billion connected things in the world by 2020*7. The IoT enables us to overlay information anywhere in the physical world – whether that is a water pipeline, a moving car or a pair of shoes.

Like a giant nervous system, the IoT gives us the ability to sense and control the world around us. As a result businesses can build powerful new services around the technology. For example, an industrial equipment supplier can provide machinery as an ongoing service, instead of selling it in a one-off transaction. Collecting detailed usage data and analyzing it enables predictive maintenance and the prevention of failures: a new business model.

As the size and cost of sensors and computer chips continues to reduce, digital services can easily be applied not just to expensive, high tech equipment, but to everyday items, from office furniture to light bulbs and clothing. We can even use this technology inside of our own bodies, opening up new possibilities for medical innovation.

AI & Robotics

Research into AI is not new. It has continued to varying degrees since 1950s. However, now it is becoming possible to use the outcomes of AI research in real business situations. The rapid advance of computing power is one reason for this.

But AI is also being driven by the huge amount of data that is available for machine learning to exploit. Data that the three previous digital waves have been driving. In addition, we are discovering new techniques. For instance, the most recent developments of deep learning, which uses neural network computing, are enabling a computing program to recognize features of visual images without any human help.

Combined with the IoT, we expect AI to have a significant impact on business and society. Algorithms that use machine learning*8 and deep learning have the potential to analyze real-time data from any connected physical objects and processes. This holds enormous potential for businesses and key social infrastructure to operate autonomously. Furthermore, these are autonomous, robic processes. They can use data to self-learn and self-improve.

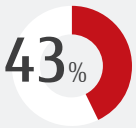
We have seen the first and second waves drive the emergence of many on-line digital companies. However, we believe it is the third and fourth waves, enabling us to digitalize physical assets and provide autonomous control, will turn out to have the greatest impact on established industries.

*7 Cisco Systems "Embracing the Internet of Everything To Capture Your Share of $14.4 Trillion", 2013
*8 Technology that provides computers with the ability to learn as a human does without being explicitly programmed

The challenges of digital

Digital transformation is not easy. It involves upheaval and will test even the most determined business leader. There are many challenges to overcome in a digital transformation, but we believe they come into four categories.

Leadership and Talent



43% of C-suite executives named finding talent as the most significant challenge in meeting digital business priorities.*9 Building digital capabilities requires unique skills. It requires understanding not just of emerging technologies but also of business and customer needs. It requires fresh thinking.

The issue of strategy and leadership is equally critical.

How do you build the right strategy? How do you create consensus in your organization of the right approach, and who is the right person to lead it?

Security

While digital is good for creating efficiency and new value, it creates new vulnerabilities. In 2015, 66% of CEOs named cyber security the biggest challenge to their company.*10 A characteristic of a more connected world is that physical assets are also facing cyber security risks, in addition to IT infrastructure and information. From connected cars to important social infrastructure like electricity grids or pipelines, these things all face the risk of hacking.

*9 McKinsey "Minding your digital business", 2012
*10 Fortune "The results of the 2015 Fortune 500 CEO survey are in...", 2015

Complexity

The fact is that new technologies emerge faster than people can respond. Today organizations have to see change as a normal part of business.

However, change creates complexity. For instance, where once most retailers had only a single channel to their customer – their stores - now they must consider multiple channels – online, mobile and so on. It is one thing to implement these new channels to customers, it is quite another to knit business systems and processes together. The business needs to approach its customers in a coherent manner through all its channels.

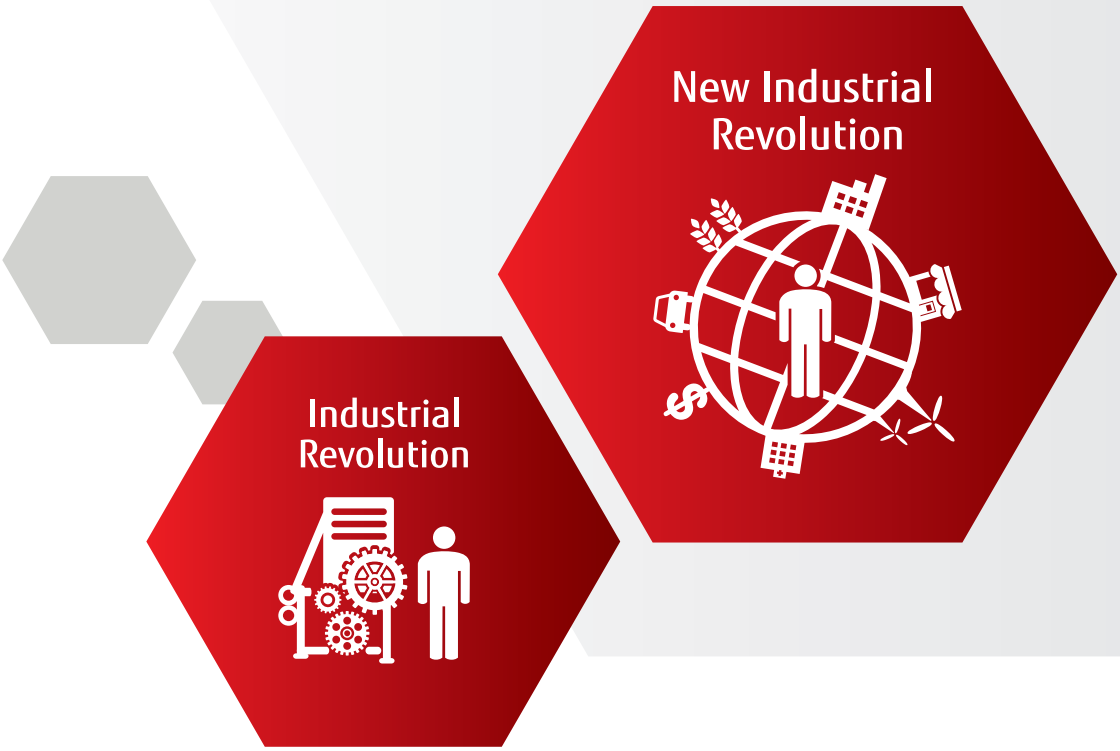
A failure to deal with the issue of complexity will prevent an organization benefitting from digital.

Adoption

A major hurdle to overcome is caused by people's attitude to change brought by new technology. Convenience alone does not lead to adoption. Old habits die hard and people can take a long time to modify their behavior.

Worse still, if people do not trust technology they will never see the benefit of using it. Unless privacy of personal data is adequately protected, people will be deterred from using a digital service.

A New Industrial Revolution



The industrial revolution started in the mid-18th century and gave rise to huge gains in productivity. We tend to think that technology change, for example, the steam engine, drove this economic expansion. However, these new technologies could not deliver unless businesses and society made fundamental changes to the economic framework. Establishing rights of ownership, the accumulation of capital, division of labor and the creation of a new market economy turned a technology revolution into an economic one.

It is still the way business works today. Under this framework, value is exploited through the management of assets – natural resources, plant and machinery, labor and financial capital.

We have seen advances of course. Businesses have optimized their value chains to produce standardized products at lower cost and at larger scale. Computing technology has accelerated the change by automating processes and improved operational productivity. But management of assets and resources remains the focus of most modern businesses.

But like the steam engine before it, today digital technology is poised to bring a seismic change to the economic model. Cloud, mobile, IoT, analytics, AI and robotics provide a new technology toolkit for businesses to use.

In the digitalized economy, the key value drivers are creativity, intelligence and connectedness. People empowered with digital technology can be more creative to deliver innovation – whether that is in new products and services or in new business models. The analysis of data and computing algorithms produce new intelligence. The cloud, mobile internet and the IoT connect not only people but also many things around us.

It is a new industrial revolution. It means that individual customers can enjoy using customized products and services tailored to their needs, instead of standardized ones. Businesses can exploit ecosystems of suppliers, partners and customers to co-create value. This can greatly increase the size of the market and the set of customer needs they are able to address. Business operations become more autonomous and fluid, instead of hierarchical and rigid. People work more openly and collaboratively within their organizations and with external people.

Human Centric Innovation

Digital transformation therefore is not about technology innovation alone, but about changing the way businesses create value for customers. It is about how people work. It encompasses the transformation of organizations, operational process, and customer relationships.

Digital must be about people. It is about using technology to get the best out of our human potential – our creativity and our ability to make judgements. And it is about using technology in ways that positively impact people's experiences and lifestyles.

For most businesses this requires a change of mindset. The key to successful digital transformation comes from knowing that value is created from connectivity and putting people at the center of digital technologies.

Human Centric Innovation is an approach to creating business and social value by empowering people with digital technology. It is about bringing together three key value drivers – creativity, intelligence and connectedness. Each value is derived from dimensions of people, information and infrastructure.

Human Empowerment
Empowering people with digital technology

Creative Intelligence
Using intelligence derived from analyzing data and employing algorithms

Connected Infrastructure
Connecting things and the infrastructure of business and society

To address the challenges of digitalization, organizations must consider the impact of culture, resilience and trust.

To realize digital transformation, organizations must nurture a new culture to support a new way of working, while keeping the existing business running.

They must also build resilience to cope with increasing security risks and complexity.

And they must be able to build and secure trust. Trust is forged through working for the common good, and having a shared vision.

Fujitsu believes Human Centric Innovation is the key approach to achieving real business and social value from digital transformation. Digital technology of course is crucial to this. But unless we build it around people, we put the potential at risk.

Human Empowerment

- Better Experience
- Quality of Life
- Creative work
- Decision support
- Acquiring knowledge and skill

Connected Infrastructure

- Sensors
- Smart Home
- Smart Cars
- Smart Factory
- Smart Agriculture
- Smart Healthcare
- Smart City
- Robots

Creative Intelligence

- Information from people and things
- Business and social information
- Information Analysis
- Algorithms and AI
- Security and Privacy

Chapter 2

Making the change

How can an organization achieve digital transformation?

It is meaningful to think of digital transformation at a project level, a business level and an industry level. A digital business platform helps an organization to empower people, to use intelligence from data, and to build connections with external ecosystems.

Outcomes of Digital Transformation

For business leaders, digital transformation means a fundamental change to the way their organizations work and the very nature of their products and services. Digital technology helps businesses improve efficiency and engage with customers more intimately. It enables them to reinvent business models and bring innovation and value for customers, with significant effects on revenue, profits and potential for growth.

Business model transformation

- **From goods-selling to service-provision**
  For instance, a machinery manufacturer can digitally transform their product by embedding sensors and developing software algorithms to analyze the data they produce, to find anomalies and predict failures. As such, they can offer the product 'as a service'. Customers using the machinery pay in accordance with a service level.

- **Fast value realization to meet individual customer's need (Mass customization)**
  Connected digital technologies enable businesses to produce goods and services tailored to an individual customer's preferences immediately and flexibly.

Operational Excellence

- **Empowerment of employees**
  Intelligence can be developed from managing and analyzing enterprise-wide data and customer data. It helps employees make better judgments. Digital technology such as augmented reality enables technicians to do maintenance work more efficiently.

- **Autonomous operation**
  Production operations and logistics can be optimized by using sensor data and algorithms. Robots handle operational tasks autonomously.

Customer Intimacy

- **Better understanding of individual customers**
  By analyzing customer behaviors in multiple physical and digital channels, businesses can produce insights and develop stronger and closer relationships with their individual customers. This also helps to optimize their marketing approach.

- **Maximizing Customer Experience**
  The experience of individual customers can be maximized by overlaying digital on physical touch points (e.g. retail shops).

Product Leadership

- **Incorporating intelligence into products and service**
  Sensors or computing chips can be embedded in a product. Insights may be gained from analyzing data via a network, helping create a new value.

- **Co-creation of innovative value with customers and partners**
  Enterprises have the opportunity to co-create innovative value by connecting their products and services with complementary products and services from customers and partners via APIs.*11

*11 Application Programming Interface : An API is a pre-defined set of functions which specify how software components should interact with each other

Transformation at 3 levels

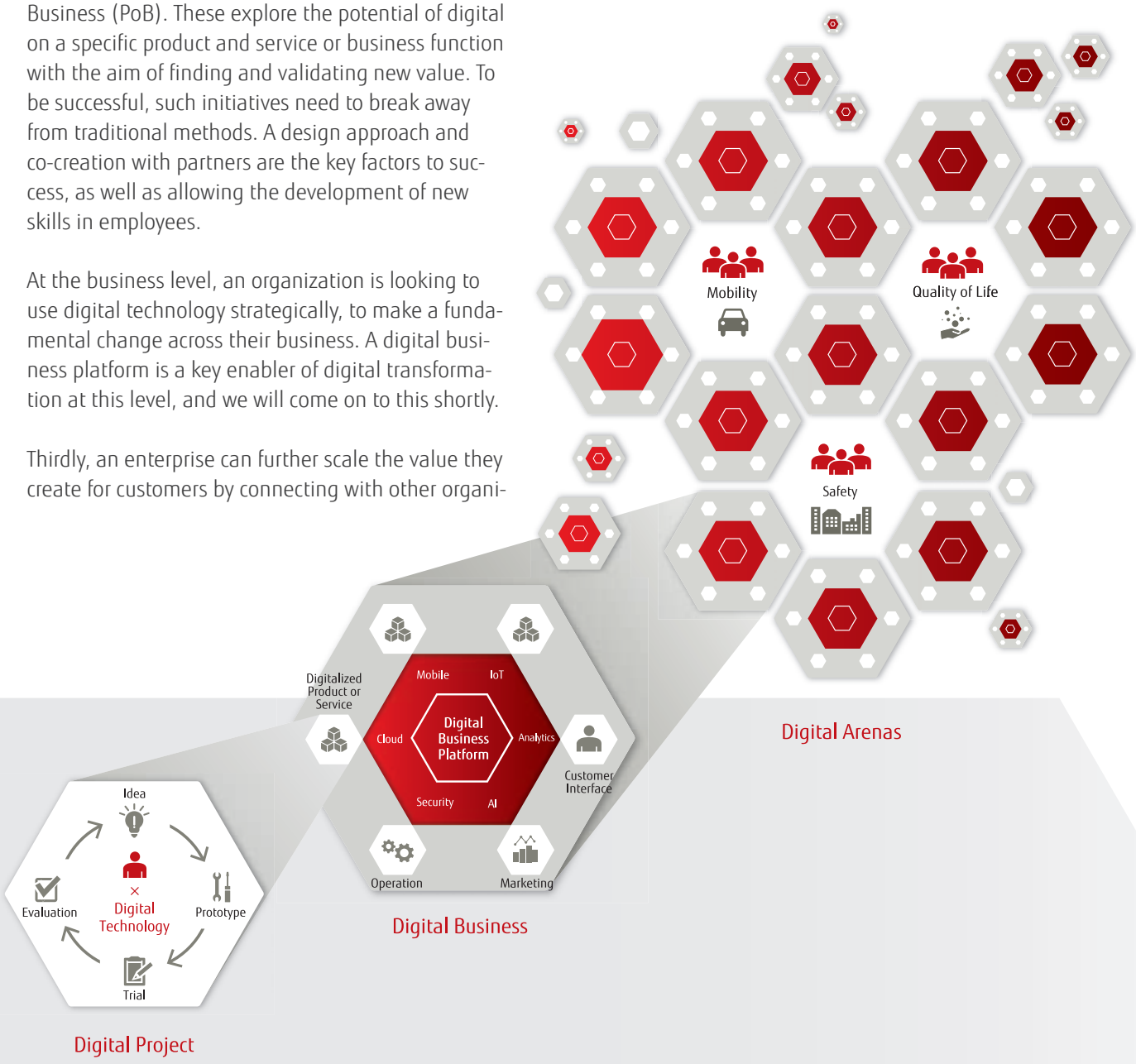
The immediate challenge for any organization embarking on a digital journey is to understand what it means for their business, and what approaches are needed. It is not easy to define a scope for Digital transformation. What's more, different industries are at different levels of maturity with digital. We find it helpful to think of digital transformation at three levels: A project level, a business level and an industry level. At each level, value is created on a larger scale.

At the project level, digital initiatives often take the form of a trial: a Proof of Concept (PoC) and Proof of Business (PoB). These explore the potential of digital on a specific product and service or business function with the aim of finding and validating new value. To be successful, such initiatives need to break away from traditional methods. A design approach and co-creation with partners are the key factors to success, as well as allowing the development of new skills in employees.

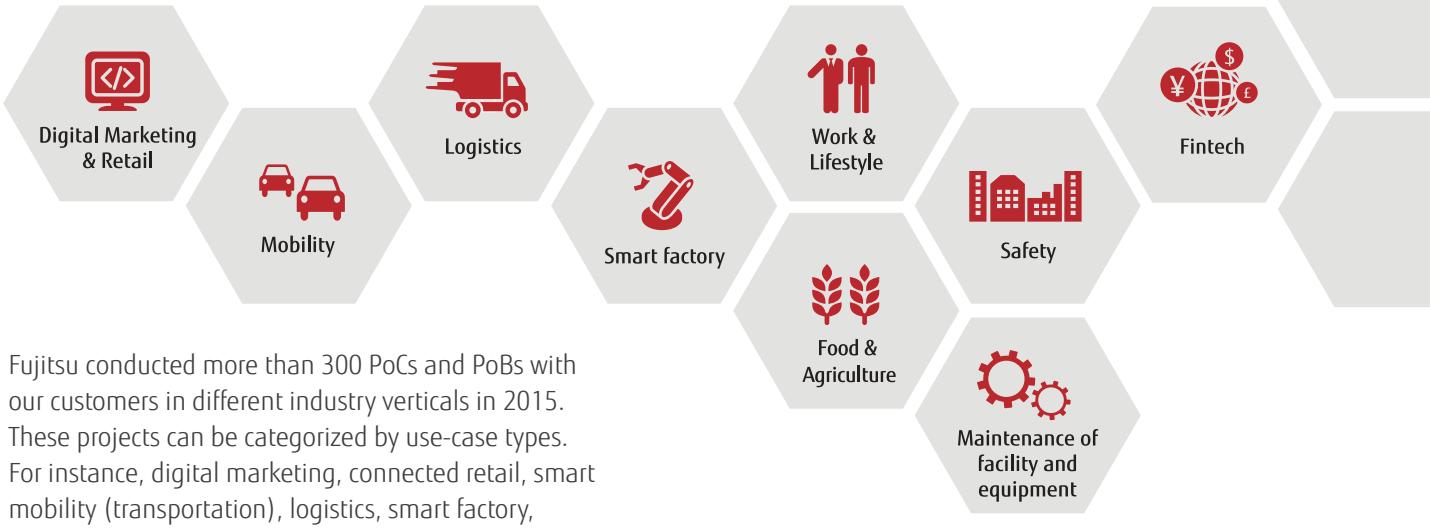
At the business level, an organization is looking to use digital technology strategically, to make a fundamental change across their business. A digital business platform is a key enabler of digital transformation at this level, and we will come on to this shortly.

Thirdly, an enterprise can further scale the value they create for customers by connecting with other organizations and beyond their own industry. In the digitalized economy, the borders of existing vertical industries are increasingly blurred and reshaped. But these new structures are shaped around customer needs and values, rather than physical assets. We call them 'digital arenas'. At this level, interfaces are key, and particularly APIs which enable different digitalized products and services in different verticals to connect and interoperate.

Let's investigate these three levels in more detail.



Starting a digital project



Fujitsu conducted more than 300 PoCs and PoBs with our customers in different industry verticals in 2015. These projects can be categorized by use-case types. For instance, digital marketing, connected retail, smart mobility (transportation), logistics, smart factory, workstyle transformation, personal safety, smart agriculture, facility monitoring, Fintech,*12 and so on. Many of them used IoT and data analytics, supported by other digital technologies.

These projects have demanded closer collaboration with our customers, and benefited from the combination of their business knowledge and our digital technology expertise.

What makes these projects different is they attempt to apply technology directly to the business instead of using it to enhance back office productivity. The purpose is to discover new value from innovation.

To make digital transformation a reality, an organization has to encourage different types of employee skills and approaches. It may even require cultural change. People's creativity is key for digital innovation. It also requires a multi-disciplinary approach - business leadership, technology leadership and engineering capabilities. Data scientists need to be involved to deliver insights from information and designers are crucial for ensuring good customer experience. In fact, a design approach is essential to the process, from creating a vision, developing a prototype, to testing and updating it, and all in a fast iteration cycle. This is lean innovation. It moves fast and with greater agility.

One of our customers, Mitsui Chemicals, wanted to take just such a new approach. They held intensive workshops to transform their workstyle, with Fujitsu's design team facilitating. Mitsui brought together people from many different business competencies who together developed a future workstyle vision. This resulted in a radical change to office spaces and workstyles using digital technology to enable more fluid collaboration.*13

A critical concern for business leaders is to deliver digital projects while keeping their existing business running flawlessly. In normal business operations, failures are prohibitive. Measurements and incentives are structured for minimizing them. In contrast, in a digital project, it is important to learn from failures. It is only through failure that successful business patterns can be found. But quick decisions are required whether to continue or stop a project. Business leaders must manage and align these conflicting management principles.

Open Innovation is playing an important role in digital transformation. In June 2015, Fujitsu launched Open Innovation Gateway to activate innovative practices faster through partnering with the most talented people and progressive institutions in the Silicon Valley ecosystem and beyond.

*12 An abbreviation of financial technology, Fintech companies are working to create financial innovation leveraging digital technology.
*13 For detail please see Book 2 page 28, Customer Stories, "Work style innovation encourages creativity, harnessing the aspirations of all employees" Mitsui Chemicals, Inc.

Digital Business

To use digital technology in a strategic way, business leaders have to think about incorporating digital to the heart of the business value creation process. Let's have a look at some digital business scenarios.

Digital Marketing

Digital technology empowers marketing teams by building a rich understanding of individual customers. It uses data analytics and algorithms to tailor the engagement with each customer, thereby automating the marketing process. For example, Nikkei Business Publications, the largest printed and on-line publication company for business people in Japan, embarked on a digital program with Fujitsu. By integrating separate customer databases they were able to build a better understanding of individual customers and enable better ways of targeting them. This resulted in doubling of the effectiveness of their marketing campaigns.*14

Connected Retail

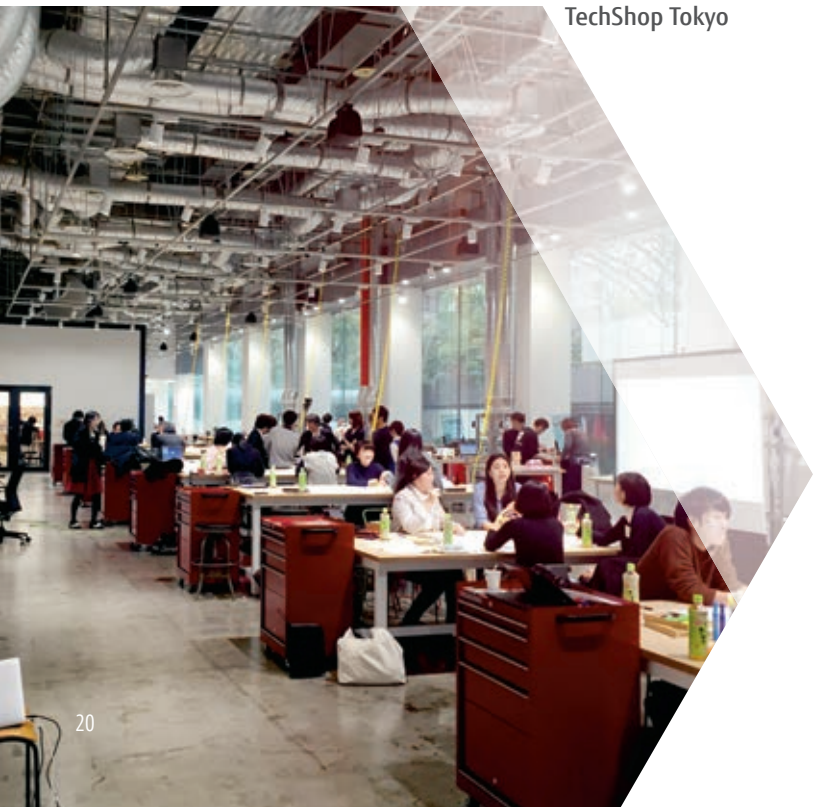
The first and second digital waves have dramatically changed the landscape of the retail industry. Retailers are under serious competition from a steadily growing online and e-commerce sector. Customer experience is everything. Retailers are working to maximize their experience through multiple channels – in social networking, websites and stores. In stores, for example, sensors and mobile technology allow a retailer to monitor and analyze the flows of customers. As a result they can arrange the floor layout in a way that best suits their customers and allows the store to provide the best services. The retailer can link the customer's in-store experience with their digital experience, for instance sending messages and offers relevant to their interests.

Fintech

The finance and banking industry is undergoing a huge transformation as a result of digital. New Fintech ventures are providing innovative financial services, using data analytics, algorithms or blockchain technology. New services include mobile payments, personal financial management, peer to peer lending,*15 autonomous credit assessment and virtual currencies. These Fintech ventures use APIs to connect with the services of banks and other institutions. Fintech ventures and traditional financial institutions are starting to shape a new financial ecosystem. In July 2015, Fujitsu set up a Fintech consortium, called Financial Innovation for Japan, which developed into the community of more than 200 financial institutions and Fintech companies.

Smart manufacturing

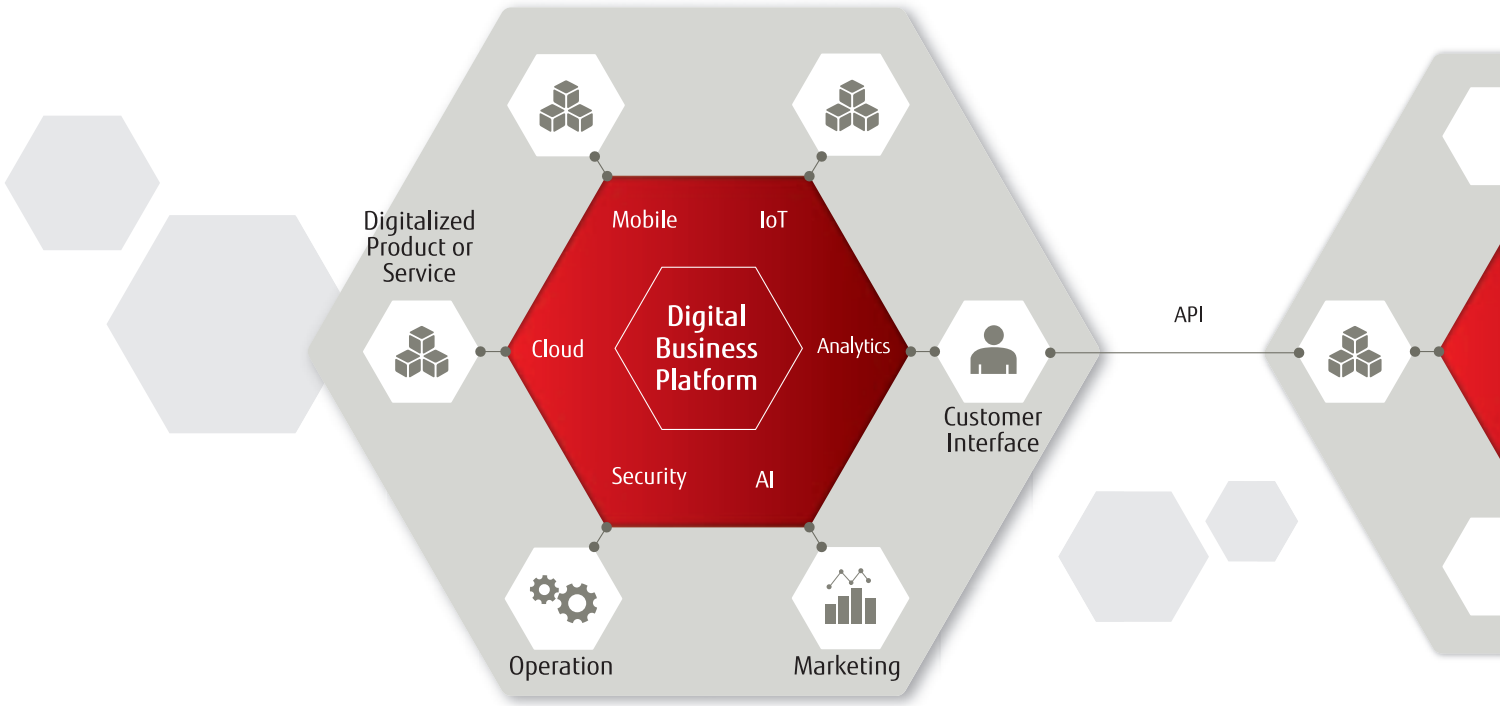
In manufacturing, new technologies such as IoT, simulation, robotics and 3D printing are converging physical and digital operations, transforming the way we make things. The IoT connects separated processes across a single factory as well as across multiple factories in different locations. Workers are assisted by intelligence derived from data analytics to better collaborate with robots on the factory floor. And today small startups and even individuals can have access to the latest technology for making. In February 2016, Fujitsu opened TechShop Tokyo, in collaboration with TechShop, Inc. of the USA. This is a large-scale membership-based maker space. Individual members, startups and businesses create a community, and enjoy working on making, sharing the same space and a wide variety of tools including 3D printers.



TechShop Tokyo

*14 For detail please see Book 2 page 24, Customer Stories, "Advanced marketing in the new digital era: Rapid integration of dispersed data on customer attributes" Nikkei Business Publications, Inc.

*15 Lending money to individuals through online services that match lenders directly with borrowers.



Digital Business Platform

How can an organization realize these outcomes? A digital business platform is the key.

In the first and second digital waves, online B2C*16 platform service providers accomplished exponential growth. They provided services at low cost or even free, leveraging the scale of a shared digital business platform. Their platform services enabled a wide variety of third parties and even individuals to create innovative hardware products, software applications and services. For instance, smartphone apps are provided by countless developers around the world. In this way, an ecosystem is formed around a platform.

The third and fourth digital waves will have even greater impact on almost every industry. The IoT enables us to connect physical things, sense conditions, analyze the collected data, make a judgment and deliver automated responses. Advanced algorithms allow this process to be conducted much more autonomously and in real-time. Business leaders should think about how they can build and exploit a new type of digital business platform to enable their business to expand and thrive.

Businesses want IT to more directly drive business value affecting their top lines. A digital business platform is a holistic business framework that helps an organization in three ways. It enables them to empower their employees, to use intelligence derived from data and algorithms, and to build fast, reliable connections both internally as well as with the external ecosystem of customers, suppliers and partners. The platform is data-oriented; it connects all the data within an organization as well as its customers. In addition, it must help an organization to build resilience against increasing threats to cyber and physical security.

In 2015, Fujitsu began providing a digital business platform, we call MetaArc. We named it from two Greek words, meaning 'Beyond' and 'Connections'.This comprehensive framework has been designed for our customers to enable their digital transformations. MetaArc is based on scalable cloud computing infrastructure. It is designed to offer the capabilities of mobile, IoT, data analytics, and AI as a service. By integrating these services, businesses can quickly and easily mash together new digital business solutions and services. Its cloud also enables a marketplace of services to help businesses form digital ecosystems with their partners via APIs. MetaArc offers resilience to businesses with its security functionality. Fujitsu is migrating all our existing business applications on to MetaArc and developing new solutions to operate as an integrated digital business.

*16 B2C : Business to Consumer

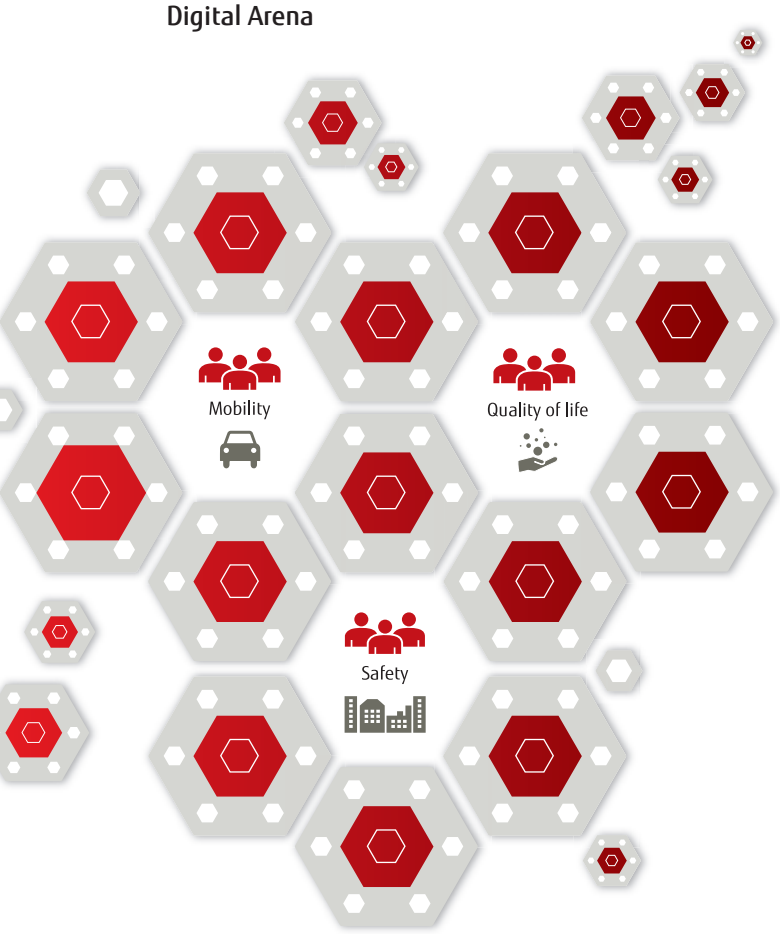
Digital Arenas

In the digitalized economy, the borders of existing industries are increasingly blurred and become fluid. Different digitalized products and services will be connected via APIs, exchanging information, and delivering greater value for people as a result. In this economy, value that consumers demand will be co-created by suppliers, partners and even the consumers themselves, via shared platforms. A huge amount of information crosses the existing boundaries, brought together, creating new knowledge. Embedded algorithms process information, enabling autonomous operations and empowering people. This is not a future scenario, but it is already happening.

Mobility

Today, it is said that 'distance is dead'. Yet at the same time location information is vital. Fujitsu has been providing a location information cloud service, called SPATIOWL, since 2011. This cloud service can collect location information about vehicles, and people too, through sensors and ordinary smart devices, generating a real-time dynamic view of urban mobility. SPATIOWL can map additional layers of information, such as weather, shopping, parking spaces, fuel stations, or public services. It delivers insights through the analysis of multi-layered information. It is used as a shared platform for urban mobility, attracting service providers from across different industries.

Digital Arena



Safety and security

Aioi Nissay Dowa Insurance is starting to use SPATIOWL to provide a driving assistance telematics service for their customers in April 2016. Location information can also be used for protecting personal security. Another of our customers, a personal safety service company, is providing a mobile personal security service using SPATIOWL. It enables them to look after vulnerable people like the elderly, children or people with disabilities. It uses sensing and analytics to recognize anomalies in their movements and behaviors, such as having a fall, and generates alerts in response.

Quality of life

We want to live long but also enjoy a good quality of life. What people want is not just treatment of diseases when they suffer from them, but ongoing holistic support for living well. In an aging society this is becoming increasingly a priority. By connecting services across many different sectors and industries – healthcare, elderly care, pharmaceutical, and IT – we can deliver this. Now, patient medical records can be shared among doctors and professionals in different hospitals, clinics and elderly care facilities to provide more patient-centric services. Such information can be used for finding innovative treatments and drugs. In addition, daily behavioral information collected from wearables can be brought together, helping us live fuller lives. Fujitsu is working hard to connect and secure these different services, helping promote the wellbeing of people.

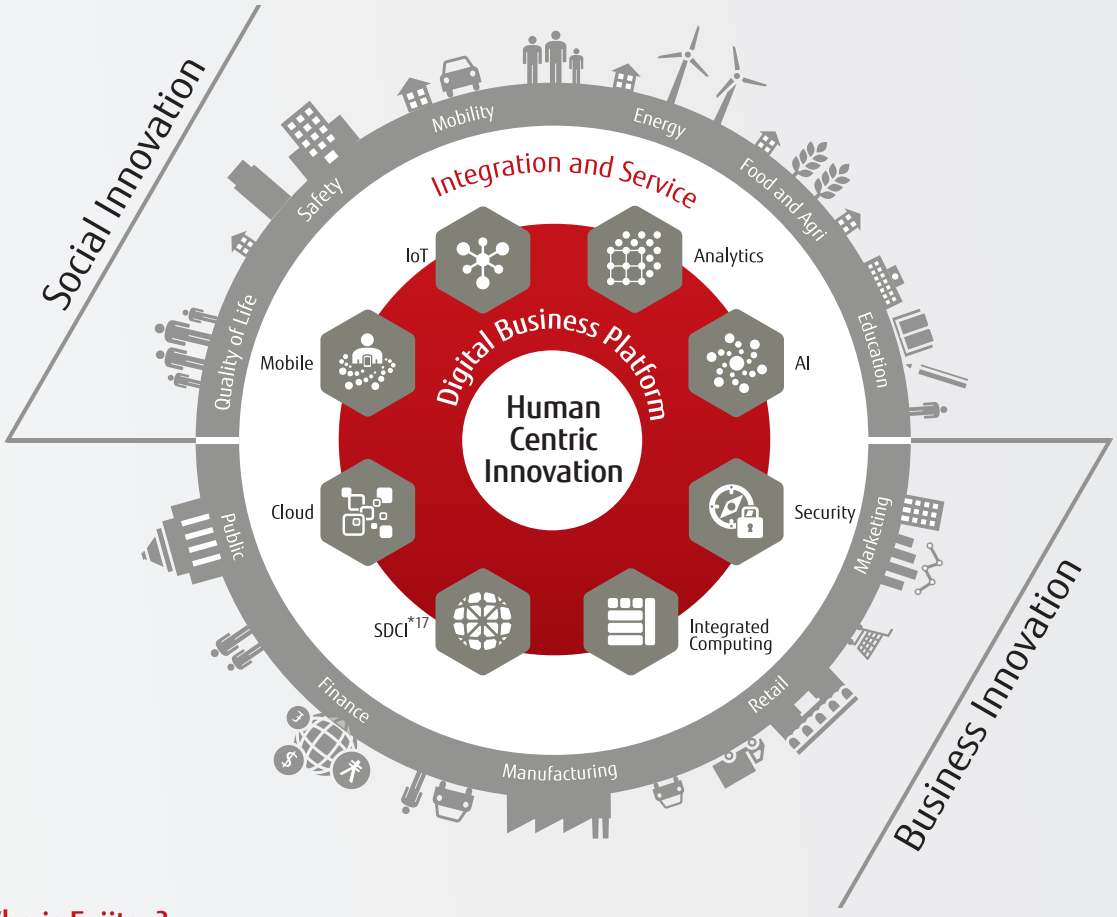
We believe the digitalized economy will be built based on such digital arenas. We will expand further on this in the next chapter.

Fujitsu's value

Fujitsu wants to be our customer's business partner, helping you drive your digital transformation.

- We provide a toolkit of technologies to meet your digital needs – cloud, mobile, IoT, data analytics, AI, and supporting security.
- We help our customers build and use their own digital business platform. To do this Fujitsu provides MetaArc that enables them to use these digital technologies and exploit them in their business.
- We also offer highly reliable computing and networking infrastructure that provides performance and resilience.
- We provide services which integrate these digital tools into the heart of the business and help our customers shape new ecosystems across industries, to ensure that business outcomes are delivered.

You can find more details of our technology portfolio and customer stories in Book 2 of Fujitsu Technology and Service Vision.



Who is Fujitsu?

- The 5th largest IT service provider in the world & the largest IT service provider in Japan
- We have 160,000 employees
- We have 121 datacenters and 74 service desks worldwide
- We were named in Fortune Magazine's 2016 list of "World's Most Admired Companies" for a fourth consecutive year
- We were chosen for the Dow Jones Sustainability World Index for the 16th Time in 2015

*17 Software-Defined Connected Infrastructure

Chapter 3

Digital Future

Human Centric Intelligent Society

Intelligent software is excerting ever greater control over the physical world, changing everyday life and the landscape of the economy.
We believe the most critical mission of technology is to empower people, helping create a safer, more prosperous and sustainable future.

Dawn of a new era

What will be the major differences between today and the future?

Let's return to those four waves we introduced in Chapter 1. We might consider the first three waves as a process of digitalizing the physical world. The first wave – the internet – created a connected information infrastructure, the second wave – mobile internet – is digitalizing how people interact, and the third wave – IoT – is digitalizing physical objects.

As a result, we are living in an increasingly hyperconnected world.

So what is happening now?

These first three waves of digitalization will continue to expand and drive change. But now we enter a new phase of exploiting these vast digital resources. This will give us the opportunity to have greater control of the world around us, leveraging new insights and autonomous processes.

There are two major implications of this:
Firstly, a new 'genus' of intelligent technologies is emerging. Our fourth digital wave. AI and robotics technologies are advancing rapidly, being used in many different situations, from self-driving cars to disaster prediction.

Secondly, a new type of digitalized economy will develop. We believe this new economy will be founded on the creativity of people, intelligence derived from data and the hyperconnectivity of digitalized services.

As a result, there is an enormous potential to make the world work better. Because we now have the tools to do it.

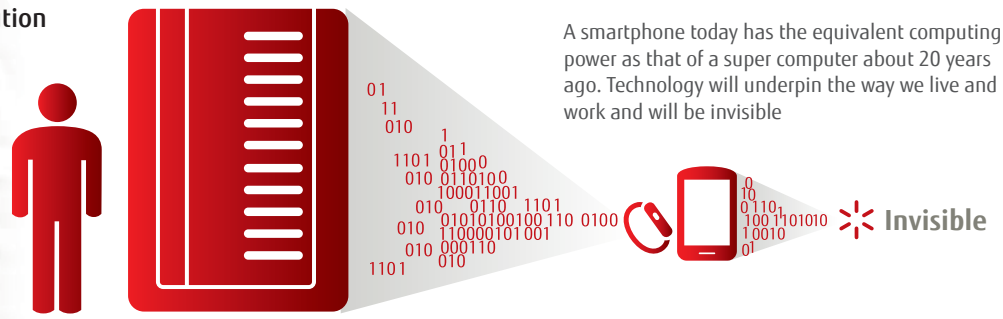
This is the final chapter in our story.

Exponential technology evolution

For those people who would prefer artificial intelligence to remain in the pages of science fiction, time is running out. Computing speed continues to accelerate, and incredible volumes of data can be handled instantly. At the same time, our understanding of how a human brain works is increasing, and we can apply this new knowledge to computing architecture. It is difficult to underestimate the impact the continued evolution of these technologies will have on the world.

In a project for the National Institute of Informatics of Japan, researchers of academic institutions and businesses are collaborating to develop a system (the "Todai Robot"), which, by 2021, will have the cognitive capability needed for admission to the University of Tokyo. The objective of this project is to assess how far AI can do the cognitive tasks we humans can do. Fujitsu Laboratory's researchers have been working in the math exam team. A query and answering system*18 may relatively easily answer simple questions asking facts, using machine learning and natural language recognition. But it is much more difficult to solve a math question – we have to use reasoning. Our reasoning technology helped the system to achieve a deviation value*19 exceeding 64.*20 This is already at a level to pass math exams of many universities.

Technology Evolution



*18 Systems that automatically answer questions posed by humans in a natural language
*19 Scores that are expressed as differences (deviations) from the mean
*20 A practice mathematics test for National Center for University Entrance Examinations

Human Centric AI

Human vs AI

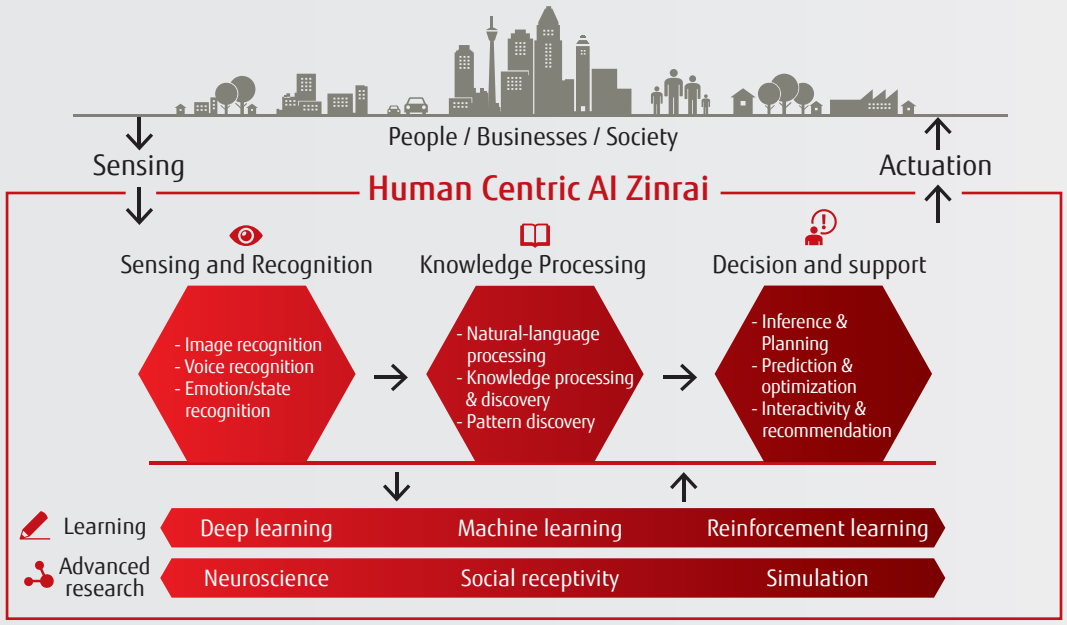
AI is a core technology which enables many complex processes to be conducted independently of human judgment. Now, deep learning is often featured in the media. But it is not the whole story of AI, just an important piece of the puzzle. Our human cognition is continuously generated from complex interactions between our sensory organs, nervous system, brain and external environments. To achieve an AI, we have to replicate and bring together a range of cognitive capabilities: perceiving, reasoning, making choices, learning, communicating, and moving and manipulating.

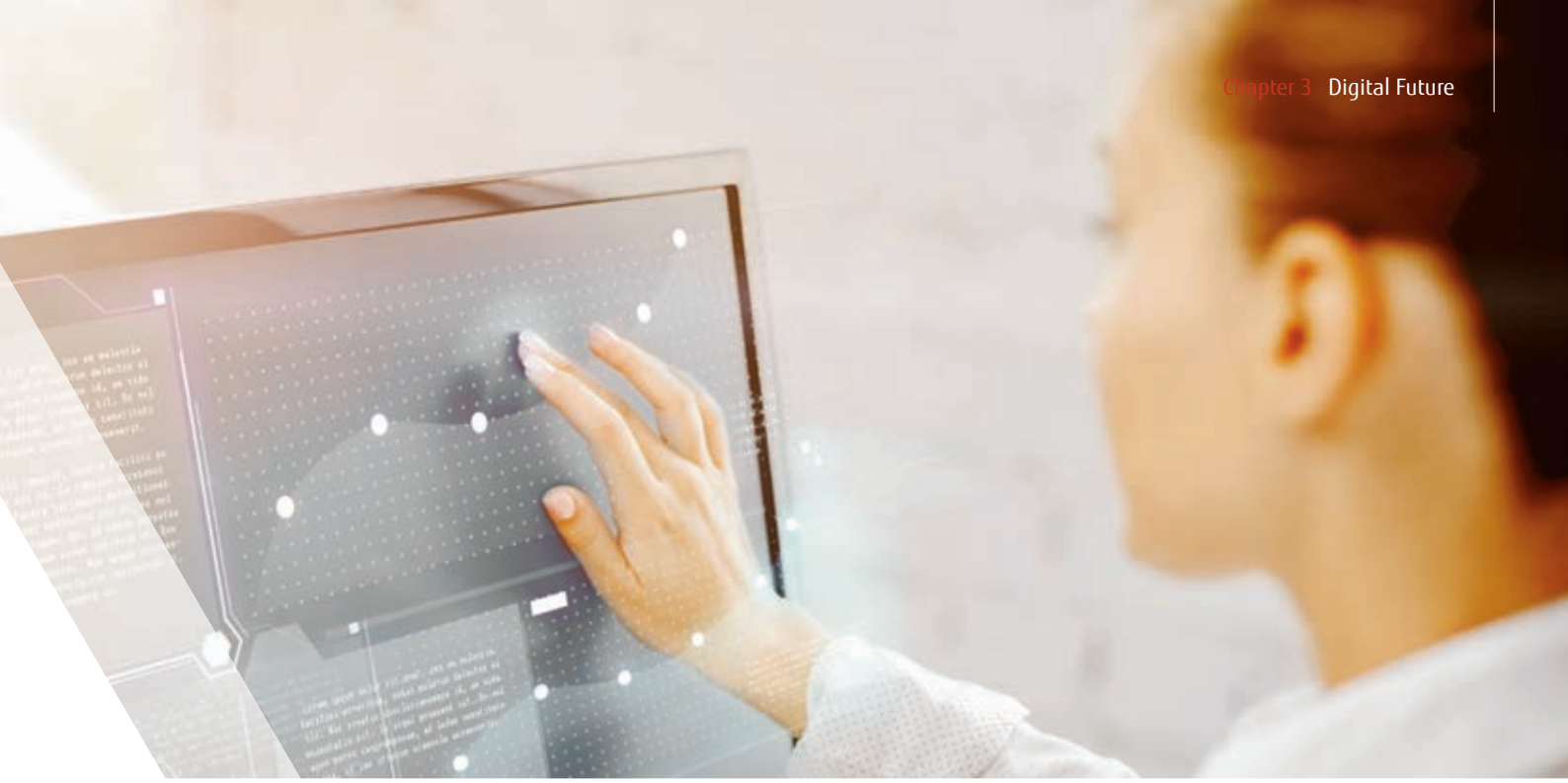
Fujitsu is developing key technologies under a comprehensive framework (see diagram). We call it Human Centric AI, Zinrai. Fujitsu is incorporating component technology such as machine learning, deep learning and visual recognition, into our digital solutions and services.

In February 2016, Fujitsu started a joint project with Coosy Inc., who operate Hapicana, the largest-scale e-commerce site of cosmetic goods and related information in Japan. Fujitsu applied deep learning to 50,000 face images, delivering eight face types based on features such as shapes of contour, eyes, nose and lips as well as skin color. Using these models, we are working to develop a new service for advising on makeup and recommending cosmetic goods which best suit.

Thinking about what AI is leads us to look back on who we as humans are. We see, hear, smell, taste, touch and sense our world. Our sensory capability is incredible. For instance, our fingers can sense micron-level differences – which machinery cannot achieve. We feel happiness, sadness and a vast range of other emotions. We think intuitively. We are creative. We have a dynamic model of our world, channeled through names and meanings. With these capabilities we can understand the world around us and respond in the ways we need to. And most importantly, we live, work and play with other people. We sometimes hate and even fight each other, but also we laugh together, and love. In that way, we form society. All these are interactive functions of our mind, body and environment.

Computers will be able to understand our language, search through huge reserves of data and return most





useful advice instantly. They can recognize images much faster and even more accurately than we can. They can sense the world differently – for instance seeing ultra-violet light waves. Computers can do specific tasks much faster and accurately. But it will take a long time before computers and robots can respond to any situation as we can do so intuitively. Most importantly, it is unlikely that computers will ever have emotions, or the capacity to be inspired or creative.

Human Centric AI

Many people see AI as incompatible with human life. They see it as a rival to human intelligence, and many have been warning of the dangers of the technology. Fujitsu sees it differently. We believe that AI technologies will be complementary to people's lives. When it comes to AI, taking a human centric approach is more important than ever. The key will be to naturally integrate the technology into human activity – so as people can be saved from repetitive routine work, while at the same time be given maximum support in making decisions about the things that matter.

Fujitsu believes the most critical mission of technology is to empower people and help everyone live a fuller life. We are working to realize a future in which people and AI autonomously collaborate and achieve previously unthinkable breakthroughs. We call it Human Centric AI.

Of course, we shouldn't underestimate the potential impact of evolving technology on human jobs. A study of the Oxford University in 2013 reported that 47% of jobs in the United States are subject to replacement by machines within the next 20 years.*21 We have seen in the past how technology, such as factory automation, replaced jobs. However, we should also recognize the positive aspects of new technology. For example, the Internet has created a whole host of new jobs, that were unimaginable 20 years ago, from web designers to social media managers. People will have the opportunity to do more creative work, instead of being like cogs in an industrial process. Education for digital literacy and creativity will be of great importance. Now, many countries, including Japan, are facing the serious problem of aging populations and the decrease in the working-age population. AI and robots will be able to provide meaningful help for elderly people, and potentially fill this shortage in the workforce.

AI and robotics will be embedded in many facets of the hyperconnected world, changing business and the economy.

*21 Carl Benedikt Frey and Michael A. Osborne, Oxford University " The Future of Employment: How susceptible are jobs to computerisation?" 2013
(It is also estimated that 49% of jobs in Japan are potentially replaceable by AI or robots within the next 10 to 20 years. Nomura Research Institute, http://www.nri.com/Home/jp/news/2015/151202_1.aspx)

The Digitalized Economy

A consequence of a hyperconnected world is a different sort of economy.

The biggest change is how software is used to support business and society. Intelligent software, including algorithms and AI, is exerting ever greater influence over the physical world. It means we have the capability of connecting and controlling physical assets - appliances at home, cars and public transportation, factory machinery, energy infrastructure, and so on. It also means we have the potential to benefit from autonomous business operations.

In the pre-digitalized economy, physical assets like plant and machinery are mostly fixed. Businesses produce value by investing in and using those assets. In the digitalized economy, everything becomes more fluid. With the power of intelligent software, equipment, machinery and infrastructure will sense changes in environments and respond to them more autonomously.

But we shouldn't forget about people. People also interact with greater fluidity, openly collaborating with colleagues as well as people outside their organizations. Knowledge is brought together across industries and geographies.

The digitalized economy is therefore driven by the trio of people's creativity, intelligence derived from information and software, and the hyperconnectivity of things and services.

A Hyperconnected API Economy

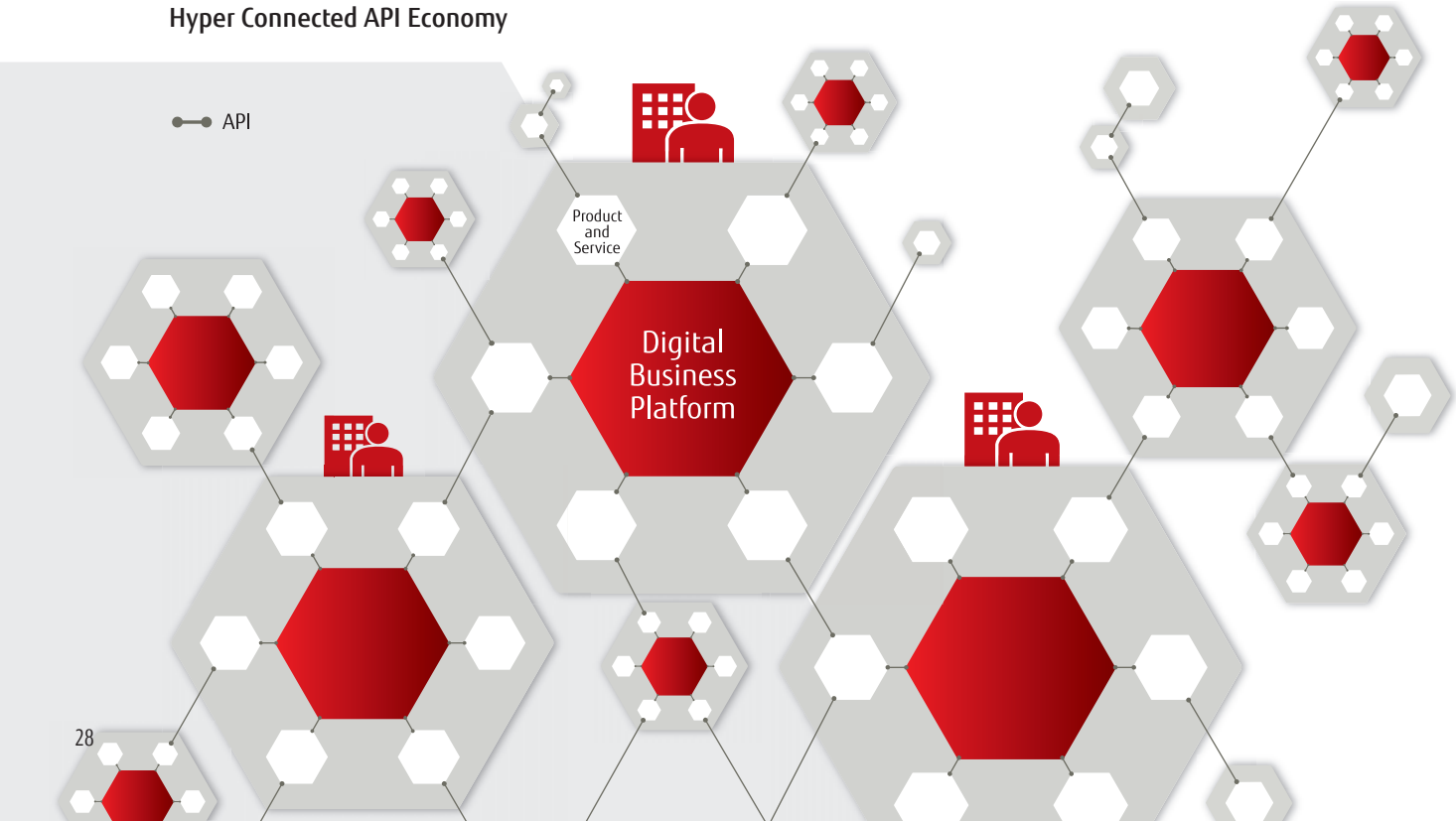
In the new economy, software is connected through APIs. The management of APIs becomes crucial. Instead of thinking of software as discrete and bounded, we must now think of it as modular and extendable. A module of such software is called a micro service. A variety of innovative services are designed, created and delivered by mashing up micro services available in the market. The development is very fast, and the creativity of people is the key.

Such connections may be intra-organization, in which case they would enable that organization to achieve greater efficiencies through automation. But services and processes can be further automated across intra-industry or inter-industry interfaces. Businesses from different industries can collaborate to co-create value.

How business works in the new economy

This hyperconnectivity paves the way for a new economic construct – the digital arena, as we discussed in Chapter 2. In an arena, a user and a supplier depart

Hyper Connected API Economy



from the simple relationship of buyer and seller. They co-create experience and outcomes through continuous engagement. Where industries are orientated around production activities, arenas are orientated around value and outcomes. Where industries are focused on products and services, arenas are focused on customer or citizen needs.

For businesses, it is important to set out a business architecture adapted to be part of a digital arena. This means consciously creating interfaces to the external world. The competitiveness of a business will be measured by the strength of its ecosystem, how many robust value-creating connections it has with partners through APIs.

This must be central to the strategy of the business. To be able to decide what is done privately and what is open and collaborative is a business decision at its most fundamental level. It requires a clear understanding of how the business is differentiated from competitors and creates value in its market. And especially, how the business plans to leverage its digital advantage in the future.

Trust

A further implication of the digitalized economy is that trust takes on a more important role. Who will allow a business to store and process their most private information, such as their vital health data, if the business is not trusted? Which company will allow a business partner to provide their customer a joint service connected through APIs, if the partner's system security is questionable?

Without trust, it is difficult for businesses and public services to make vast amounts of information flow seamlessly and in a way that brings benefit. We should always ask whether use of technology is good for our life, people's privacy is well protected, and people will be better off. In this respect, it increasingly matters for businesses to align their business goals with the common good of society.

Human Centric Intelligent Society

We are facing serious social challenges. People in many areas still live in severe poverty, suffering from a shortage of food and water, and underdevelopment of social infrastructure, education and healthcare. People are increasingly living in cities, causing challenges of urban transportation and environmental protection. The average age of the population is becoming older in many countries, increasing medical costs and the burdens of supporting elderly people. Furthermore, climate change is a significant risk for all people. In addition to growth, we have to pay extra attention to sustainability of local communities, global society and the natural environment. Resilience to drastic changes, disasters and threats is one of the most needed capabilities. ICT has an important role to help solve these difficult challenges.

In 2015, the United Nations set out 17 Sustainable Development Goals. These can also serve as business goals. Fujitsu is working with our customers and partners to shape a sustainable society, contributing to some of these goals. The following are just a few examples:

Mitigation of natural disasters

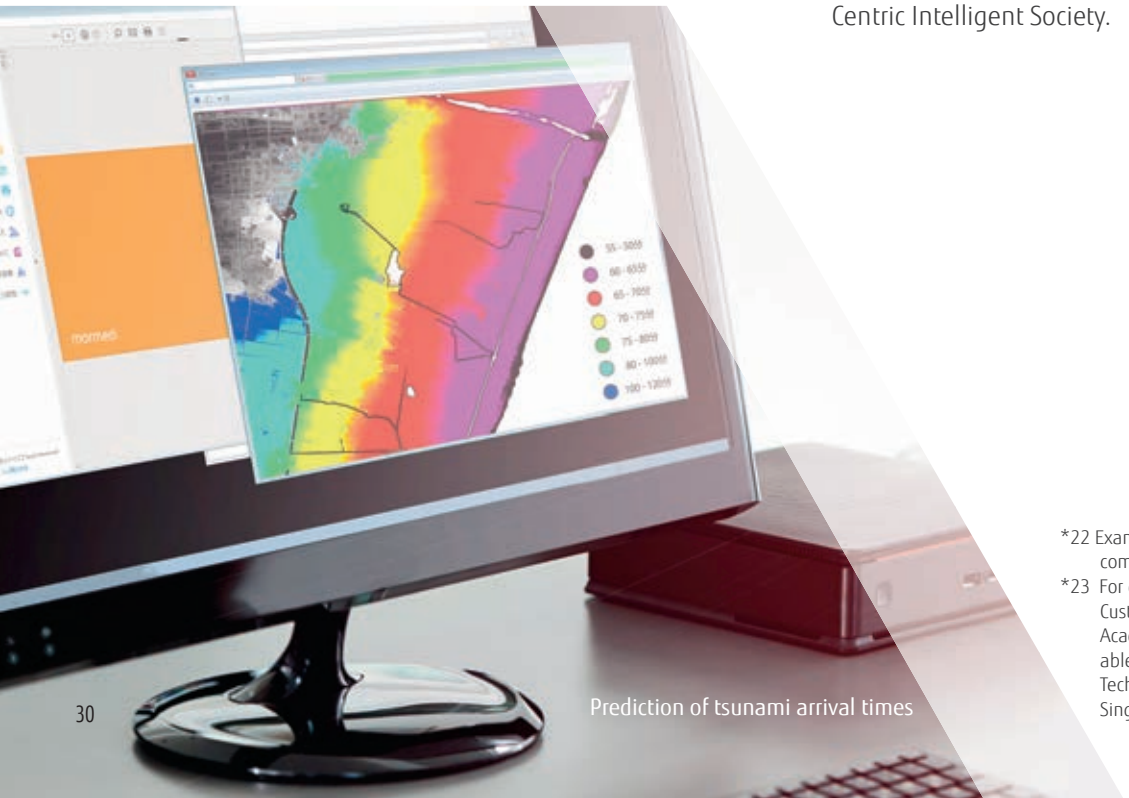
In March 2011, a huge Tsunami hit the coastal area of Japan, which destroyed wide areas and killed many people. In response to this, Tohoku University and Fujitsu Laboratories have developed a tsunami model that can quickly predict the extent of potential flooding using a supercomputer simulation. For example, flooding in the Great East Japan Earthquake started in Sendai one hour after the earthquake struck. With this technology basic predictions of where flooding would occur in the City of Sendai can be provided in about 10 minutes.

Urbanization

Singapore is working to realize its vision of a Smart Nation. In 2015, the Agency of Science Technology and Research (A*STAR) together with Singapore Management University and Fujitsu, set up a Centre of Excellence(COE) to jointly research and develop solutions to realize a sustainable city. The COE identified two key areas to explore initially: Maritime and Port Optimization and Dynamic Mobility Management.*22 Fujitsu contributes high performance computing, SPATIOWL, our location information services platform, along with expertise in big data and mobility, working together with the partners using Singapore as a living laboratory.*23

Our Vision

Now, we come back to the opening future scenarios. Technology is neither good nor bad. How people use it matters. It is each of us who make a choice. Fujitsu believes conscious collaboration by stakeholders will overcome the digital paradox, leading to a safer, more prosperous and sustainable world. We call it a Human Centric Intelligent Society.



Prediction of tsunami arrival times

*22 Examins and improves the dynamics of commuter traffic in urban spaces

*23 For detail please see Book 2 page 38, Customer Stories, "Industry, Government and Academia establish partnership for sustainable urbanization" Agency for Science, Technology and Research (A*STAR), Singapore Management University

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FUJITSU

Fujitsu Technology and Service Vision 2016

Book 2

shaping tomorrow with you

CONTENTS

Digital Leaders' Agenda

The way we live, work, and interact with people is changing rapidly. These changes are driven by digital technology. Digital is a set of connected technologies such as cloud, mobile, the Internet of Things (IoT), analytics, Artificial Intelligence (AI) and supporting security technologies. Digital technology enables connections, not only between people but also between many things in real time. It enables enterprises to connect their services across existing industry boundaries. It also enables enterprises to reach consumers, co-creating new value.

Business leaders have very high expectations of digitalization. According to research conducted by Fujitsu in Europe, 75% are accelerating the digitalization of their businesses, especially in attraction of talent, faster market response, customer acquisition, and productivity improvements.*1 In Japan, the results are similar. Research has found that over 70% of respondents are preparing for digitalization.*2 Organizations are incorporating digital technologies into the heart of their businesses in order to optimize processes, pursue operational excellence, improve customer experience, and also increase both customer and employee satisfaction.

Manage existing technology and digital technology

However, 70% of survey respondents still consider initiatives for digital transformation to be a gamble. To achieve digitalization, processes and information must be seamlessly aligned between the front-end and the back office. Approximately one-third of those surveyed responded that existing infrastructure had become a roadblock for process integration. Another issue is the lack of relevant skills required for digitalization. In addition, IT departments are overstretched as they must keep existing systems running while also modernizing them and implementing security measures against increasing threats.

Today's enterprise IT systems need to be much more flexible and reliable than ever before. Digital leaders such as CIOs and Chief Digital Officers are challenged with driving digital transformation while managing existing IT assets.

The Fujitsu Technology and Service Vision 2016 Book 2 introduces Fujitsu's ideas on how digital leaders can achieve digital transformation. It also includes success stories from our customers on the co-creation of innovation and outlines Fujitsu's portfolio of enabling technologies and services. We hope that this booklet helps you develop a successful digital strategy.

Main benefits of digitalization within organizations

1. Attraction and retention of talent

43.1%

2. Business responsiveness to the market

37.8%

3. Customer retention and loyalty

37.3%

4. Increasing workforce productivity

36.7%

*1 Walking the digital tightrope - A Fujitsu report, January 2016 survey of more than 600 European CEOs and senior IT decision-makers,
*2 Gartner press release : "Gartner announced the digital business readiness of Japanese companies. Over 70% of respondents are preparing for digitalization, but only 20% set digitalization as a companywide initiative." October 2, 2015 http://www.gartner.co.jp/press/html/pr20151002-01.html

Technology Concept

Digital Leadership

Digital transformation for growing business and strengthening customer relationships.

CEOs are now demanding that IT departments make a greater contribution to business outcomes than ever before.
Digital leaders need to make many important decisions. Which digital technologies should they adopt and how can they integrate them with their existing IT assets?

The Key to driving Digital Transformation Human Centric Innovation

Adopting new technology does not on its own achieve digital transformation. How will digital technology change the way people work? How will it be incorporated into the business? Digital leaders must consider many aspects of their business.

Digital transformation is about changing the way businesses create value for customers. In a digitalized world, value comes through connectedness. For successful digital transformation, it is important to put people at the center of everything. If we automate processes without considering people, we may create efficiencies, but they will be without real benefit.

Human Centric Innovation is an approach to creating business and social value by empowering people with digital technology. It is about bringing together three key value drivers - the creativity of people, intelligence derived from information, and the connectedness of things and processes. In other words, digital leaders need to drive the development of creative talents, to use information to discover new insights, and to connect infrastructure together to generate new value. In order to realize these things, we recommend five practical steps for digital leaders to take.

1. Grow digital skills

Digital leaders must develop skills for achieving digital transformation in their organizations, and for empowering employees with digital technology. According to Gartner's CIO survey, skills are the largest barrier to achieving their objective.*3 The survey reveals that the top three new skills that need to be developed are:

1. Information/Analytics,
2. Business Knowledge/Insights, and
3. Security and Risk Management.

Not only will CIOs need to plan for developing skills in individuals, but they will also need to build teams that are multi-skilled.

2. Use a digital business platform

In the digital era, the competitiveness of a business will be measured by the strength of its connectedness within the organization as well as with its external ecosystem, for example how many robust value-creating connections it has with partners. Businesses want IT to drive business value more directly and impact their top lines.

A digital business platform is the key to achieving this. A digital business platform enables an organization to empower its employees, to use intelligence derived from data, and to build fast, reliable connections both internally as well as with the external ecosystem. In addition, the platform must provide resilience against increasing threats to cyber and physical security.

3. Align digital technologies with existing IT systems

CIOs are challenged with using digital technologies to achieve growth and profit, as well as keeping existing IT systems running and modernized. This involves managing two different systems: innovative technology for digital business and existing IT assets for core tasks. A digital business platform must also handle

Talent issues are the biggest barrier to CIO success

1. Skills	22%	5. Technology	9%
2. Money	15%	6. Change	8%
3. Culture	12%	7. Relationships	8%
4. Alignment	11%		

n=555 Global

The biggest talent gaps are information and business knowledge

1. Information/Analytics	40%	6. Software Development	13%
2. Business Knowledge/Acumen	18%	7. Architecture	12%
3. Security & Risk	17%	8. Leadership	9%
4. Digital	15%	9. Attract/Retain	8%
5. Project Management	13%	10. Technical Skills	8%

n=937 Global

*3 Gartner Symposium ITxpo 2015 "The 2016 CIO Agenda Building the Digital Platform" Dave Aron 28th October 2015

these two different systems. Most importantly, both systems must be effectively aligned and balanced to reduce cost as well as to generate new value for business growth.

4. Leverage the four digital waves

Digital technology has grown through four major waves of development: the internet, mobile internet, IoT, and AI and robotics. Many digital leaders have programs underway for leveraging the internet and mobile technologies. But IoT and AI technologies have the potential to provide far greater impact to all industries. Digital leaders need to understand the implications of these new digital technologies and build strategies. Furthermore, the successful digital leaders will work out how to integrate technologies from the different waves.

5. Co-create new value

In the digital era, the borders of existing industries are increasingly blurred and become fluid. Diverse digitalized products and services will be connected via software, exchanging information, and delivering greater value for people. Value that consumers demand will be co-created by suppliers, partners and even the consumers themselves, in new business arenas. For example, in the case of Fintech,*4 technology startups and traditional financial institutions connect their systems via application programming interfaces (APIs)*5 and co-create new services.

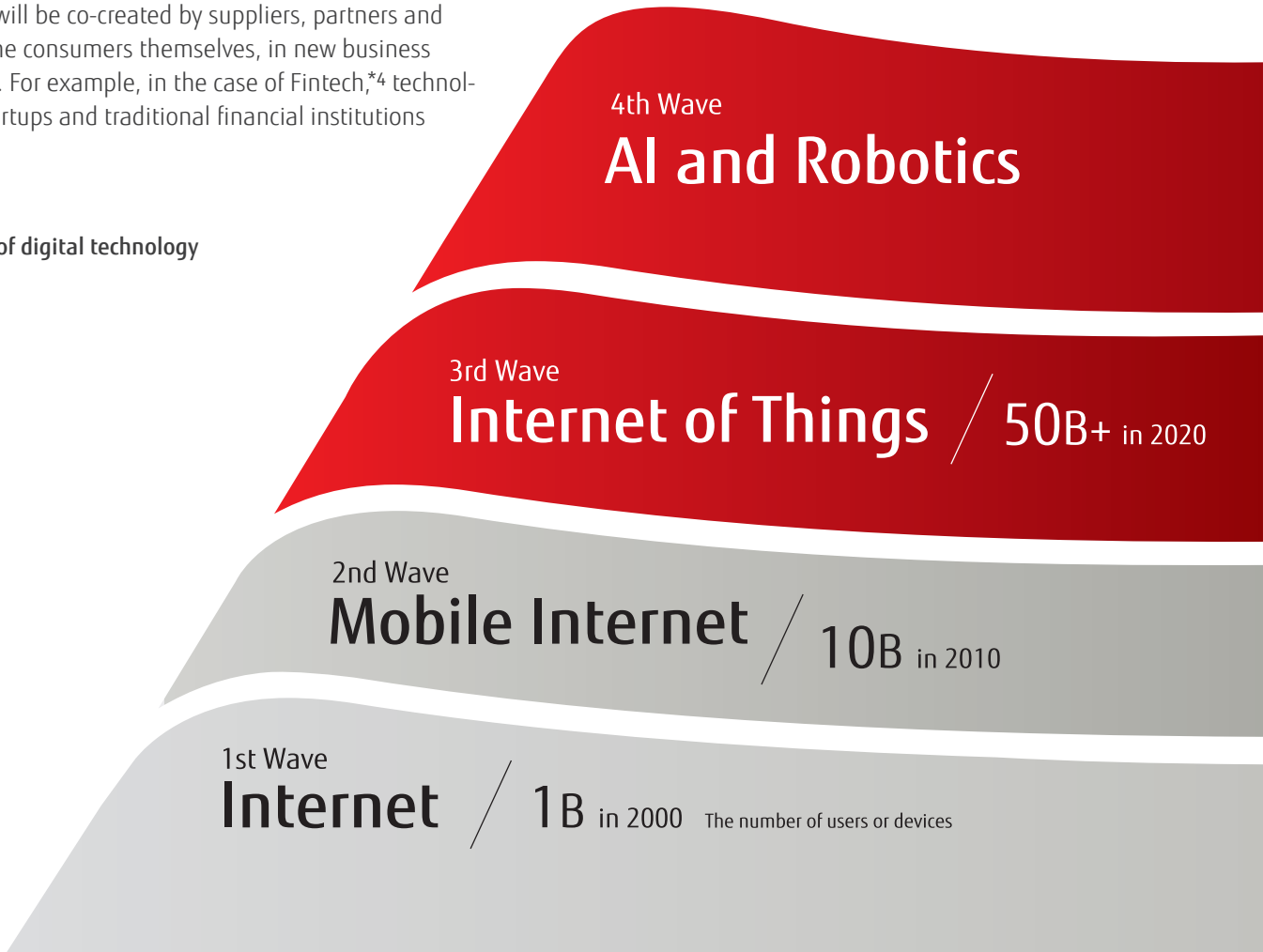
Therefore, innovation often requires co-creation with customers and partners. To find new value, it is effective to take a design approach and verify concepts and business models via a Proof of Concept (PoC) and a Proof of Business (PoB). An agile development method is used to deliver the result.

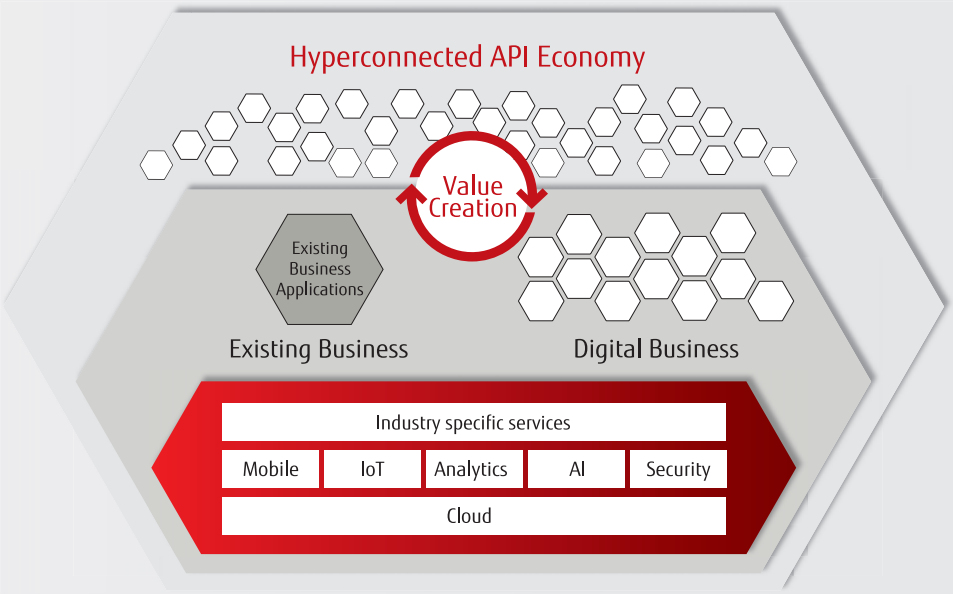
Your partner for digital transformation

Fujitsu wants to share your challenges and objectives, and be with you on your journey of digital transformation. Our digital business platform, called MetaArc, and a comprehensive suite of the latest digital technologies and services will enable your transformation. You will find more details in the following pages.

*4 An abbreviation of financial technology. Fintech companies are working to create financial innovation leveraging digital technology
*5 Application Programming Interface : An API is a pre-defined set of functions which specify how software components should interact with each other

Waves of digital technology





MetaArc, a business platform enabling digital

In 2015, Fujitsu began providing a digital business platform, we call MetaArc. This is a comprehensive framework for an organization to achieve digital transformation.

In the digital era, technology needs to be responsive to provide new services on demand. It also needs to be flexible to connect processes and information within an organization as well as with external partners and even across different industries. MetaArc comprises a full suite of our cutting edge technologies, skills and services, and leverages our extensive ecosystem of partners. It is designed to provide our customers with these outcomes:

1. The on-demand consumption of digital technologies as a service.
2. Alignment and balancing of new digital technologies with existing IT systems, and
3. The ability to digitally connect with partners and customers, enabling the creation of ecosystems.

1. Digital technology as a service

To achieve business growth, organizations must find ways to use real-time information about their customers' behaviors or their business operations to produce new insights and use them for adjusting strategies. To enable this, organizations must exploit the four waves of digital technology effectively. MetaArc comprises a suite of cloud-based digital technologies - mobile, IoT, analytics and AI – delivered as a service. Businesses can easily and quickly mash up these services to develop and provide digital business solutions and services.

2. Alignment of new and existing IT systems

A variety of cloud delivery models are available for MetaArc. Customers can blend these together to meet their business needs such as security and data governance. All models adopt the same architecture, allowing these systems to connect to each other in a hybrid cloud environment. A set of services to modernize existing IT systems are also provided so that they become more flexible and suited to digitalization, enabling the alignment of new IT systems with traditional IT systems. It reduces complexity and costs by effectively managing the resulting IT landscape. It also facilitates creating new value.

3. Connecting partners to form an ecosystem

In the framework of MetaArc, Fujitsu offers a marketplace of services using APIs to enable businesses to act strategically and leverage the growing API economy.*6 Fujitsu will introduce WebAPIs*7 to help our customers grow their businesses by facilitating collaboration beyond their industry boundaries and creating new and valuable ecosystems.

Next, we will explain about the digital technologies which MetaArc comprises as well as the infrastructure technology supporting them.

*6 Economy where new services are developed by using APIs and new value is created
*7 APIs based on Web technologies such as HTTP

Cloud, evolving with business growth

In the digital era, different businesses and services are connected and interact via APIs to create new value. Cloud technology is the basis for such connectivity and is evolving rapidly as a result of open technology community activities. Fujitsu's K5 cloud service provides the foundation for MetaArc. It is built on open source technologies such as OpenStack for IaaS and Cloud Foundry for PaaS. As an active participant in the development of these technologies, Fujitsu ensures that its customers can use the latest offerings reliably as soon as they become available.

Hybrid cloud using open technologies

According to research in Japan, around 40% of respondents are developing a hybrid cloud to gain the benefits of both cloud and on-premise implementations.*8 To address the growing demand for hybrid cloud solutions, K5 offers four different cloud services from public cloud to dedicated on-premise private cloud, which can be chosen based on the needs in security, performance and cost. Fujitsu also provides a private cloud product called PRIMEFLEX. Because these clouds adopt the same open source technologies and architecture, it is very easy for an organization to develop a hybrid cloud environment.

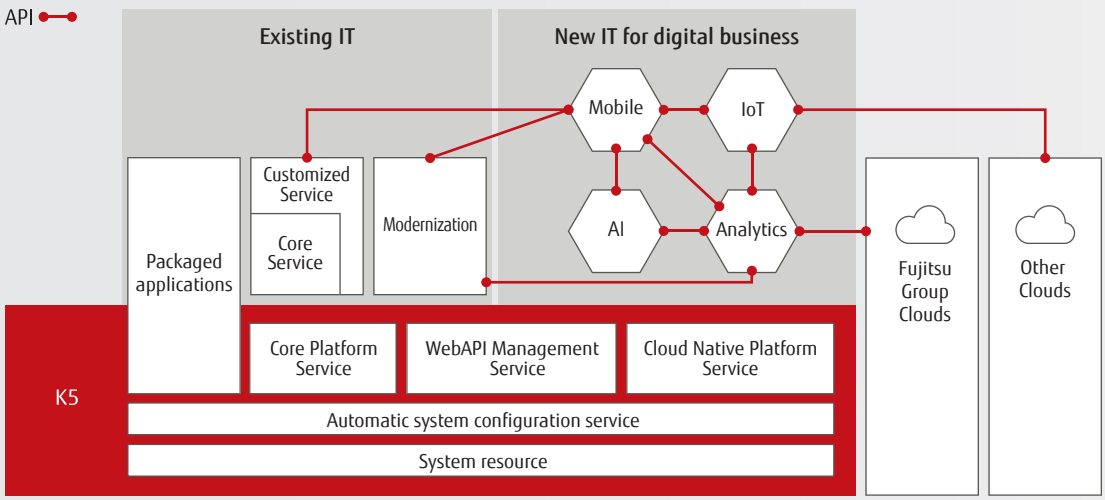
Digitalization services

K5 provides various services to drive digitalization and enable the alignment of new IT systems with existing systems. To realize a new digital service, K5 provides a mashup style of DevOps service, that enables agile application development. A Web API management service is also available for managing internal and external APIs. It makes connections to different services much more straightforward, broadening the availability of services in the marketplace.

Multi-cloud integration

Fujitsu's activity in open communities helps us to ensure interoperability with other cloud offerings that also use open source technology. Fujitsu provides a multi-cloud integration portal that enables the management of multiple cloud services and virtual systems. We also offer a network hub for hybrid connection. Through these, Fujitsu enables multi-cloud integration between a customer's own cloud and a partner's cloud, to fully support our customer's hybrid cloud strategy. This capability will enable the strategic use of ecosystems to drive business growth.

Fujitsu cloud K5 supporting hybrid cloud strategies



*8 MM Research Institute "Cloud service trend in demand/Japan" November, 2014

Digital workplace evolution

The world of work is changing at a rapid pace. More and more routine work is becoming automated or outsourced, and creative work and knowledge work is gaining importance. In the past, IT has focused on improving efficiencies of operations. In the mobile era, the most important priority is to increase the creativity of employees. In order to achieve this, businesses need to give utmost flexibility in terms of time, location and devices, while ensuring security and privacy. The mobile service platform, provided as part of MetaArc, connects companies and employees securely. Applications running on mobile devices support employees' mobile work, enhancing creativity and productivity.

Platform delivering business service securely

The use of applications on mobile brings with it many challenges. Some of these include the need for high-level security, authentication, unique development environments for each OS, and ease of operability. Fujitsu Mobilesuite service on MetaArc manages these issues and delivers a mobile environment suited to the needs of customers and their specific requirements. With its shared development features, integrated management functions and dedicated application portal, Mobilesuite helps to reduce the development and operational costs as well as enhance user experience (UX).

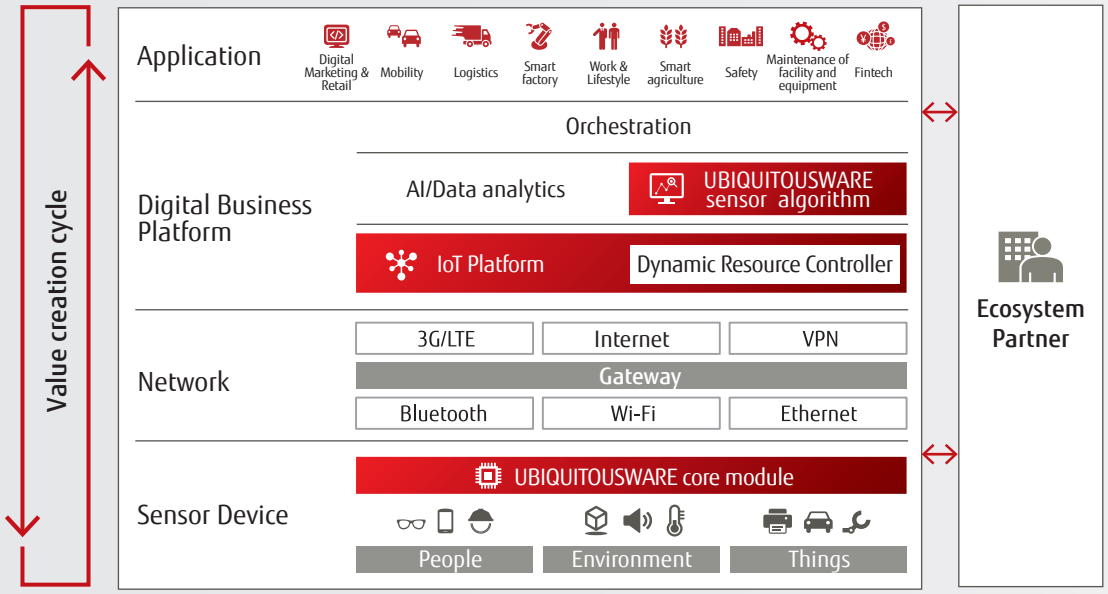
Mobile applications create new value

Many business applications are now available via a mobile device, enabling the transformation of business processes where ICT has not been fully used. For example, Fujitsu "Gifocus" navigation service can place customer and other data on a map, providing insights which have not been identified. Sales personnel and call centers can apply such information for their businesses and create new value.

Devices and services provide workplace anywhere

In line with our human centric vision, Fujitsu has developed mobile devices to suit individual and business requirements. For example, robustness and reliability are required to ensure ultimate productivity anywhere and anytime. In line with the needs of industry verticals, Fujitsu offers dedicated ruggedized and semi-ruggedized tablets. For general business users, Fujitsu provides a managed workplace service, enabling employees to work securely from any device and any location.

These products and services help businesses to put people at the center, and to connect platforms, applications and devices seamlessly in a way that enhances the productivity of employees. This will in turn help increase employee satisfaction and retain talent, further strengthening the competitiveness of businesses.



The IoT empowering people

Organizations need to take action to protect their position and legacy under the changing business environment. They must recognize the importance of disrupting the market before one of their competitors does. Fujitsu can help enterprises digitalize with confidence, and innovate by safely balancing the use of new technologies - such as IoT - with traditional technologies. Real-time access to information is crucial for optimizing business models. From workplace solutions to wearable technologies, and from sensors to the cloud, technology should support people and empower them naturally and unobtrusively.

Realizing human centric IoT

The core of Fujitsu's IoT capability is the IoT platform offered as part of MetaArc. This platform provides data aggregation and management as well as application development services and device management capabilities. The dynamic resource controller of the IoT platform enables optimized distributed processing between the edge and cloud computing according to changes in traffic. In addition, leveraging our long history in mobile device innovation, Fujitsu has developed the Ubiquitousware range of IoT solutions to boost productivity and ensure the safety of workers in the field. Fujitsu GlobeRanger also offers a management function for IoT devices, which has been introduced by many customers such as the Richardson Police Department in Texas.*9 Fujitsu RunMyProcess further adds rapid application and business process development capabilities for IoT solutions.

Co-creating a global ecosystem

To achieve digitalization companies can no longer operate alone. Fujitsu works with a broad ecosystem of partners to provide end-to-end solutions that suit various customer requirements. We have strengthened our strategic partnerships with Cisco, Microsoft, and Intel with a new specific focus on IoT. We also operate both globally and locally with a network of other partners to meet the evolving needs of our customers. Fujitsu is a member of the Industrial Internet Consortium (IIC), and is the sole Asia-headquartered steering committee member. As part of our work with this body, Fujitsu has contributed to the IIC via a factory visualization and analysis test bed that incorporates solutions deployed at our Yamanashi and Shimane factories. To realize the benefits of connecting people, information, as well as things and infrastructure, Fujitsu aims to create an environment that supports innovation on a proven IoT platform and solutions.

*9 For the details please see page 30, "Using RFID technology to transform the management of police inventory" Richardson Police Department

Evolving analytics to enable innovation

Analytical practices are expanding from the areas of descriptive analysis, which analyzes facts about what has happened, to the areas of predictive analysis, which provides insights into what is likely to happen and which options are best. In recent times, big data analysis has become accessible to enterprises. Big data analysis can uncover the instinctive behavior of people affecting business outcomes (e.g., predicting customer visits or the likelihood of membership termination). It can also extract valuable knowledge from data, which previously was the realm of only professionals and experts (e.g., predicting equipment failure and product quality). Fujitsu provides a range of analytics service as part of MetaArc, to help our customers achieve digital transformation.

Using machine learning and deep learning

Anomaly analysis is a capability that uses machine learning*10 to enable us to predict equipment failure. Fujitsu has developed a technology which automatically identifies signs of failure by analyzing huge volumes of sensor data generated in a factory. This technology is incorporated in Fujitsu's analytics software to predict equipment failure. Furthermore, we have also begun offering a new service that uses deep learning technology.*11 It enables computers to recognize patterns in a similar way to how people use their five senses. As a result, computers can independently analyze much more complex data, which previously required professionals with expert skills. As this type of technology evolves, it will enable businesses to automate more tasks, and free people up to focus on more valuable activities.

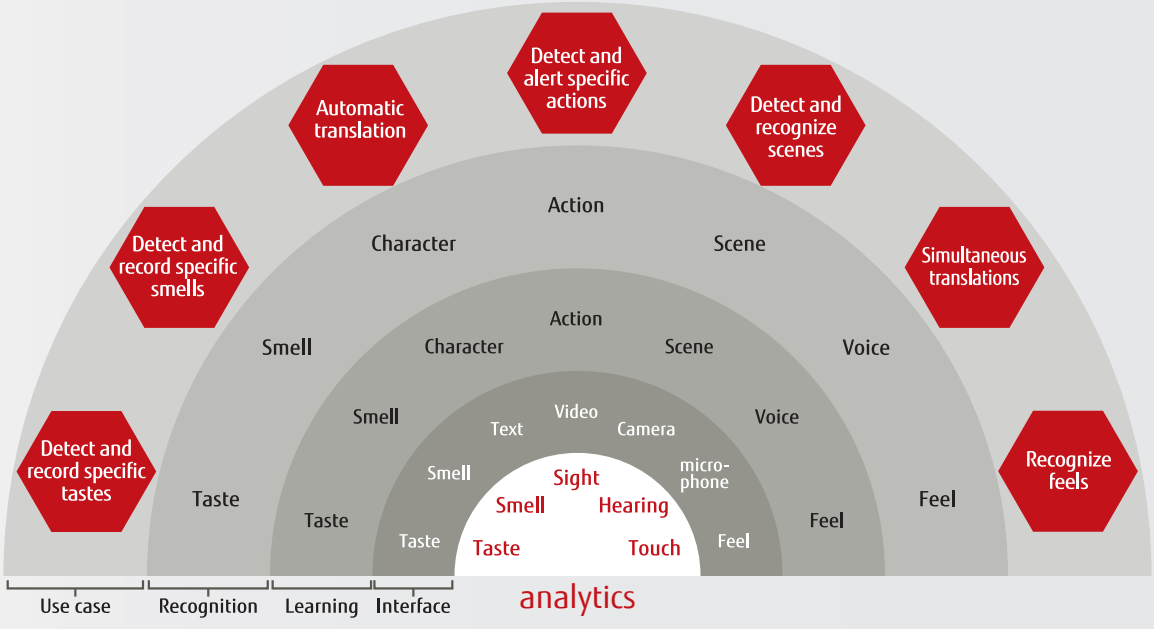
With a comprehensive range of offerings

A full suite of technologies and expertise in analytics, as well as integration capabilities, are required to apply analytics to a business in an effective manner.

- Networks and storage for collecting data
- Data scientists to plan and perform data analysis
- Huge computing resources for big data analysis
- Technology and expertise to incorporate resulting knowledge into an IT system

Fujitsu provides data analytics services to various industries and sectors. For example, Fujitsu offers its Engagement Analytics solution for retail. This solution analyzes data from various sources using Fujitsu's patented Flow Discovery technology. Through detailed analysis of shoppers' behaviors, retailers can improve their shopping experience. Fujitsu supports customer innovation by providing a comprehensive range of analytics solutions and services.

Broader use of deep learning technology



*10 Technology that provides computers with the ability to learn as a human does without being explicitly programmed
*11 The latest machine learning algorithm that uses neural network computing

Human Centric AI

Artificial Intelligence (AI) technologies such as deep learning have rapidly advanced and are now being used in many areas like analytics. AI is the fourth wave of digital technology, and we expect it to give the most significant impact on business and society. Fujitsu believes the most critical mission of technology is to empower people and help them to live a fuller life. We are working to realize a future in which people and AI autonomously collaborate and achieve previously unthinkable breakthroughs. We call it Human Centric AI. Fujitsu incorporates AI related technologies in its solutions and services, and provides them as a service on MetaArc.

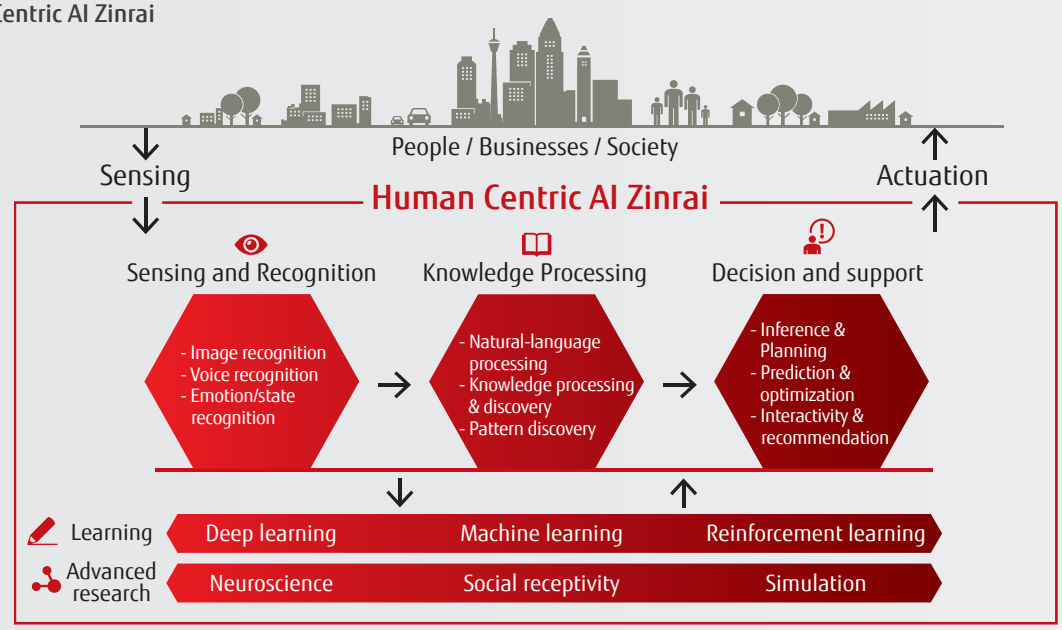
Human Centric AI Zinrai

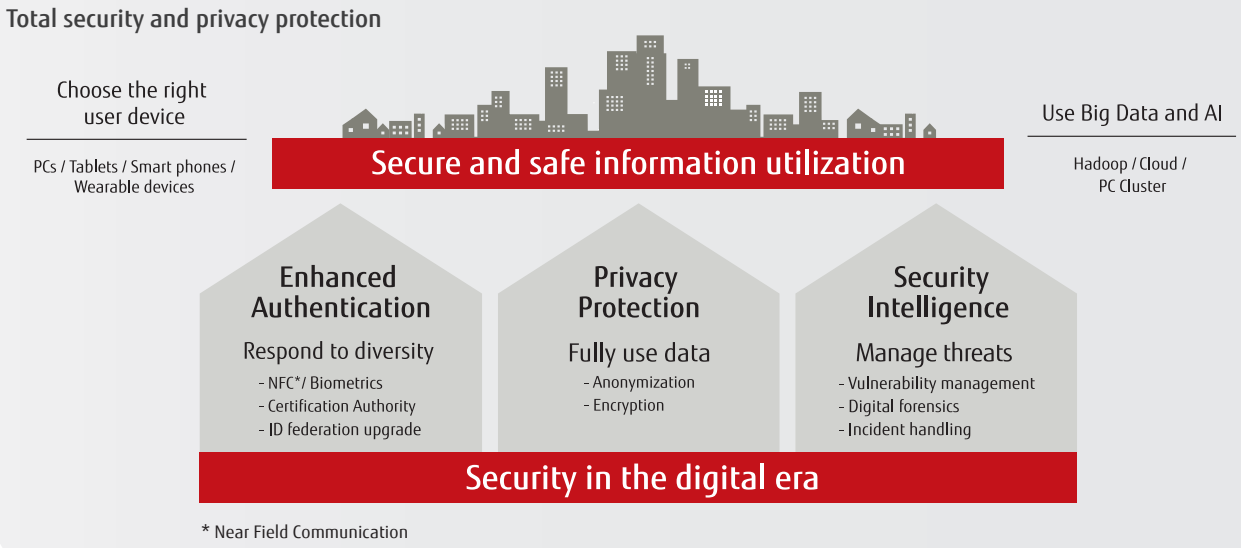
Fujitsu has been developing technologies and expertise in AI for over thirty years. Today, we map them in a comprehensive framework named 'Zinrai'. Zinrai consists of three key functions: Sensing & recognition, Knowledge processing, and Decision & support. These key functions are augmented by self-learning functions. For example, Fujitsu developed "affective media processing technology" which assesses an individual's intentions and emotions. By tracking the eye movements and motion of a person, this technology enables the most relevant information to be delivered at the right timing. With this technology, services can be automated and tailored to personal needs. Another example is an application of deep learning technology to the recognition of handwritten Chinese characters. The learning technologies developed by Fujitsu performed better at reading handwritten Chinese than real people.

Integrating AI technology into business

We believe these AI technologies will help enterprises in various industries - manufacturing, retail, finance and more – to transform their businesses and develop new products and services. To enable digital transformation with AI technology, Fujitsu also provides AI consulting services. We believe AI technology will play an important role in enriching people's lives and helping to build a better society. Fujitsu continues to invest in AI technologies, applying them to many business areas.

Human Centric AI Zinrai





Security in the digital era

The number of ways in which data is used continues to increase as IoT evolves. At the same time, we need to take seriously the rapidly growing security issues. Digital leaders must recognize that security issues cannot be solved with a one-time investment; instead they need ongoing management and attention. To build resillient business and society by using technology safely and securely, it is critical to enhance authentication, maintain privacy, and make use of security intelligence.

Enhance authentication to respond to diversity

An authentication platform is vital for bolstering device security and for connecting physical and digital spaces. This platform strictly controls access under specified conditions, optimizes service levels and quickly detects and prevents improper use. To achieve these outcomes, an authentication platform needs to be made responsive to diverse requirements by introducing, for example, two-factor authentication, or biometric authentication - such as Fujitsu's PalmSecure palm-vein authentication technology which has been adopted by Sberbank in Russia.*12

Maintain privacy to make full use of data

Ensuring privacy is crucial when using innovative technologies to derive greater value from data. It is necessary to comply with legislation that protects privacy in each country. Fujitsu has developed anonymization technology that securely uses data containing an individual's private information, and homomorphic encryption technology to search and process encrypted data securely. These technologies are delivered as a solution that creates value from data by linking multiple services, while strictly maintaining data privacy.

Security intelligence

Signs of cyber attacks can be detected in advance. While it is not at all easy, potential threats can be averted. To achieve this, however, it is first necessary to collect threat information from all relevant global information sources and to keep abreast of how these threats are impacting on current ICT assets. The next step is to evaluate how to respond to threats, and establish a team of experts that can guard against and manage attacks.
Fujitsu handles hundreds of millions of incidents each day on its internal networks, which connect around 300 group companies globally. Fujitsu accumulates security knowledge and provides this intelligence to customers as a managed security service. For example, Fujitsu managed security service has helped Scottish Water to strengthen its information security defenses.*13 Fujitsu co-creates security intelligence with customers and continually drives security innovation to a new level.

*12 For the details please see page 18" Transforming the school canteen experience helps to increase security and safety" Sberbank
*13 For the details please see page 26" Cyber Threat Intelligence transforming security protection and safeguarding business " Scottish Water

Unique advanced technology for connected infrastructure

To respond to rapidly changing business environments, ICT infrastructure must provide higher speed, reliability, and operational efficency as well as optimized performance. What kind of infrastructure should be used for a datacenter so that organizations can benefit from digital technolgies? There are many technologies available now, such as software-defined flexible ICT infrastructure, clustering for non-stop service operation, and built-in security in the ICT infrastructure. Fujitsu has a solid track record in developing world-first and best-in-class technologies. We have integrated these with open source technologies to provide an optimized computing environment for our customers' needs. These leading-edge technologies underpin Fujitsu cloud K5 and PRIMEFLEX, enabling highly reliable connected infrastructure.

Toward virtualized and distributed computing

The future of ICT is moving toward virtualized and distributed computing, where computing nodes are connected via networks and controlled by intelligent software. An autonomous management function will soon be embedded in this ICT environment, which will grow with businesses and operate reliably throughout the lifecycle. Fujitsu calls this future ICT Software-Defined Connected Infrastructure (SDCI). To realize SDCI, Fujitsu has mapped out its next-generation architecture, Fujitsu Intelligent Networking and Computing Architecture (FINCA), and continues to research and develop related technologies.

New network products through FINCA technologies

Leveraging virtualization technology in datacenters, networking functions can now be virtualized in a standard server and integrated with Software-Defined Network (SDN) technologies. This is known as Network Functions Virtualization (NFV). NFV is gaining momentum as it is not only flexible in providing the best connection between cloud and users, but it is also an enabler of 'Edge Computing' and 'Fog Computing' which are important components of the IoT. FINCA-based products have already contributed to enhancing our customers' ICT infrastructure. For instance, PRIMEFLEX realizes hybrid IT, combining clouds and on-premise environments. Fujitsu's Virtuora network product range enables a flexible wide area network and new NFV products are also slated for release.

To be competitive, businesses must become more agile. Fujitsu incorporates software-defined technologies into its PRIMEFLEX and NFV products such as the Virtuora line-up. We continue to develop new technologies that make advanced ICT solutions more efficient and responsive to business requirements.

Innovation through cloud services for industries and co-creation

Digitalization is changing our everyday lives, business and society. It is creating a whole new world where people as well as many things around us are connected to networks, sharing information and generating new knowledge. People work more openly and collaboratively. Business operations become more autonomous and fluid. This is a hyperconnected world.

In a hyperconnected world, knowledge moves fast across the existing borders of an organization, an industry and a country. For any business or public service, it is becoming crucial to leverage the creativity of individuals and bring together their knowledge. Together with our customers, Fujitsu wants to play an instrumental role in creating greater value for people through facilitating knowledge exchange and integration.

Industry and business services on MetaArc

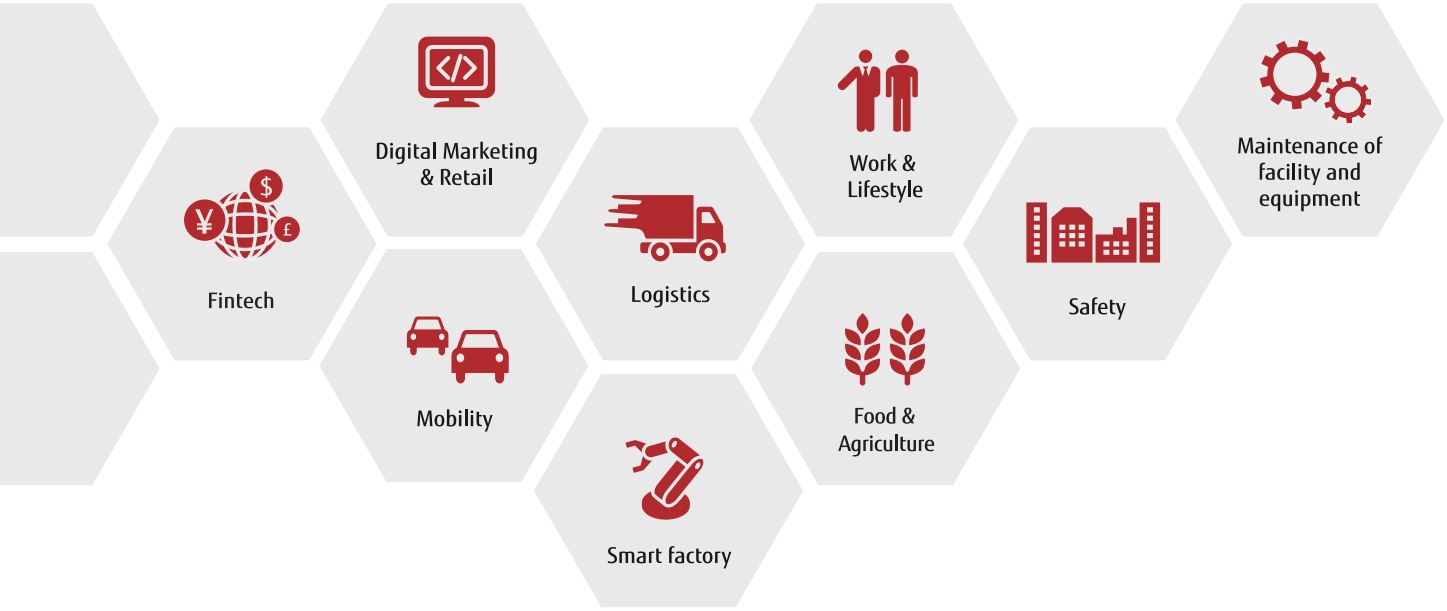
To be successful in the digital era, enterprises must consider combining their own knowledge with that of other businesses in different industries to deliver new value benefitting people and society as a whole. This requires a mechanism to allow enterprises to access knowledge of other industries and businesses as a service. Fujitsu has accumulated a vast amount of experience and expertise through engagements with customers in many industries. Based on these, in 2015, Fujitsu announced a new concept of integration services, we call "FUJITSU Knowledge Integration," that helps customers achieve digital transformation. Fujitsu provides knowledge on various industries as a service and makes it available to customers via our Digital Business Platform MetaArc. We began offering the first service for the finance industry. Fujitsu is developing other platform and industry services on MetaArc and will make these available for customers to use via APIs.

Nurture talent for co-creation

Diverse lifestyes and the ever changing needs of customers are making the planning and execution of businesses more complex than ever before. In such a constantly evolving and uncertain business environment, enterprises need a new approach for creating innovation.

Co-creation is the best way to achieve this. We are actively organizing many hackathons, attended by external and Fujitsu people, to hone skills of talents for digital business and greatly assist with understanding consumer needs. Fujitsu will continue to take a co-creative approach to innovation with our customers.

Digital technology transforming business and society



Fujitsu wants to be your business partner, helping you achieve digital transformation and creating valuable business and social outcomes together. We have already supported digital transformation in many of our customers' businesses across industries. For example, Combios de Portugal(CP), Portugal's national rail operator, introduced a new ticketing system from Fujitsu. It contributed to improving customer experience and minimizing fraud.*14 In Japan, Leopalace 21 launched a new business by setting up virtual power plants with solar panels on apartment rooftops.*15 Fujitsu's remote monitoring solution for solar power generation was the key to the success of this business. We cover these and many other customers' stories in the next chapter.

In addition, Fujitsu conducted more than 300 PoCs and PoBs with our customers in different industry verticals during 2015. These projects can be categorized according to usage. For instance, digital marketing, connected retail, smart mobility (transportation), logistics, smart factory, workstyle transformation, personal safety, smart agriculture, facility monitoring, Fintech, and so on. By leveraing our experience in these projects, we offer digital solutions and services that enable our customers to transform their businesses and processes.

Support business, around the world

Fujitsu operates in more than 100 countries throughout Europe, the Americas, Asia and Oceania. In particular, Fujitsu is the No. 1 service provider in Japan and is ranked the fifth in the world. In its outsourcing business, Fujitsu has established a network of more than 100 datacenters, including a core of 16 key facilities in Japan. Through this datacenter network, Fujitsu provides cloud services (IaaS, PaaS and SaaS) and other services that meet the various needs of customers, such as reduced operating costs and a smaller environmental footprint.

To provide support for customers' IT operations on a global scale, Fujitsu plans to more than triple the resources of our global delivery centers (GDCs) by boosting GDC staff from 5,000 in 2015 to 18,000 in 2017. Although they are spread across regions*16, these resources will be centrally managed and virtually integrated as a single pool. This will enable each region to flexibly raise their service levels for customers. Fujitsu will continually train customer-facing staff to improve their skills and expertise in order to ensure high-quality service delivery and proposals that exceed customer expectations.

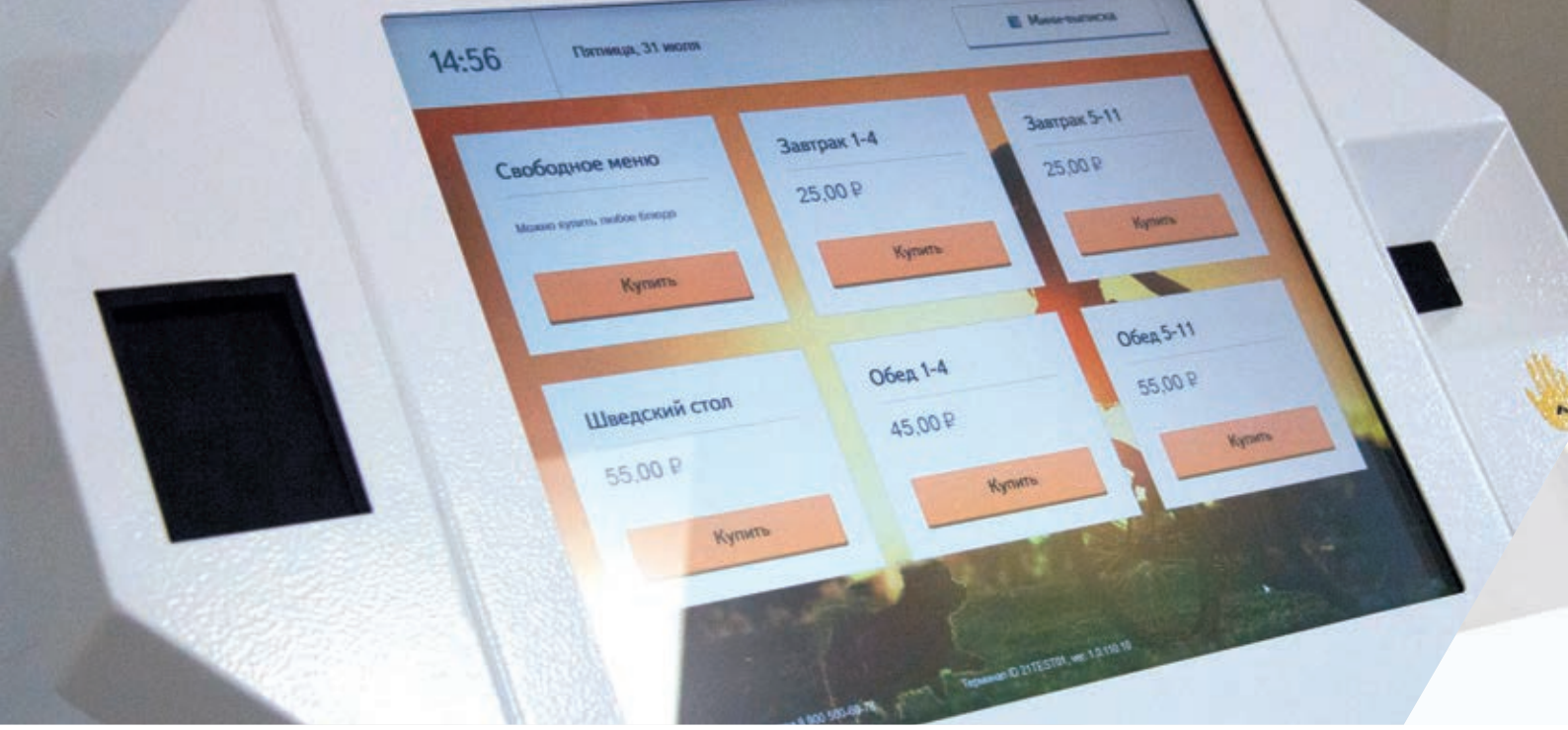
*14 For the details please see page 22 "Transforming customer experience and minimizing fraud with a new ticketing platform" Comboios De Portugal(Trains of Portugal)
*15 For the details please see page 36 "Turning apartment rooftops into 'virtual power plants', green energy through mega-solar power generation " Leopalace21 Corporation
*16 EMEIA(Europe, Middle East, India, and Africa), the Americas, Asia and Oceania

Customer Stories

Digital Transformation, driven by Human Centric Innovation

Co-creation of innovation with customers

Human Centric Innovation is an approach to creating business and social value by empowering people with digital technology. The customer stories in this chapter introduce how human centric approach creates innovation for business and society.



Transforming the school canteen experience helps increase security and safety

Sberbank

Human Centric Innovation

Sberbank wanted to give schools the chance to securely and reliably manage canteen transactions for their students. To do this, they turned to Fujitsu PalmSecure, a contactless ID platform. With this technology, students no longer need to carry cash to school. Canteen queues have been reduced, ensuring all get fed on time and parents can keep track of their children's diets and how they spend their allowance. This solution has since been rolled out to over 40 schools.

"Speed is of the essence in the school canteen with lots of hungry mouths to feed within a very tight time-frame; Fujitsu PalmSecure makes that process faster by automating payment. And parents have total visibility of every transaction so they know when money is being spent on fast food and candy."

Yana Pavlova, Head of Customer Relations, Sberbank

Making lunch payment safer and smarter

Sberbank is the leading circulatory platform in the Russian economy, accounting for one third of its banking system, including 14 territorial banks and over 16,000 branches throughout the country across eleven time zones. It offers the widest selection of banking services for retail customers, from traditional deposits and various types of loans to bank cards, money transfers, bank insurance and brokerage services. The company employs over 260,000 qualified professionals who work together to produce world class products and services.

Schools are among Sberbank's many customers and the company is always exploring new areas where it can add value. Currently 80% of Russian schoolchildren use cash to pay for lunches, while the majority of the remainder use card payment. However, money can easily be lost or stolen, or spent on unhealthy food and drink. Cards, meanwhile, break or can be lost. Sberbank wanted to introduce a more efficient and secure method for handling canteen transactions in the school environment.

"Cash can be spent on candy in the corner shop or be stolen by bullies, and parents have no visibility of it so we thought there had to be a smarter way to manage lunch money," explains Yana Pavlova, Head of Customer Relations, Sberbank. "We looked at mobile payments but not every child has access to a mobile phone."

After looking at other potential biometric solutions, the bank came across Fujitsu PalmSecure. This met the key criteria of delivering an ultra-reliable, contactless and cost-effective authentication solution.

"Fingerprint ID was effective but parents had concerns about hygiene because it requires physical contact where-

as iris recognition didn't impress us with the success rate and parents were worried about damaging the eye," adds Pavlova. "That made Fujitsu PalmSecure the ideal ID solution, combining intuitive, contactless interaction with optimal recognition rates."

Fast processing of lunch payments at 40 schools

The Fujitsu PalmSecure sensor uses near-infrared light to capture a person's palm vein pattern, generating a unique biometric template that is matched against pre-registered user palm vein patterns. The PalmSecure technology's false acceptance rate is just 0.00001 percent with an exceptional false rejection rate of 0.01 percent, all in a small form factor that generates extremely fast authentication, usually in under one second.

"We began by piloting the system in two schools with 100 children and quickly learned that it was a fast and efficient way of managing the canteen ecosystem," says Pavlova. "We have since rolled the Fujitsu PalmSecure system out to 26,000 pupils across 40 schools with plans for further deployment around the country."

Sberbank works with local IT partners and Fujitsu to install two PalmSecure readers per site and to capture student palm signatures in a centralized database. For each school, the process takes less than a month to get up and running.

"It's not quite plug and play but it's close in terms of the simplicity of installation. That means we can cover a lot of ground quickly," continues Pavlova. "Now each canteen is processing an average of 30,000 rubles per day."

Security and safety for parents and students

Fujitsu PalmSecure has transformed how schools manage their canteen environments. Not only does it streamline the service, reducing queues, it also automatically notifies parents regarding what their children have purchased.

"Speed is of the essence in the school canteen with lots of hungry mouths to feed within a very tight timeframe; Fujitsu PalmSecure makes that process faster by automating payment," remarks Pavlova. "Parents have total visibility of every transaction so they know when money is being spent on fast food and candy.

"They can choose to be notified by SMS or email and we can also integrate behavioral suggestions based on what is being purchased."

It's simple for students and parents to top-up their virtual wallets for free online or at any branch of Sberbank, making the whole process painless. For Sberbank, the new system generates revenue through the minimal commission fees it charges other banks for top-ups.

"It is a holistic authentication solution that means kids don't need to carry cash making them safer and giving their parents more information about their diets," comments Pavlova. "This means they can make more sensible choices and the school can take a better look at overall purchasing patterns."

Sberbank and Fujitsu PalmSecure have together given thousands of children an easy, secure and reliable way to manage their money. With such tangible success, the bank is keen to explore other areas where the authentication solution might be used.

"Bank cards are a good solution but not the ultimate one because they also can be lost or damaged so this biometric technology is a viable and long-term alternative that can be used, for example in branch to access your funds," concludes Pavlova. "We've also already trialed it in a grocery store and the feedback from customers and owners alike has been very positive. Fujitsu gives us intuitive innovation that is uncomplicated and delivers results. PalmSecure has provided a stable, secure payment system for thousands of students."

Customer Profile

Sberbank

Address : Moscow (Russia)
Founded : 1841
Employees : 260,000+
URL : http://www.sberbank.ru

Never Stop! – Upgrading the cash market trading platform "arrowhead" in the quest for world-class reliability

Tokyo Stock Exchange, Inc.

Human Centric Innovation

The Tokyo Stock Exchange's "arrowhead" cash market trading system was ranked as one of the world's best in terms of processing speed. Having undergone a thorough overhaul in September 2015, order processing speed is now three times faster than the old system. Orders have increased exponentially with the growing use of algorithmic trading and other techniques. By enabling processing at a faster rate, and by introducing a mechanism to minimize the impact of system failures and unintended orders, the upgrade has delivered a world-class system for market reliability and security.

"This is the first time I've ever experienced the launch of a system without the slightest hint of a problem. The extensive elimination of bugs in upstream processes was achieved as a result of the determination shared by Tokyo Stock Exchange and Fujitsu."

Kenichi Hosokawa, Senior Manager, IT Development, Tokyo Stock Exchange, Inc.

World-class system performs five times better than target

Tokyo Stock Exchange, Inc. (TSE) is one of the world's top bourses, and it lists around 3,800 brands, including local and overseas equities, ETFs, and REITs. Daily trading value exceeds three trillion yen.

The cash market trading system supporting such high transaction volumes is known as "arrowhead". Developed together with Fujitsu under the slogan Challenge "10" msec, arrowhead sought to achieve a response time per order of less than 10 milliseconds, but ultimately achieved two milliseconds. Having achieved this performance, five times faster than the original target, the system was launched in January 2010 and was then continuously enhanced to reach one millisecond response time. Among the stock exchanges around the world competing to outdo each other in terms of order processing speeds, this performance placed arrowhead among the world's most advanced securities trading systems and TSE went on to play a key role in the global economy.

Planned upgrade three years after launch; aiming for further improvements in reliability and security

In addition to its order processing speed, arrowhead also had a proud track record in terms of its system security. However TSE embarked on a plan to revamp the system in December 2012. In explaining the reasons for taking the bold step of overhauling the system a mere three years after it went into production, Kenichi Hosokawa, Senior Manager, IT Development of Tokyo Stock Exchange says, "It is important to continue our quest for transaction stability because the concentration of orders in a short period of time has now increased to a point where it far

exceeds previous figures. At the same time, there is now a much greater need to ensure reliability and security."

Behind this move was the increasingly frequent occurrence overseas of 'incidents' that could jeopardize healthy trading in the market. For example, in August 2012, an unusual trading activity saw the price of more than 100 stocks swing sharply on the New York Stock Exchange (NYSE). The cause was a coding error in a program used by a major securities firm for the purpose of automatically entering trading orders via algorithmic trading. A massive number of erroneous orders were routed in quick succession to the NYSE, causing severe disruption to trading.

This incident highlights the risks associated with stock market and trading systems that process orders in times of less than one hundredth of a second. TSE must also keep in mind that they could encounter this kind of incident.

Sweeping review of system configuration using IA servers to achieve high reliability and high speed

With speed improvement an ongoing prerequisite, and stock exchange reliability and security flagged as the main priorities of the upgrade project, the TSE conducted a sweeping review of the arrowhead platform, including its hardware, software and processing logic.

The hardware deploys IA servers powered by the latest high-performance processors, a farm of approximately 200 FUJITSU Server PRIMERGY units. FUJITSU Software Primesoft Server enables both high reliability and high-speed IA server infrastructure. According to Mr. Kenichi Hosokawa, "Building the infrastructure based on a combination of high-performance IA servers and software that delivers high reliability enables both speed and reliability." The system achieved a processing speed of 300 microseconds, three times faster than the old system, as well as further improvement in reliability. It is possible to stop a server that has failed and isolate it from the rest of the system, thereby allowing another server to take over processing without data loss.

The TSE also added a new processing logic in anticipation of erroneous orders and other factors. In the event that a program of a particular securities firm were to cause erroneous orders, the orders from that firm could be suspended according to a configuration set by that firm while processed orders can be canceled automatically. This logic is designed to prevent a widespread impact on the market.

Focus on resolving bugs in upstream processes ensures a high-quality and problem-free launch

There have been no major glitches in the new arrowhead system since its launch in September 2015. On days with high volumes of transactions, the system processes over 100 million orders per day, and at peak times receives as many as 1.4 million orders per minute. The secret to ensuring quality lies in the way the project was handled.

When the policy to eliminate bugs during the upstream processes of the project was announced, the responsibilities were clarified as: "Requirements definition - TSE"; "Design - Fujitsu". Each and every one of the 80 TSE staff and 300 Fujitsu engineers engaged diligently in the elimination of bugs in the upstream processes. This saw a 90% reduction in the number of bugs found in the downstream processes as compared with the previous project, allowing the new arrowhead platform to be launched after sufficient testing. Mr. Kenichi Hosokawa praised the performance of all project members by saying: "This is the first time I've ever experienced a system launch that has been totally free of problems."

The TSE intends to build advanced intelligence into arrowhead, enhancing it with innovations such as AI-based functionality and big data technologies.

Customer Profile

Tokyo Stock Exchange, Inc.

Address : 2-1 Nihonbashi Kabuto-cho, Chuo-ku, Tokyo, Japan
Founded : 1949
Employees : 429 (as of March 31, 2015)
URL : http://www.jpx.co.jp/english/ (Japan Exchange Group)

Transforming customer experience and minimizing fraud with a new ticketing platform

Comboios De Portugal (Trains of Portugal)

Human Centric Innovation

Portugal's national railway, Comboios De Portugal, needed a digital ticketing platform that would be faster, more flexible and more accurate than its existing systems. The new system, which Fujitsu helped implement, offers much greater flexibility to customers. It also minimizes the potential for passenger fraud and enables the company to maximize revenue.

"With one transaction, it is possible to find a single ticket for the national network and in urban areas it can be used for multiple operators."

Luis Vale, Product System Developer, Comboios De Portugal

Improving customer experience with a new ticketing system

Comboios De Portugal (CP) is the state-owned national railways operator. It has a firm commitment to contributing towards Portugal's economic development and the safe, efficient transportation of its citizens. Over 100 million passengers travel with CP annually and on business days more than 1,450 train connections help to meet the travel needs of people throughout the nation.

In an increasingly competitive transport environment, providing flexibility and convenience to passengers is critical for success. Prior to the adoption of the new solution, ticketing was mostly a manual task making it difficult to centrally collect and manage data. This was not only time-consuming and prone to fraud but also made it difficult for train travel purchases to link and interoperate with other modes of transport.

"Over the past ten years, I have followed major transformations in ticketing technology. It's revolutionizing every business area and the railway is no exception because it is becoming more and more competitive," explained Luis Vale, Product System Developer, Comboios De Portugal. "So that means we need to provide the best products with the best flexibility to our clients. The system has to evolve constantly because of technology requirements and transport legislation."

CP decided that introducing a contactless card system would enable it to build a nationwide electronic ticketing platform that would better serve customers, reduce fraud and streamline costs. At the same time, the solution would strongly facilitate interoperability with other carriers.

"Smart tickets and cards help us understand clients," added Vale. "In addition, there is a permanent need for

integration with other services and transport companies."

The organization identified five areas to address: a centralized database and analysis facility; ticketing offices; on-board ticketing; self-service vending machines; and in-station gates. Following a public tender, CP selected Fujitsu to manage everything except for the physical gates.

Building a communications platform for passengers

Fujitsu's team developed a bespoke software platform from the ground up that acts as the hub for the new smart card system. This collects data from 21 applications to enable total visibility of transactions and minimize fraudulent activity.

"This centralized system is capable of communicating with other corporate system such as accounting, data analysis and access channels and, most importantly, it communicates with our 110 million passengers," says Vale.

Fujitsu equipped 325 ticket offices in 154 stations with new POS devices while also installing 165 automated kiosks, all of which connect securely to the network for real-time authentication. Passengers are now issued with CALYPSO RFID-enabled contactless cards that can be recharged at any of these locations as well as at ATMs. In addition, on-board conductors now carry PDAs which can validate and sell tickets for added convenience.

Exploring more flexible solutions together

For CP, the most significant benefit is the ability to minimize the potential for passengers to travel without paying for the correct ticket. At the same time, by automating much of the ticketing process, fewer on-site personnel are required, further lowering costs. The new solution also offers much more flexibility to customers, particularly when it comes to interoperability with other transport providers.

"Using the information that we receive in real-time from this system, we can better adapt to the actual needs of our clients. For example, now we can sell tickets through ATMs or the internet," continued Vale. "With one transaction, it is possible to find a single ticket for the national network and in the urban areas it can be used for multiple operators."

The company can also now view all transactions in real-time on a single screen, allowing it to respond more flexibly to changing market demands. This information is much more accurate than before because the potential for human error during manual entry has been eliminated.

From a passenger perspective, interoperability with other modes of transport is the ultimate in convenience. Anyone can use their smart card to board ferries, buses, the metro and the trains, thereby saving time and eliminating hassle.

CP now has a robust, flexible ticketing infrastructure that can scale as the company grows. It is reducing fraud, minimizing the need for human intervention and allowing the company to work more closely with other transport agencies.

As a result, CP has already deployed FUJITSU Server PRIMERGY across the company to support various business functions.

Luis Vale concluded, "It has been a good journey. Fujitsu better understands our business, we better understand the technologies in use and we are now together exploring new opportunities."

Customer Profile

Comboios De Portugal (Trains of Portugal)

Address : Lisbon (Portugal)
Founded : 1951
Employees : 2,700+
URL : http://www.cp.pt

Advanced marketing in the digital era: Rapid integration of dispersed data on customer attributes

Nikkei Business Publications, Inc.

Human Centric Innovation

Nikkei BP deploys a wide variety of media and services to communicate value-added information in cutting-edge and specialized fields. To ensure sustained growth, the company launched a new marketing system. The system was completed in just three months, thanks to agile development in close collaboration with Fujitsu. Together with powerful Business Intelligence (BI) tools, it provided a unified database integrating data on customer attributes, previously dispersed across many different systems and sources. As a result, the new system led to doubling the effectiveness of their marketing campaigns.

"No ICT system that supports marketing is ever 'finished'. We'll continue to boost the effectiveness of our campaigns, using an agile method to evolve the system into the future."

Tomoyuki Narita, General Manager, Client Marketing Support Department, Nikkei Business Publications, Inc.

Responding to a changing business and technology environment

Nikkei Business Publications, Inc. (Nikkei BP) is the publishing arm of Nikkei Inc., and specializes in publications about management and technology. In addition to publishing printed books and magazines as well as digital contents, Nikkei BP is engaged in the development and management of various events including large trade shows and seminars. The company distributes around 40 print media publications with a readership of two million. The number of page views for its digital media offerings has reached 125 million per month. Many business people rely on their service for information on the latest developments in the economy and technology.

The Nikkei Group is renowned in the areas of the global economy and technology, and Nikkei BP is playing a central role in its media business. Media companies are under serious pressure globally, and Nikkei BP is no exception. As the world economy increases its volatility and technology advances in a frantic pace, business people want to access more diversified and specialized knowledge. Growth is not at all given unless they successfully address their readers' need for such pinpointed information.

Customer analysis for more effective marketing campaigns

To keep growing in the ever-changing market, Nikkei BP recently launched a new marketing system. The database was built on a cloud platform to aggregate data on magazine subscribers, digital media members, content browsing logs, and tradeshow and seminar participants, that had previously been scattered across multiple systems. It also enabled the company to manage those data in one

stop. Now, they can use BI tools to identify the blue-chip customers who are most likely to subscribe to new media or participate in seminars. This helps the company to carry out more accurately targeted marketing campaigns.

Indeed, Nikkei BP accumulated massive amounts of untapped valuable data about their customers, provided when they signed up digital media or seminars. These include their names, addresses, employers, companies, departments, job titles and other information. However, because subscriber data, seminar-participant data, and browser log data were all managed by different systems, the company was unable to leverage those assets for targeted marketing in a timely fashion. Tomoyuki Narita, General Manager, Client Marketing Support Department of Nikkei Business Publications admits that, "It sometimes took us as much as a week to extract the data of customers who subscribed to IT digital media as well as to computer journals." He further commented, "Once the new system had been deployed, we were able to cross-analyze data on subscriptions of magazines, participation in seminars, and browsing of digital media. This enabled us to quickly create a prospect list based on the history of each individual's activity."

With the new system, the company greatly improved the accuracy of its customer information. Hajime Matsubayashi, Group Manager, Client Marketing Support Department of Nikkei Business Publications said, "We acquired twice the number of subscriptions, even though we sent just the same number of emails as in the past," when they announced the publication of a new professional journal in May 2015. To drive acquisition of new subscribers, the new system also allows them to use 'Look-Alike' modeling - creating prospect lists by identifying people who attended the same seminars or browsed the same contents as the registered customers did.

Using agile methods, Nikkei and Fujitsu delivered in just 3 months

But the impact on the marketing campaigns is not the whole story. What is more striking is the fact that the system was developed in an incredibly short time.

Fujitsu made a commitment to delivering a tangible outcome every three months in its proposal. Nikkei BP accepted it, and started developing the integrated database in March 2015. Implementation of BI tools was completed in just six weeks, enabling the company to improve the effectiveness of marketing campaigns as described above. In addition to the use of cutting-edge ICT such as BI tools, Fujitsu engineers with expert knowledge of digital marketing were assigned to Nikkei BP to swiftly incorporate the marketers' requests into the system. Nikkei BP and Fujitsu worked together as one team in the agile development, and greatly accelerating the delivery of outcomes.

The new system was updated in rapid intervals after the integration of database, and went into full operation in December 2015. However, Mr. Narita said, "this is just the beginning of our journey." Nikkei BP is going to extend the benefits of the new marketing system to about 200 marketing staff across the company. The company also plans to continuously evolve the new marketing system - for example, the enhancement of the integrated database and the functionality of marketing automation.

Meanwhile, the company has an initiative to modernize the existing mission-critical system that links to the new system, aiming to improve the quality of data for marketing analysis.

Customer Profile

Nikkei Business Publications, Inc.

Address : NBF Platinum Tower, 1-17-3 Shirokane, Minato-ku, Tokyo, Japan
Founded : 1969
Employees : 770 (as of December 31, 2014)
URL : http://www.nikkeibp.com/

Cyber Threat Intelligence transforming security protection and safeguarding business

Scottish Water

Human Centric Innovation

When an unknown and harmful virus penetrated Scottish Water's network, they needed to act fast. They activated the Fujitsu Cyber Threat Intelligence service, which immediately got to work to identify the source of the malware, and then removed it from all infected devices. The Fujitsu service has improved Scottish Water's information security defenses, safeguarding their business through continuous monitoring and proactive responses.

"The Fujitsu Cyber Threat Intelligence service has allowed Scottish Water to strengthen our overall security posture and provides us with the level of detection and prevention services that meets our needs."

Tom Porteous, Head of Customer Services, Scottish Water

Confronting the threat of a brand new virus

Scottish Water provides drinking water to 2.45 million households and 154,000 business customers in Scotland. Every day it supplies 1.3 billion liters of drinking water and takes away 840 million liters of waste water from customers' properties and treats it before returning it to the environment. It is a publicly owned company, answerable to the Scottish Parliament and the people of Scotland, and employs over 3,600 people.

In common with any modern organization, Scottish Water is vulnerable to malware, viruses and online threats. That's why the company has been using Fujitsu's security services for over six years. More recently, Scottish Water added the Cyber Threat Intelligence (CTI) Managed Security Service, which proved particularly useful when a brand new virus breached the company's firewall.

"An email was received by Scottish Water users from a known external sender containing a URL, which was then visited by a user. The website in question, unbeknownst to the recipient of the email, was hosting scripts, that triggered a chain of requests from the website," explains Tom Porteous, Head of Customer Services at Scottish Water. "These contained hidden malware that spread through a Scottish Water site, making it inoperable from an overall IT perspective."

Even though Scottish Water's security controls and antivirus software were completely up to date, this virus, known as Teslacrypt, did not match any known signatures. It works by encrypting files on infected machines and then demanding a ransom in bitcoin currency to unlock the devices.

"This recent security breach related to a zero-day virus – also known as next-generation malware," adds Porteous. "This is a previously unknown computer virus for which

specific antivirus software signatures are not yet available, meaning we had absolutely no protection against this virus as the security software industry knew nothing about it."

That led Scottish Water to invoke the 'BREAK GLASS incident process', giving it direct access to Fujitsu's 24/7 CTI Team.

Security intelligence identifies the threat and deploys the protection

The Fujitsu Cyber Threat Intelligence Team enhances Scottish Water's defenses using intelligence-driven security analytics. It correlates across multiple security products with strategic partners and other market leading vendors to provide the context the company needs to understand the threat.

By working closely with Scottish Water, Fujitsu was able to identify the external website where the payload was being delivered from, assess the relevant risks and work with an antivirus vendor to develop a script that could block it, including ensuring further channels for the malware were also blocked on the customer network.

"Rapid response and action from Fujitsu's Security Operations Centre (SOC), enabled it to identify both the signature of the virus and the host that deployed it. This proved to be successful, as we isolated the site immediately from our wide area network," says Porteous. "Promptly on identification of the virus signature, Fujitsu was able to pass this to our virus protection vendor Symantec so, in turn, it could develop and deploy both a fix and future protection. The host was quickly identified thereafter and our network was configured to block the suspect website so no further access into Scottish Water could be made."

In addition, Fujitsu performed a scan across all network data and all of their employees' Exchange mailboxes to establish how widely the infection had circulated. During the incident, an end-user working from home had received the same email, visited the website and been immediately infected. This incident was captured quickly and both the end-user and their device were disabled from the network before being cleaned.

Safeguarding against future attacks by leveraging Fujitsu's expertise

Thanks to the rapid response of the Fujitsu CTI team, the threat was eliminated and contaminated devices were quickly disinfected, minimizing the disruption to Scottish Water's business. Having identified the virus, Fujitsu was also able to run a further scan with more detailed accuracy across the entire Scottish Water network, all end-user devices and the data center infrastructure.

During this scan, Fujitsu identified a number of users who had received the suspect email leading to the host website. These were deleted and appropriate scans run on

every end-user device to ensure no infection. No further virus payloads were identified and further mails were prevented from being delivered.

"Fujitsu's CTI service has allowed Scottish Water to strengthen our overall security posture and provides us with the level of detection and prevention services that meets our needs," continues Porteous. "The response and recovery services have been very successful and, although there is no perfect protection in the cyber world today, Scottish Water can rely on Fujitsu's capabilities."

Having successfully averted a potential disaster, neither Fujitsu nor Scottish Water are complacent, knowing that new threats emerge on a daily basis.

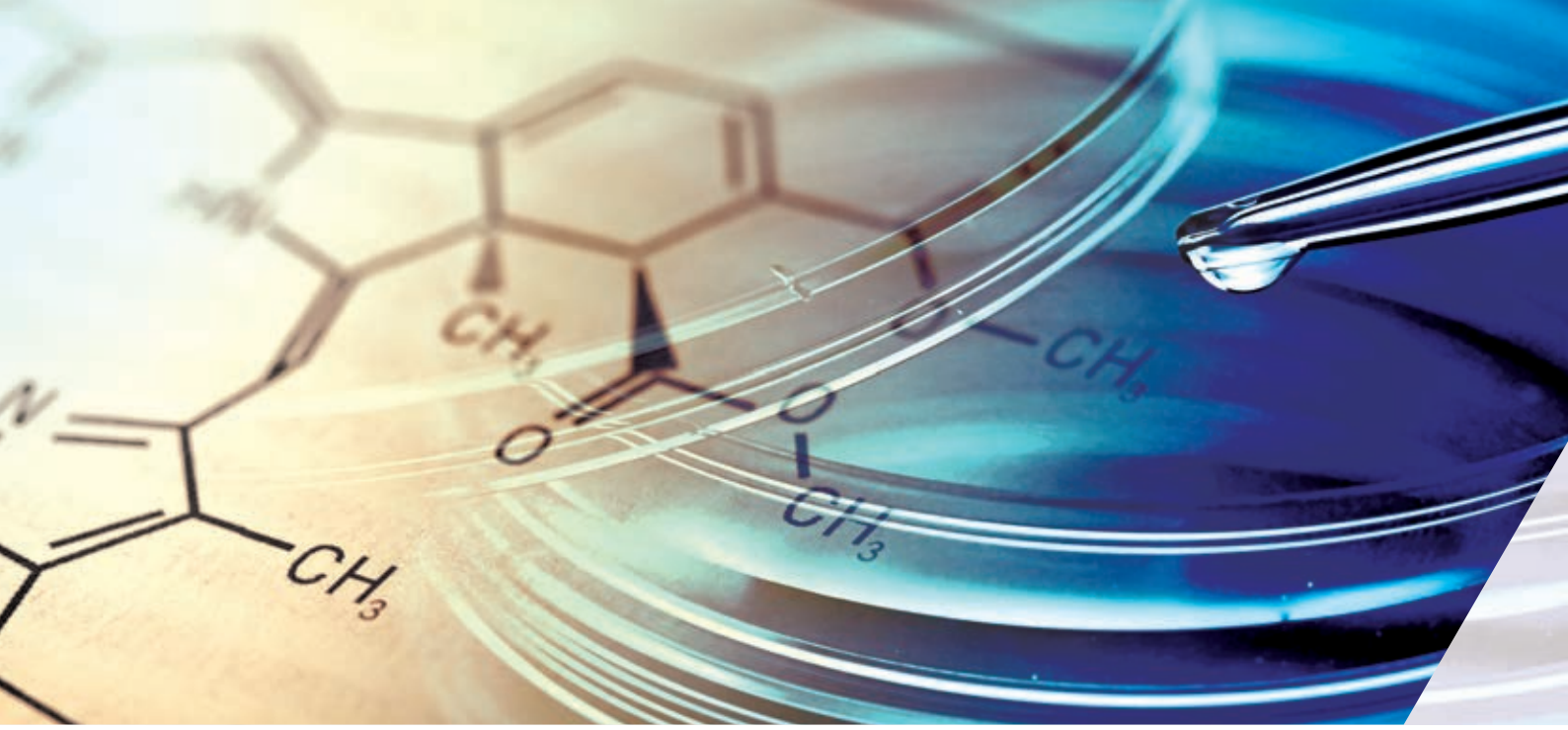
"We expect sophisticated attacks to be launched against our systems and have prepared for this eventuality by leveraging Fujitsu's expertise in this area," concludes Porteous. "In practice, such attacks are rare, however, by keeping abreast of the latest attacks and attacker techniques, we can verify that our systems are capable of detecting and repelling such threats, thanks to Fujitsu.

Porteous says, "Understanding how attacks can occur, implementing the right procedures and developing a clear response strategy can help organizations counteract future threats and recover from incidents more quickly. Fujitsu's expertise in this area has proved successful with Scottish Water and we endorse its strong capabilities in this area. "

Customer Profile

Scottish Water

Address : Dunfermline (United Kingdom)
Founded : 2002
Employees : 3,600
URL : http://www.scottishwater.co.uk/



Work style innovation encourages creativity, harnessing the aspirations of all employees

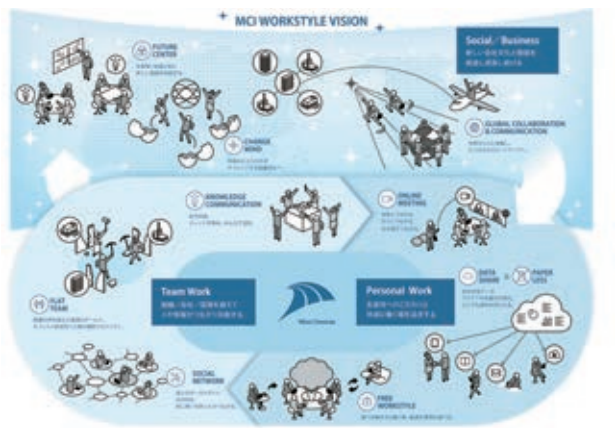
Mitsui Chemicals, Inc.

Human Centric Innovation

Diversified chemicals company Mitsui Chemicals has embarked on a work style innovation project as part of its business innovation program, the theme of which is "Creating New Customer Value through Innovation". To stimulate communication and cut across the barriers between departments and teams, a workshop was held to investigate future work styles and the ICT system required to achieve this - the aim being to build a "co-creation environment" which harnesses the expertise of each and every employee and encourages creativity.

"What we are looking to achieve through work style innovation is open collaboration across our organization, sharing knowledge among employees and creating a vibrant company."

Masaharu Kubo, Representative Director Senior Managing Executive Officer, Mitsui Chemicals, Inc.



Work style vision map

Business innovation aimed at solving problems in society, leading to new value creation

Mitsui Chemicals, Inc. is one of Japan's leading diversified chemicals companies. The firm traces its origins back more than 100 years to 1912, when it started out as a coke chemical producer. It quickly became one of the largest in Japan and continues to grow by producing resins and other industrial products, as well as the base materials for daily household consumables.

Based on a three-pronged business strategy encompassing the economy, environment, and society, Mitsui Chemicals embarked on a program of business innovation activities designed to help solve problems in society. Under the principal theme "Creating New Customer Value through Innovation," the program was launched as part of the company's 2014 Mid-Term Business Plan. The plan identified Mobility, Healthcare, and Food & Packaging as the three target segments that would drive future growth through social contribution, accelerating profit growth and the growth of next-generation business.

Using Fujitsu as a reference for implementing work style innovation

Strengthening these target segments is not the only step to be taken by Mitsui Chemicals in its drive to create new customer value. The company has also been engaged in a work style innovation project designed to encourage creativity all employees. The aim is to raise the level of business innovation capability across the company as a whole.

The work style innovation project began in late 2013, ahead of the launch of the Mid-Term Business Plan. Considering the impact generated by improving communications throughout the Mitsui Chemicals Group, it was important to invest in both tools and the spaces that would spur communication. So in addition to implementing a new information system, the company also started using its office space more effectively.

Not only would a new ICT system create a much more pleasant place to work, but this would enable employees to communicate across the divide between different departments and teams. In drawing up the blueprint for such an exercise, Mitsui Chemicals singled out the Fujitsu reference model.

The head offices of both Mitsui Chemicals and Fujitsu are located in the same building, so they each have the same floor layout. However, at the time of the project Fujitsu had 40% more employees occupying a single floor than Mitsui Chemicals. Even so, flow planning allowed smooth movement of staff so that it didn't feel cramped, and a lean and efficient office was achieved using cloud and Unified Communications (UC) tools.

In addition to this, Mitsui Chemicals agreed to the work style concept presented by Fujitsu. "Unless employees change their way of thinking, the new office environment and diversified communications would not work effectively. The vision for work style innovation needed to be shared among all Mitsui Chemicals employees." Fujitsu was appointed as the company's work style innovation partner.

Co-creation of a new way of working while having fun

Mitsui Chemicals first organized a workshop where employees could think about and discuss ideas on how to change their work style. In consultation with Fujitsu, a team of around 40 people, consisting of junior and mid-level staff from each department in the head office, attended the workshop to discuss where they wanted to be and how they wanted to be working in the future. Their ideas helped to formulate a vision for how the company's work style would look within three years.

What is unique about the Mitsui Chemicals project is that based on the 400+ ideas that emerged from the

workshop, the participants produced video sketches of several work scenarios, such as participating in online meetings from any location and searching for in-house experts. Having fun together while focusing on co-creating a future way of working, they reportedly raised the expectations and enthusiasm of staff that often work outside of the office and had previously felt left out of the loop.

To give substance to the vision formulated at the workshop, the company prepared a plan that detailed actual policies to be adopted and ICT infrastructure to be deployed. From December 2014, the company gradually started deploying the UC tools and other new ICT infrastructure required to provide web conferencing and instant messaging functionality. Fujitsu was consistently involved in the project - from the workshop through to deployment of new ICT solutions - in the triple role of consultant, designer, and engineer. Mitsui Chemicals praised Fujitsu for "excellent instruction in how work style gathers together diverse personalities."

Mitsui Chemicals' work style innovation project has only just begun. The company will continue to press forward with work style innovation by introducing guidelines and plans to fully achieve a new work style in the office and maximize the benefits of the new ICT system.

Customer Profile

Mitsui Chemicals, Inc.

Address : Shiodome City Center, 1-5-2 Higashi-Shimbashi, Minato-ku, Tokyo
Founded : 1955
Employees : 14,363 (as of March 31, 2015)
URL : http://www.mitsuichem.com/index.htm

Using RFID technology to transform the management of police inventory

Richardson Police Department

Human Centric Innovation

Richardson Police Department wanted to find an efficient way of tracking sensitive police equipment. They turned to Fujitsu GlobeRanger to provide a digital solution which has transformed the way they manage their kit. The system uses RFID tags and software to enable real-time visibility of its inventory, removing the need for time-consuming audits. It provides accountability for taxpayer spending and has the potential to track evidence, increasing the likelihood of successful public prosecutions.

"Not only did the RFID technology makes us more efficient in terms of finding and keeping records of our equipment, but transformed the way that we purchase, receive and issue equipment. We found much smoother ways of processing so that we can do a better job."

Jim Spivey, Police Chief, Richardson Police Department, Texas

9/11 changed people's thinking around the security of equipment

For over 50 years, Richardson Police Department (PD) has been providing services to citizens in trouble, emergency responders in the field, and other public safety agencies. It serves a city of just over 100,000 people and is amongst the largest of 20 police departments in Texas with 156 sworn officers.

Richardson PD manages a large and complex inventory, including 50 emergency response vehicles, 39 patrol cars, weapons, swat armor and radar units. In the wake of the terrorist attacks of 2001, Richardson Police Department had serious concerns about how these assets could best be kept secure.

"We have all the equipment you could imagine with radar units and everything else that comes with a police car. And with 156 officers we have quite a bit of uniform inventory and equipment that we issue," explains Jim Spivey. "9/11 taught us some serious lessons. It made us think differently about the security of our equipment and the sensitivity of all of these weapons and badges. It made us really think more about how do we keep the security intact?"

This concern for security was accompanied by a new era of government accountability meaning local police departments were required to become more transparent about budgets. In order to accurately keep track of its own inventory, and thus how much money had been spent, Richardson PD manually checked all items on a yearly basis."

We need to be accountable to taxpayers about how we use their hard earned money. However, that accountabil-

ity involved a very manual process. We physically went around the department once a year and counted everything to make sure that it's still where it's supposed to be," adds Spivey. "We spent months trying to count this equipment. To say that it's inefficient is an understatement."

The department suspected that there must be a more efficient and effective way to track its inventory that wouldn't compromise security. Recent developments in RFID technology pointed to a potential solution, leading the organization to design a system and issue an RFP.

"We put out feelers and found some experts in this field that helped us design a system that could help manage our inventory and our sensitive property," continues Spivey. "Knowing then that we had the potential to do something with this, we put out a request for proposal."

Real-time visibility through RFID technology

One of the companies invited to tender was GlobeRanger, a Fujitsu company, that provides RFID software and solutions which enable companies to harness data that is generated outside traditional IT environments.

"GlobeRanger was the only company that owns its software and offered a solution that would work for us. Furthermore, its experience with the Department of Defense assured us that we could depend on it," says Spivey. "GlobeRanger helped us wade through this whole idea of how to deploy RFID in a police department. We found out that there were tags for every kind of equipment you can imagine."

GlobeRanger iMotion Edgeware simplifies the development, deployment, and management of these RFID, mobile, and sensor-based tags. It seamlessly integrates existing and new technologies such as bar codes, RFID, wireless and sensor-based systems while preserving past investments. Richardson PD soon realized that one tag would not fit all of its requirements and selected six different tags to ensure its entire inventory was covered. These ranged from laundry tags for uniforms to weapon tags and sensitive vehicle security tags.

"We all have an ID card to access the system, scan our name and scan the uniform item that we're going to be issued," comments Spivey. "That system automatically updates our records and makes sure that we know who has what, how many they have, how long they've had it and when they're ready for a change-out."

Adding up to one extra officer on patrol

The new GlobeRanger platform has transformed how Richardson PD operates, making it more effective and giving visibility of every part of the inventory. This in turn provides public transparency and reduces the possibility of weapons or badges ending up in the wrong hands.

"Not only did the RFID technology make us more efficient in terms of finding and keeping records of our

equipment, but it also transformed the way that we purchase, receive and issue equipment," says Spivey. "And we found much smoother ways of processing these things so that we can do a better job."

As a result, officers are now able to inventory their cars and get on the street 15 minutes faster, which equates overall to one extra officer on patrol, courtesy of the GlobeRanger technology. It also maximizes accountability and security while ensuring that every piece of equipment can be tracked around the clock.

Having started with uniforms and then added equipment to the RFID platform, Richardson PD is now looking at other areas where it might serve a purpose for the common good.

"I hope that we're able to move this into the future by better managing our evidence," concludes Spivey. "It has to be precise but I'm convinced now, having experience with GlobeRanger, that we'll be able to use this technology to manage our evidence and have even more solid prosecutions in the future. I really appreciate what GlobeRanger has done for us and I'm sure this is something that a lot of police departments could use."

Customer Profile

Richardson Police Department

Address : Texas (United States)
Employees : 252
URL : http://www.cor.net/

Bringing world-famous online games to users much faster with a new delivery platform

Square Enix Co., Ltd.

Human Centric Innovation

The global gaming industry is continuing to enjoy unabated growth. Square Enix, a leading Japanese gaming company, responded to ongoing growth in the European market by building a new delivery platform for online gamers based in that region. Fujitsu provided a datacenter equipped with large-scale computing infrastructure, combined with comprehensive maintenance support for trouble-free operation. This new platform accelerated data delivery times for online gaming connections, leading to a greatly enhanced player experience for Europe-based gamers.

"Considering the current state of the gaming industry, it is crucial for Square Enix to further expand its operations outside Japan. Our ICT team is committed to following through on this policy. We look forward to the solid support of Fujitsu, with its rich international experience, as we continue to develop our ICT infrastructure globally."

Hirokazu Nishikado, Executive Officer, Square Enix Co., Ltd.

Responding to global growth in online gaming

The gaming market is continuing to expand around the world. According to the 2015 Digital Content White Paper, produced by the Digital Content Association of Japan, the global market of the gaming industry in 2014 reached $84 billion. The Japanese market accounted for approximately $14 billion – a figure that has eclipsed Japan's movie market. One of the key reasons for this growth is the increasing prevalence of easy-to-play game content, such as digitally delivered and online games, which means that anyone can enjoy playing more readily than in the past.

Square Enix is a total entertainment company operating in the amusement, publishing, and property rights management businesses, but with digital entertainment as its core focus. It is one of the leading game content producers in Japan and provides a host of online games to players worldwide. The company's portfolio of popular Massively Multiplayer Online (MMO) titles includes FINAL FANTASY XI & XIV and DRAGON QUEST X.

An optimal online gaming experience demands a stable, large-scale, high-performance server environment that can handle the concentrated volume of accesses by users from around the world. Any delay in network connection time caused by distance, known as latency, is a major issue. Square Enix had been delivering game content to its global audience from MMO content delivery platforms in Japan and North America. As a result, online gamers in Europe – remote from either of these platforms – missed out on the immediacy experienced by users in Japan and North America. Proximity is critical to rapid

delivery times for content-rich games, so Square Enix resolved to provide an enhanced online gaming experience for users in Europe by building a new, locally based delivery solution.

Comprehensive support from platform development to infrastructure management

Fujitsu has a long history of working together with Square Enix as a trusted business partner, providing the company's social game content distribution platforms in Japan and North America via the highly flexible Fujitsu Nifty Cloud service. Also, in the field of game development, Fujitsu supported the expansion of Square Enix's operations by creating network infrastructure in China for its offshore development activities. Given this background, Square Enix naturally turned to Fujitsu for assistance in creating the new MMO content delivery platform for Europe.

Hirokazu Nishikado, Executive Officer of Square Enix explained the company's objectives: "We were very particular about choosing the optimal location. Plus, important factors included the choice of primary Internet Service Provider (ISP) and the Internet Exchange (IX) that we would be able to connect to. Needless to say, we also had to focus on keeping costs down." As a result, Fujitsu was tasked with providing robust infrastructure combined with comprehensive support. This solution would need to deliver low-cost operations with the flexibility to expand into other regions, but it could not require any Square Enix employees to be dispatched overseas.

To provide a solid network foundation, Fujitsu proposed a system comprising several hundred PRIMERGY servers installed in a datacenter located near the largest game user base in Europe. Once the project was under way, Fujitsu collaborated with its European subsidiaries to provide appropriate support on the many issues common to global projects, including cultural expectations, time differences, and local laws and regulations. This allowed the new infrastructure to be built in a short timeframe. Furthermore, the Fujitsu operations center in Japan liaised closely with the customer's Japan-based operations team, making it possible to create a stable operating environment with low fixed costs, requiring no Square Enix staff to be based in Europe.

Significantly enhanced gaming experience leads to growth in user numbers

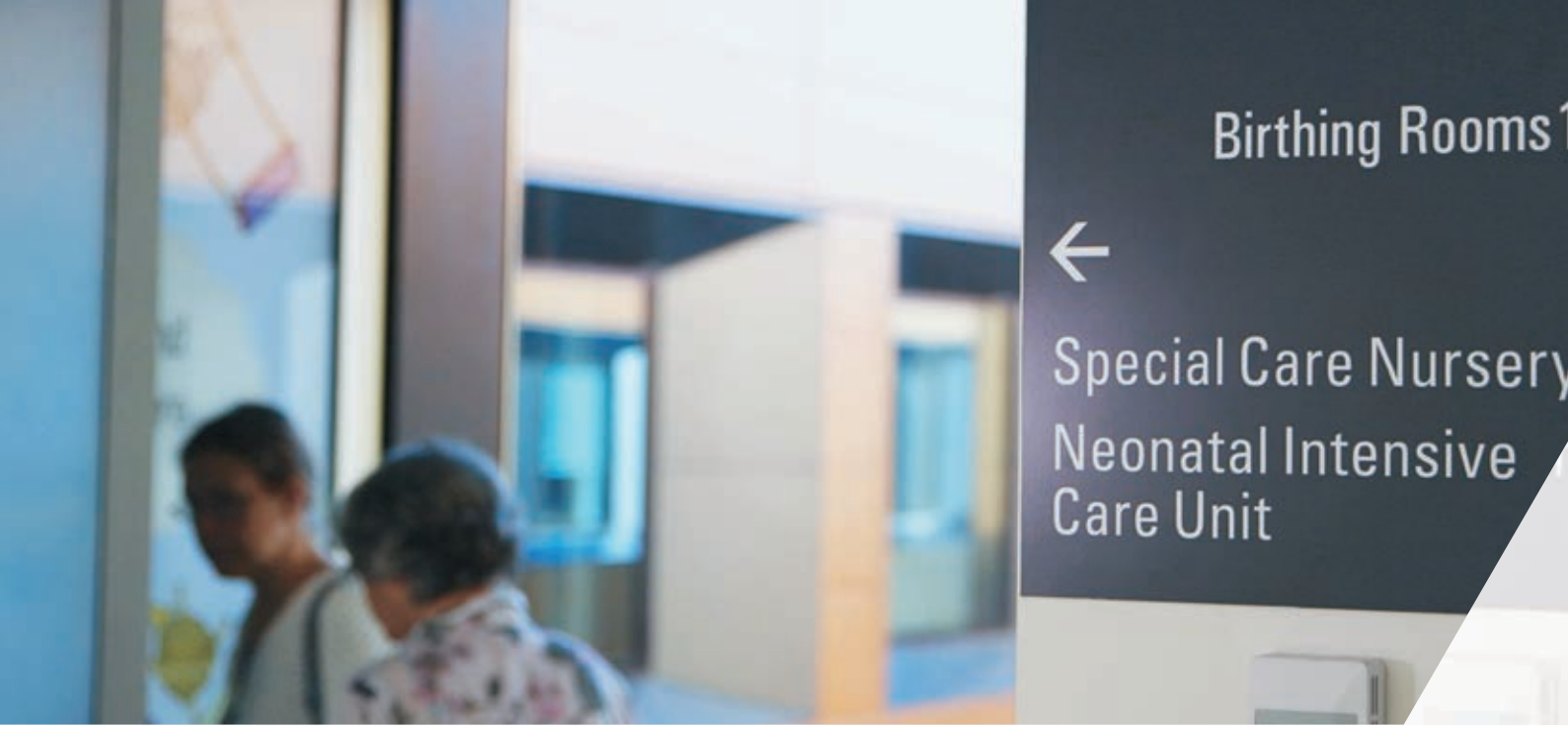
Since commencing the provision of games via the new European MMO content delivery platform in October 2015, the latency issue has been resolved and European users have experienced a dramatic boost in responsiveness. One European gamer commented on social media, "As far as speed is concerned, it's like a completely different game." Thanks to this dramatic improvement in user experience, the number of European gamers is rising and Square Enix plans to capitalize on this business growth. The company is considering further strengthening its game content delivery infrastructure to help trigger additional expansion.

Importantly, Square Enix now also has the confidence by knowing that it can successfully build, operate and manage global infrastructure from Japan, thereby alleviating the stress associated with any similar ventures in the future. Based on this positive outcome, the company plans to extend its content delivery platforms to new regions to further improve the experience of its legions of loyal game users. Mr. Hirokazu Nishikado comments, "Square Enix fully expects Fujitsu to continue supporting us as we deploy our global ICT infrastructure." He then concludes, "we would also like to engage with Fujitsu in some new initiative that will radically change the interaction between games and technology and people."

Customer Profile

Square Enix Co., Ltd.

Address : 6-27-30 Shinjuku, Shinjuku-ku, Tokyo, Japan
Founded : 2008
Employees : 3,864 (consolidated; as of March 2015)
URL : http://www.jp.square-enix.com/



Human centric technology brings parents and their babies together

ACT Health (Canberra Hospital)

Human Centric Innovation

Canberra Hospital caters for people across a huge area, and regular visiting is difficult for families who live far away. The hospital deployed an in-house webcam system in its neonatal intensive care unit, to transform the experience for parents. They worked with Fujitsu and ADTEC to design a secure, user-friendly webcam solution that streams to any location via the Fujitsu cloud. The new system is not only convenient, it is completely secure, giving parents peace of mind.

"We have had visits from lots of hospitals to see the webcam solution for themselves and the overwhelming feedback is that they love it. It is an intuitive, user-friendly and secure way of bringing parents and baby together over long distances."

Belinda Connors, NICUCAM Project Officer, ACT Health Directorate

Helping parents to bond with their babies

Canberra Hospital is located in Garran in the Australian Capital Territory, housing 672 beds and catering to a population of about 550,000. It was formed when the Woden Valley Hospital and the Royal Canberra Hospital were amalgamated in 1991, and was renamed the Canberra Hospital in 1996. The institution acts as a teaching hospital for the Australian National University Medical School and the University of Canberra's School of Nursing.

Canberra Hospital's Neonatal Unit serves a radius of up to 800km with around 40% of its patients coming from outside the city. This presents a significant challenge to those travelling with severe illnesses, but particularly for parents with infants in the Neonatal Intensive Care Unit (NICU) and Special Care Nursery (SCN).

"Babies can be with us for weeks so for parents with work commitments and other children to look after, it is difficult to spend as much time with their new baby as they would like," explains Professor Kecskes, Neonatologist, ACT Health Directorate. "This leads to separation anxiety and great stress while also making it hard for us to teach them how to best care for the new arrival."

The hospital wanted to find an innovative way to allow parents to see and bond with their baby while demonstrating the special needs involved. After seeing a webcam system in a Berlin Hospital, Professor Kecskes led the NICU team to implement their own in-house solution, however, it was not without its problems.

"It was clunky with a poor interface and limited functionality, depending on staff to allocate and re-allocate babies to a specific camera. For example, we often move babies to a different cot if they get sick, meaning there

was a risk that parents logging on could be looking at a different baby," adds Kecskes. "We wanted a more dynamic, automated solution that would offer more flexibility and reliability."

Following a tender process, the hospital elected to partner with local specialist ADTEC and Fujitsu. ADTEC is an industry leader in connecting people in urgent situations. For over 15 years, numerous organizations and companies have trusted ADTEC with their emergency alerting and communication network requirements.

Privacy is crucial in a hospital environment

The development of the solution involved careful consideration of the unique factors of the hospital environment and its stringent needs for security and privacy. The process was highly complex and required careful examination of sensitive issues to come to fruition.

"Security and authentication are critical in this project, particularly when you consider we are streaming live images of young babies," says Belinda Connors, the NICUCAM Project Officer. "We also wanted extra features such as the ability for parents to upload photos, add specific baby info and blog."

Security measures taken in the design include SSL encoding of data streams and a secure stream that requires remote computer authentication and token authentication to access any streaming components. It also includes integration with video streaming and system monitoring for a seamless and user-friendly experience.

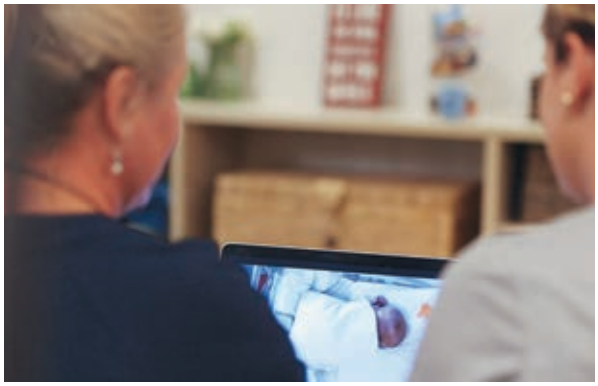
The streaming server is installed on the Fujitsu cloud, providing high reliability and compatibility with a range of streaming protocols. This wealth of compatibility means that the hospital can comfortably deal with any current video app or device available now and in the future.

Contribution to staff and regional hospitals

One of the key advantages is that it helps parents to bond with their baby regardless of their physical location. A survey conducted by the hospital shows that this has led to a 98% reduction in stress, which in turn makes life easier for families and staff. The system also enables nurses to demonstrate how to carry out simple procedures such as inserting a feeding tube.

"It helps bring parents and children together no matter where they might be and it allows relatives around the world to virtually visit their new arrival," continues Connors. "It's easy for nurses to turn off when necessary or switch feeds between cots to ensure they are with the right baby. That makes for happier staff and more relaxed parents."

Canberra Hospital has also been impressed by the reliability of the ADTEC/Fujitsu solution. Whereas the previous in-house system was prone to regular downtime, the new solution has experienced 100% uptime. And, in



the case of any problems, there is the peace of mind of 24/7 support from both partners.

The camera system also enables outreach teaching to regional hospitals via video link. This networking improves professional relationships with the surrounding region and also facilitates the exchange of knowledge to improve the care and treatment of new born babies.

Furthermore, it makes the hospital a more attractive choice for patients by enabling it to offer new services, building its reputation as a pioneer in the field of healthcare. It also reduces the number of people trying to access the ICU at peak times, which frees up staff to focus on healthcare rather than facilitating visitors.

Canberra Hospital now enjoys a cost-effective, stable and secure webcam solution that encourages bonding between parents and premature or sick babies. The success of the camera system solution has encouraged other health care organizations to evaluate the solution.

"We've had visits from lots of hospitals to see the webcam solution for themselves and the overwhelming feedback is that they love it," concludes Connors. "It's an intuitive, user-friendly and secure way of bringing parents and baby together over long distances."

Prof Kecskes states, "We've had people from every continent log on securely to see their baby or relative. The webcam solution from ADTEC and Fujitsu is really helping people connect in times of great stress."

Customer Profile

ACT Health (Canberra Hospital)

Address : Canberra (Australia)
Founded : 1914
URL : http://www.health.act.gov.au

Turning apartment rooftops into 'virtual power plants', green energy through mega-solar power generation

Leopalace21 Corporation

Human Centric Innovation

Leopalace21 has launched an innovative business by installing photovoltaic (PV) solar panel systems on apartment rooftops throughout Japan to operate as utility-scale virtual power plants. The company has adopted Fujitsu's Venus Solar as the ICT infrastructure solution for its operations management and maintenance needs, remotely monitoring the minute-by-minute operational status of systems distributed across 4,500 apartment buildings. This has enhanced the efficiency of its mega-solar operations by identifying the cause of any drop in output, thereby ensuring that every opportunity to generate power is harnessed.

"We have been able to make a significant contribution toward creating a green society by engaging in a verification project together with Fujitsu and implementing ICT infrastructure to remotely monitor installations dotted throughout the country."

Shigeru Ashida, General Manager of Business Plan Director, Executive Director, Leopalace21 Corporation

Contributing to society through virtual mega-solar power plants on apartment rooftops

Leopalace21 Corporation is a major real estate leasing firm. The company approaches landowners with proposals for effective land usage, undertakes the construction of condominiums or apartment blocks on that land, then bulk-leases and manages each building after completion. Leopalace21 is also engaged in the business of leasing individual apartments to tenants throughout Japan. The company has recently begun to actively pursue opportunities overseas, establishing local offices in Southeast Asia – including Thailand, Vietnam, and the Philippines – to provide real estate brokerage services.

With the aim of boosting its contribution to society, Leopalace21 is focusing on energy projects, one of which is the virtual mega-solar project known as Roof Mega-solar Project. This involves using the rooftops of its leased apartments as 'power plants' to harvest solar power as a source of eco-friendly renewable energy. As of September 2015, the company had installed PV systems on the rooftops of 4,500 apartment buildings, with a total generating capacity of 70 Megawatts.

A chance encounter with a Fujitsu employee overcomes challenges and leads to new business

Roof Mega-solar Project reached the point where it could generate enough eco-friendly solar power to meet the annual needs of more than 18,000 typical households. But installing PV systems was not as attractive to apartment owners as the company had hoped. Some owners were already receiving stable rental income and were not necessarily keen to invest extra funds for the

installation of power generating facilities.

Furthermore, even with the consent of apartment owners, no substantial operation and maintenance service existed to cater for small-to-medium scale apartment rooftop installations (unlike for single-family detached houses and utility-scale solar projects).

The solution came from a chance encounter. Shigeru Ashida, Executive Director, Leopalace21 Corporation recounts, "The breakthrough came when a Fujitsu employee who happened to be living in an apartment managed by our company devised the 'roof-lease' idea, which entails leasing roof space from apartment owners in order to generate power."

Remotely monitoring installations throughout Japan by applying cutting-edge ICT

All of the power generated from apartment rooftops is sold to major power utilities at a fixed-price, and some of this income is paid to apartment owners for renting their rooftop space. This means that apartment owners can actually earn extra income without having to bear the upfront investment costs. In addition, the cooperation of many apartment owners promotes the deployment of renewable energy, bringing us a step closer to creating a green society.

The business model jointly developed by Leopalace21 and Fujitsu was launched as a pilot project in Fukushima Prefecture; September 2012 saw verification start at 70 apartments in that prefecture. The project helped staff acquire expertise in using ICT to bring together small-to-medium scale PV systems installed on physically disparate apartment rooftops and run them as a virtual mega-solar power generation system. At the same time, the project confirmed that the "roof-lease" model is conducive to reducing the environmental footprint.

Building on these results, Leopalace21 launched its Roof Mega-solar Project business nationwide. The group company established to drive this initiative has so far installed 4,500 PV systems over three years. It has increased year-on-year the amount of power generated and sold.

Fujitsu provides infrastructure support for the project. The PV remote monitoring solution known as "Venus Solar" was developed by Fujitsu based on its understanding of Leopalace21's needs, the know-how accumulated through many years of remote monitoring and control of plants and buildings, and the knowledge acquired through the Fukushima Prefecture Pilot Project for Virtual Solar Power Plant. Each apartment complex has four or five power conditioners for PV power generation, and the power output by each is collected at one-minute intervals for monitoring at a datacenter.

Mr. Ashida, explains that via remote monitoring, "We are now able to accurately monitor the status of facilities

Monitoring power generation

throughout Japan from the datacenter and we can see whether any drop in output is due to changes in weather, shadows cast by surrounding buildings, or technical problems. Because identical equipment is installed on the apartment building rooftops, if there are noticeable differences in the power delivered by each power conditioner, we are able to conclude that it is most likely caused by a technical fault." In describing the results produced by the detailed monitoring service provided by Venus Solar, Mr. Ashida added, "The monitoring service leads to stable business income because it guards against the loss of energy generation opportunities caused by system failures."

Leopalace21 will continue to accelerate its program of initiatives that contribute to society. For example, the company is considering public disclosure of energy production figures from the rooftop mega-solar installations operating at nearly 5,000 locations around the country. This move will allow apartment owners who are considering installing solar PV to gain an accurate understanding of the generating capacity and economic viability of a solar system. Mr. Ashida concludes, "We ask Fujitsu to provide their ongoing support and look forward to further innovative proposals for our next new project."

Customer Profile

Leopalace21 Corporation

Address : 2-54-11 Honcho, Nakano-ku, Tokyo, Japan
Founded : 1973
Employees : 7,765 (as of Dec 31, 2015)
URL : http://eg.leopalace21.com/

Industry, Government and Academia establish partnership for sustainable urbanization

Agency for Science, Technology and Research(A*STAR) Singapore Management University

Human Centric Innovation

The Agency for Science, Technology and Research, Singapore Management University and Fujitsu have together established the Urban Computing & Engineering Centre of Excellence (CoE). Researchers from each of the three parties develop data analytics and modelling and simulation technologies, using HPC and analytics infrastructure from Fujitsu and real urban data sets from Singapore. This enables the CoE to create sustainable solutions to solve multiple social challenges in the modern urban environment.

"The purpose of the CoE is to solve local urban challenges; bringing together expertise across three organizations to develop solutions that can be applied globally. Fujitsu is playing a key role in the joint research and commercialization of the outcome."

*Dr. Hazel Khoo, Deputy Executive Director of the Science and Engineering Research Council, A*STAR*

The journey toward a Smart Nation

The Agency for Science, Technology and Research (A*STAR) is one of the government agencies that fosters world-class scientific research and talent to drive economic growth and transform Singapore into a vibrant knowledge-based and innovation-driven economy. As an agency for the Ministry of Trade and Industry in Singapore, it focuses on leveraging cutting-edge technological capabilities to solve social issues, such as rapid urbanization, and boost economic performance. Singapore is building the World's first Smart Nation by harnessing technology to the fullest with the aim of improving the lives of citizens, creating more opportunities, and building stronger communities. A*STAR is playing a key role in Singapore's Smart Nation journey.

Establishing the Urban Computing & Engineering Centre of Excellence

A*STAR engages with enterprises and universities to tackle business and social issues. Fujitsu is one of these partners, providing high-performance computing (HPC) solutions. A*STAR has also collaborated with the Singapore Management University (SMU), which too has a long-term relationship with Fujitsu.

These three parties began a discussion on how they could contribute to solving urbanization issues. They came together to invest 54 million Singapore dollars to create the CoE which is designed to investigate and address the challenges frequently faced by highly urbanized cities. The CoE is also supported by the National Research Foundation (NRF).

In particular, the CoE identified two key areas to explore:

Dynamic Mobility Management, which examines and improves the dynamics of commuter traffic in urban spaces, as well as managing crowds under extreme conditions; and Maritime and Port Optimization, which looks at the design of integrated logistics of shipments.

"Our three parties each made a commitment to exploring urban challenges, so it was a good fit," added Steven Miller, Dean of Information Systems at SMU. "The main challenge was in getting these three different types of organizations to work effectively together and to understand our respective responsibilities."

A*STAR, SMU and Fujitsu have different roles and cultures, which made the collaboration challenging at the beginning. However, as all shared the same goals and commitment, this united and motivated the CoE executives and employees. Also, they began to recognize and appreciate that each member brings different talents and expertise to the team.

"Fujitsu took the lead on the design of our Urban Computing Platform, as it has tremendous depth in advanced computing," continued Miller. "Then we all worked together on identifying what problems we should address and on communicating with external parties to understand the real-world user requirements." Fujitsu also brings its expertise in big data, mobility and HPC to the CoE. A*STAR contributes capabilities in big data, simulation technologies, and behavioral science. Furthermore, SMU's expertise includes Artificial Intelligence-based methods and software systems for planning, scheduling and decision making.

Using Singapore as a living laboratory

The CoE now employs about 80 people with diverse backgrounds and skills. It has built an Urban Computing Platform equipped to handle the complex analytics, using a combination of PRIMERGY servers and PRIMEFLEX for Hadoop. This Urban Computing Platform also enables the CoE to conduct large-scale test-bedding with external partners. The analytics engine runs on FUJITSU SPATIOWL Solution, which can process and assimilate a significant amount of temporal and spatial data, enabling the CoE to develop new algorithms on how to influence behavior and thus mitigate congestion. This data comes from using Singapore as a living laboratory to collect traffic, geographic and other information.

"Crowd traffic has its own rhythms and unusual patterns of sudden changes, like the weather, making it difficult to predict. There are multiple factors to consider in order to optimize mobility capacity in the short term without building new roads and infrastructure, which can only be done in the long term," remarked Miller. "We take the current situation and explore how to better accommodate rising numbers and sudden surges in the existing infrastructure, through the R&D efforts of the CoE using Fujitsu's HPC." By harvesting data from three areas: a shopping

center, a convention center and a taxi-sharing field test, the CoE is demonstrating how to feed real world information into the system and quickly model potential outcomes. This in turn generates solutions for performance improvement that can be translated back into reality by the government or business organizations and eventually productized and made available to other countries and organizations.

The Maritime Port Optimization solution is designed to help vessels in the Singapore Strait access quicker routes by predicting hotspots and problematic situations, thus improving vessel turnaround time. It also helps optimize port operations in cargo flow and handling. In turn, the position of the port of Singapore as a world leading hub is strengthened.

"It all ties into the Singapore government's recent Smart Nation initiative, which aims to integrate technology to solve social and urban problems," comments Dr. Hazel Khoo, Deputy Executive Director of the Science and Engineering Research Council, A*STAR. "Our work at the CoE will have a direct impact on how we live our lives and conduct business in the modern world."

With the first phase of the project well under way and the second phase to kick off soon, the CoE has already established itself as a leading source of research, combined with tangible solutions, for the very real issues facing urban environments.

"We are proud to partner with Fujitsu to set a good global example of how the private sector, university-based R&D and national government-based R&D can work together," concluded Miller. "Urban issues by definition have multiple stakeholders and jurisdictions; putting together the CoE has given us a good understanding of how to effectively manage these complexities."

Partner profile

Agency for Science, Technology and Research (A*STAR)

URL : http://www.a-star.edu.sg/

Singapore Management University

URL : http://www.smu.edu.sg/

Co-creating a business model for strong, dynamic agriculture that uses diverse sources of knowledge

Iwata Smart Agriculture Project
Joint Venture of Fujitsu, ORIX, and Masuda Seed

Human Centric Innovation

Three companies have embarked on an agricultural innovation project - a company with an extensive agricultural products distribution network, a plant nursery business with expertise in developing seed varieties, and an ICT company skilled in digital technologies. Launched in early 2016, the Iwata Smart Agriculture Project aims to co-create a new business model involving a number of operators who will combine their knowledge and expertise to establish an agricultural value chain focused on creating a strong agricultural base in the Iwata area.

"The new project is a venture with a perspective across the entire value chain consistent with our vision for agricultural innovation, so we were definitely keen to be involved in the co-creation of a new business model."

Masayuki Kurashina, General Manager, Agribusiness Department, ORIX Corporation

"We aim to take Japanese plant and seed varieties to the world by positioning this new project as our Plant and Seedling Showroom. That is the true appeal of the co-creation project for us."

Hidemi Masuda, Senior Managing Director, Masuda Seed Co., Ltd.

Structural issues underlying the strong Japanese agricultural export market

With exports of Japanese agricultural commodities increasing in the wake of the worldwide boom in Japanese cuisine, export figures for 2015 showed a 24.2% increase over the previous year, reaching 443.2 billion yen. On their own, these figures would seem to indicate a bright future for Japanese agriculture, but a closer inspection reveals underlying structural issues that need to be resolved if the sector is to continue growing.

For one, most agricultural enterprises are small and lack the resources to invest in innovation and growth. Furthermore, the farming population in Japan is aging rapidly. If younger people are unwilling to work in agriculture and the number of people taking up farming dwindles, this will lead to farmland being abandoned and uncultivated. As a result, yields will decline, negatively impacting regional economies.

Agricultural business has become globalized and more competitive. This all means that it is now imperative for agriculture in Japan to make drastic changes.

Connecting the market, producers, and nursery business

With our "Akisai" Food and Agriculture Cloud offering,

Fujitsu has been engaging in smart agriculture projects to contribute to improving the food and agriculture industry since 2012. These have the objective of using ICT to harness different sources of knowledge and information, from a variety of operators, to deliver regional development via a strengthened agricultural sector. This is also a challenge for Fujitsu to enter the agriculture sector as a business owner rather than as purely an ICT provider.

The new Iwata Smart Agriculture Project is one of the first initiatives of the smart agriculture. It was launched with the aim of creating a strong agricultural base. ORIX Corporation, Masuda Seed Co., Ltd., and Fujitsu co-founded a joint venture company in early 2016 and started its operation. ORIX provides innovative financial services as its core focus but is also involved in other business services in a variety of sectors including real estate and energy. Masuda Seed is a plant nursery business that has developed many new seed varieties over its 90-year history. Fujitsu has a solid track record in implementing technology-based agricultural solutions.

The most striking feature of this project is that it creates an ecosystem, bringing together the strengths and diverse knowledge of multiple operators to build an agricultural value chain, thus co-creating a new business model. Having built a national customer distribution network through financial services, ORIX's forte is its ability to directly gauge the needs of the food service and retail industries. This strength is used for a 'market-in' approach which involves planned production based on customer demand. It is hoped that if this approach can inform the types of vegetables that consumers want through retail outlets, then this will encourage producers to take up the challenge of cultivating new varieties.

This will also benefit seed and plant nursery businesses that undertake agricultural R&D. Until now these businesses have been a well-kept secret. Japanese growers have had little contact with the international market and many of the new varieties that have been painstakingly developed remain undiscovered. However, the new project should address this issue by acting as the agent between the market, producers, and nursery businesses. The advantage of having a place for co-creation is that it generates support for nursery businesses, as evidenced by the fact that several companies have already approached Masuda Seed to participate as partners in the new project.

Establishing a new style of agriculture that fully leverages digital technologies

The Iwata Smart Agriculture Project will establish a new style of agriculture that takes full advantage of digital technologies including sensors, networks and cloud. It will initially address the strong market demand for tomatoes, bell peppers, and salad kale.

A plant factory consisting of several large greenhouses is to be built in the city of Iwata in Shizuoka Prefecture, which receives about 15% more sunlight per year than the national average and is therefore very suitable for greenhouse horticulture. Sensors for measuring temperature, humidity, CO_2 levels, and the concentration of hydroponic solutions will be deployed in these greenhouses.

Monitoring the conditions of greenhouse

The data collected by the sensors will be sent via the network for storage in Fujitsu's "Akisai" Food and Agriculture Cloud. Remote real-time monitoring of the climate in the greenhouses - including remote opening and closing of windows, starting and stopping of exhaust fans, air temperature control, and other features - gradually builds a technical understanding of how to optimally maintain the most suitable environment for vegetable production.

In the future, the cultivation performance information stored in Akisai will include optimum sensor settings for each seed variety. In addition, greenhouse environment control methods will be packaged with a view to using them for developing a licensing business that achieves stable quality and yield. In the words of Takeshi Sudou, Deputy Head of Unit, Food & Agriculture Open Innovation Planning Office, Innovation Business Unit, Fujitsu, "Our aim is to be the driving force behind agricultural innovation in Japan through co-creation, and to contribute to regional revitalization through agriculture."

Partner Profile

Smart Agriculture Iwata Co., Ltd.

Address : Nakaizumi, Iwata, Shizuoka Prefecture
Founded : 2015

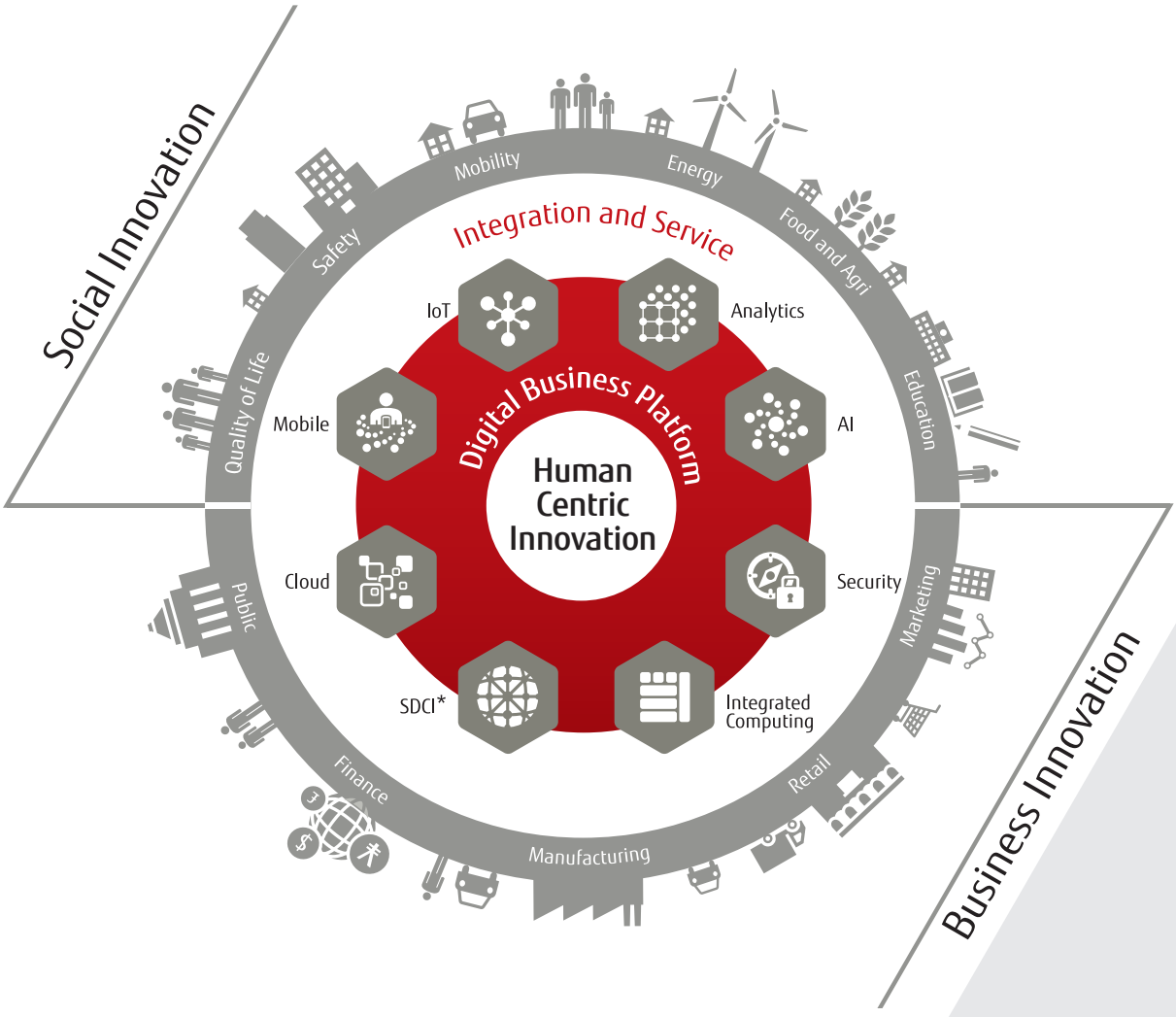
Services, Products and Solutions

Fujitsu's broad portfolio for digital transformation

Every day, Fujitsu's 160,000 employees are working with customers, to help them achieve digital transformation and help solve difficult social challenges. Through these activities, we aim to realize our vision of a Human Centric Intelligent Society. Fujitsu puts people at the center of everything, working on the research and development of industry-leading technologies and the delivery of technology-based services. Our people collaborate across different functional groups, delivering a portfolio of services, products and solutions that meet the demands of our customers' digital businesses:

- FUJITSU Digital Business Platform MetaArc
- Systems integration and services for co-creation
- Products and services featuring advanced technologies:
  Cloud, Mobile, IoT, Analytics, AI, Security, Computing and Networks

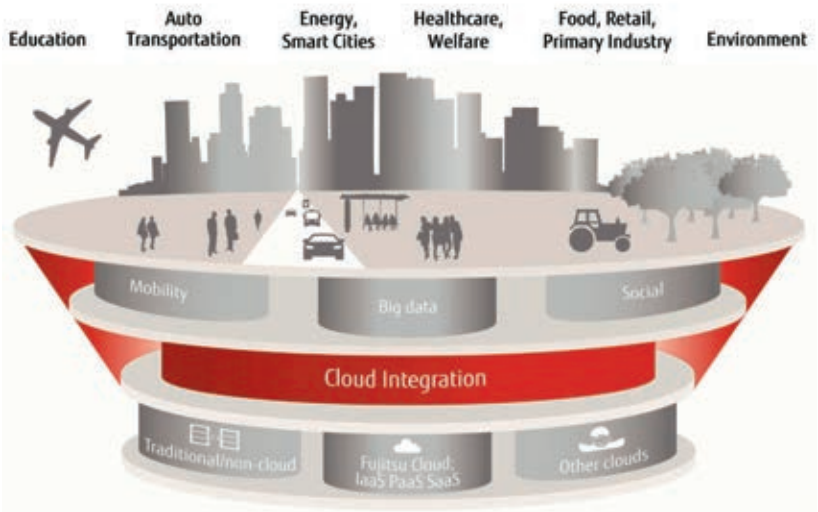
Fujitsu integrates these digital technologies on MetaArc, and contributes to the digital transformation of our customers.



*SDCI : Software-Defined Connected Infrastructure

Integration

Fujitsu delivers next level solutions for customers in a competitive environment. Leveraging the latest industry trends, advanced system development and business expertise, Fujitsu provides end-to-end integration services from planning to system operation.



Services, Products and Solutions

Services

Business and Application Services

Fujitsu's Business and Application Services leverage innovation from the Fujitsu group and partners, delighting our customers via an industry led approach, with a focus around complex systems integration that enables our customets' digital transformation. In balancing new and existing technology commitments, our comprehensive business and application services are ideally placed to help customers successfully deliver their key transformation initiatives. Fujitsu provides a full range of application services to support the development, integration, testing, deployment and ongoing management of both custom developed and packaged applications.

■ Business Consulting

Fujitsu's Business Consulting enables customers to achieve greater operational efficiencies, performance and maximize ROI of current existing and planned IT implementations and business strategies. Fujitsu helps organizations to formulate strategies through services including business case development, road-mapping and assessment services. Fujitsu manages every aspect of business change to ensure that the impact on an organization is minimal. Fujitsu XpressWay is a cost-effective output-focused IT business consultancy approach which offers your organization a new way to get more out of IT. We blend together business and technical capabilities, to deliver the outcomes you need to improve agility and exploit new market opportunities.

■ IT Consulting

Fujitsu helps organizations understand what is the best technology to use to achieve business objectives, whilst understanding emerging technologies. Fujitsu uses a consulting led approach, aided by robust assessment tools. Services include: IT Strategy and Effectiveness, Application Value Assessment, Application Modernization, Data Center Assessment, and IT Service Management.

■ Application Development and Integration

Application Development and Integration Services help customers respond to change by defining and delivering application transformation projects. Fujitsu's experience in dealing with complex multi-vendor environments and emerging trends/technologies, ensures that projects are managed professionally and on budget. Offerings include: Package Implementation Services, Custom Application Development, Systems Integration, Application Modernization and Migration, and Test and Validation Services.

■ Innovative Application Services

To help our customers benefit from digitalization, Fujitsu is rapidly expanding a range of innovative, vertical focused offerings to address specific industry challenges. Examples include Retail Analytics, Smart Ticketing for the transport sector and Augmented Reality for utilities.

■ Application Management and Outsourcing

Fujitsu recognizes that organizations have invested a lot in their current application landscape so we ensure that the investment is not lost and unlike many of our competitors Fujitsu does not singularly promote a technology. This enables organizations to create business value and agility, and to derive maximum value from the application landscape.
With the introduction of Transformational Application Managed Services (Transformational AMS) Fujitsu provides an end-to-end offering for supporting the application framework to ensure it meets the changing needs of organizations adopting digital technologies. Fujitsu is helping organizations to transform in this fast changing world through an integrated bi-modal approach which builds the bridge between the digital world and existing business operations. This includes proactive management of the global applications landscape, to keep the business running and up-to-date; innovations driven by business insights to identify and drive change, for greater business impact; and automation-centric transformation to enable the rapid realization of goals

Services, Products and Solutions

Services

Business and Application Services

■ Enterprise Applications

Fujitsu's Enterprise Applications services cover the design, development, configuration, implementation, rollout and ongoing management of solutions based on packaged ERP applications. Fujitsu provides scalable services for market leading software products such as SAP and Oracle, covering core business functions including finance, HR and supply chain management.

■ SAP Services

Enterprises around the world have made significant investments in SAP technologies to assist with this challenge but need support in getting the most out of their vast capabilities. As a trusted SAP Global Partner for over 40 years, Fujitsu offers a complete range of tailored, future-proof SAP services that help customers simplify, innovate and grow. We are driving innovation across all areas of financial and operational performance–from cloud services via managed SAP operations to solutions and services for on-premises deployments.

■ Oracle Services

With a 30+ year strategic relationship with Oracle, Fujitsu is a Global end-to-end Oracle Solution Partner with over 60 Specialization certifications across the Oracle stack that encompass Cloud, Hosting / Hardware, Systems Integration and Application Managed Support. Fujitsu balances the business requirements for Fast IT, digital transformation and cloud with existing technology commitments, to help customers successfully accomplish their key transformation initiatives with Oracle's leading technology and Fujitsu Oracle Innovation.

■ FUJITSU Cloud Services Management

- Reducing the cost and complexity of managing hybrid IT –

FUJITSU Cloud Services Management addresses the key challenges of managing a hybrid IT landscape of cloud and non-cloud systems while delivering savings in operational management costs. FUJITSU Cloud Services Management enables you to integrate and manage new services with existing infrastructure. It provides a complete set of integration tools to source and adopt new cloud services and comprises: management, resource provisioning and reporting, process and data integration, data management, system and process monitoring, service management, identity and access management. Cost analytics, cost simulation and report management provide enhanced reporting and financial management

■ Applications Modernization

A comprehensive set of Application Modernization services that enable customers to more easily migrate or modernize legacy applications to reap the benefits of cloud services, minimizing the risks and costs - and giving them greater flexibility for the future.
Applications Modernization comprises:
- Application Value Assessment: identifying which applications would benefit from applications modernization and cloud deployment.
- Application Modernization: utilizing the cloud without moving the entire application to the cloud - for instance, moving the front end or database.
- Application Migration: migrating entire applications to the cloud.

Managed Infrastructure Services

Fujitsu's Managed Infrastructure Services provide a cost effective, reliable and flexible ICT infrastructure to customers. This infrastructure may be owned by the customer or Fujitsu. Our services comprise Data Center Services, End User Services, Service Desk, Technical and Maintenance Services, Cloud, and Network and Communication Services as well as Cyber Security Services, as described on page 52.

■ Data Center Services

Fujitsu's Data Center Services provide our customers with the complete range of services to ensure their IT systems are fully operational for their users as well as to improve their IT flexibility, efficiency, performance and to reduce their costs. Our operational Datacenter Services comprise:
- Datacenter Outsourcing where we take on the responsibility for managing and transforming your services.
- Remote Infrastructure Management (RIM) for servers, storage and other DC and cloud hosted infrastructure.
- Managed Hosting for Cloud and non-cloud systems: backup and recovery services as well as DC network services.
- In addition Fujitsu has technical consultancy and project services that enable us to undertake assessment, advisory, migration and transformation projects for our customers - either as part of a wider outsource or as part of the customer's journey towards cloud infrastructure.
- As part of the transformation of customer infrastructure we provide FUJITSU Cloud Service K5. Designed for organizations that want a choice of services on demand, our K5 allows you to take any workload into the cloud – whether you need a trusted public, private hosted, private or a hybrid cloud environment.
- Fujitsu Cloud Service K5 also offers Platform as a Service (PaaS) capability to support migrating mission-critical applications to cloud, integrating new digital initiatives with existing IT systems as well as developing new cloud native applications. To help transition and transform applications we offer blueprinting, orchestration, native application development and API integration.

■ End User Services (EUS)

Fujitsu's End User Services are for organizations who want to securely access applications and data on any device in any location. EUS enables change and underpins business agility. It delivers business value while driving out costs and improving the user experience. EUS is a superset of a number of offerings and services that enables Fujitsu to offer a blend of traditional and cloud based services to meet each customer's individual needs. EUS encompasses: Classic Workplace, Virtual Workplace, Mobile Workplace and Collaborative Workplace - all supported by Service Desk, Technical Support Services and Service Delivery Management.

■ Service Desk

Fujitsu's Service Desk takes a user-centric approach and leverage proven processes, tools and a global network of service desk centers. Fujitsu can offer multi-lingual service desk support in more than 30 languages out of our five global service desks in Costa Rica, Malaysia, Poland, Portugal, and the Philippines, enhanced by local service desk capabilities in over 30 countries. Fujitsu's Service Desk delivers exemplary service quality that enhances user experiences, going beyond fixing problems, identifying root causes and integrating preventive support solutions based on real-time analytics. Our focus is on the value we can create for our customers and the quality of the customer experience we deliver. By applying Sense and Respond - our approach to implementing lean principles in a service environment, we seek to fix users' problems quickly and easily, and to see how these problems can be eliminated permanently-eradicating waste from the IT service. Through TRIOLE for ServiceNow, all our global service desks work to the same processes and standards, compliant with the ISO 20000 international standard, operating to best practice principles and delivering exemplary service quality.

Services, Products and Solutions

Services

■ Technical Support Services

Business processes and business continuity depend on a reliable IT infrastructure.
- Managed Infrastructure Support can be Offsite (Remote Services) or Onsite Support Service. The ongoing fulfilment of all Service Level Agreements in IT Infrastructures cover proactive, predictive and preventive support services for Fujitsu and multivendor hardware and software products, including retail systems.
- Managed Rollout and Lifecycle Support Services ensure that the right systems are rolled-out, upgraded, relocated or de-installed at the right time in the right location. Fujitsu offers rollout concepts and project management covering localization analysis, installation, training, data migration and system disposal.

Fujitsu serves as the one-stop resource for the customer's whole IT environment.

Products

Software

Fujitsu is the only Japanese vendor with a systematic software product lineup. Fujitsu integrates optimal systems according to customer needs and objectives, based on a core lineup of proprietary technologies and products combined with supplementary partner software products and open-source software.

■ Middleware

■ FUJITSU Software Interstage Business Operations Platform

This solution integrates multiple business systems using a web service, supports companies in developing new business processes. The solution has a wide range of features, including connectors that link existing SAP systems and other business packages as web services without requiring application revisions or connection add-ons, processes, data connectivity, and user interfaces. With this single solution, companies can build services that support new business processes.

■ FUJITSU FlexFrame Orchestrator

Fujitsu's innovative FlexFrame Orchestrator solution enables operating SAP applications, databases and the SAP HANA platform easier, faster and more effectively. It simplifies the management of complex SAP environments, optimizes planning, operation and change management and reduces costs by up to 90% while increasing agility by up to 50%. Comprising most advanced orchestration and administration capabilities, FlexFrame Orchestrator is an optimized operational concept for the entire SAP landscapes.

Integrated Systems

Under the name of FUJITSU Integrated System PRIMEFLEX, Fujitsu provides a broad lineup of Integrated Systems. PRIMEFLEX encompasses factory-installed solutions which are ready-to-run and reference architectures which can be easily adjusted to customer-specific requirements. Both options are supplemented by truly attractive service offerings. (For a full description, please see the 'Integrated Computing' section on page 53.)

■ SAP

■ FUJITSU Integrated System PRIMEFLEX for SAP Landscapes

FUJITSU Integrated System PRIMEFLEX for SAP Landscapes allows a rapid high-quality implementation of infrastructure for SAP applications and databases including new developments like S/4HANA. It is designed, delivered and supported as one product. The integrated FlexFrame Orchestrator software offers consistent and standardized administration of infrastructure, databases, and applications. This makes operation more reliable and dramatically boosts responsiveness throughout the business enterprise.

■ FUJITSU Integrated System PRIMEFLEX for SAP HANA

PRIMEFLEX for SAP HANA is backed by 40 years of experience in delivering fast, secure, high availability implementations with optimized TCO, successfully reducing complexity. Fujitsu's SAP HANA expertise, infrastructures and services enable customers to fully exploit the potential of the SAP HANA platform (For more information, please see the ' Analytics' section on page 51.)

■ FUJITSU Integrated System PRIMEFLEX for SAP Adaptive Server Enterprise

This end-to-end solution incorporating integrated services and support has proven to be reliable and affordable for extreme transaction processing. At the same time it is able to keep pace with the constantly increasing amount of data and transactions. It significantly reduces complexity, time to production, risk, and TCO for enterprises.

Services, Products and Solutions

Solutions

Industry Solutions

Fujitsu's long and comprehensive global experience means we have been able to develop expertise across a number of industries. Working together with customers we drive value by utilizing industry specific expertise.

- Retail *Featured below
- Automotive
- Healthcare
- Life Sciences
- Financial Services
- Manufacturing
- Telecommunications
- Energy and Utilities
- Public Sector
- Defense and National Security
- Education
- Logistics
- Distribution
- Food and Beverage
- Betting and Gaming
- Media

FUJITSU Retail Solutions

Fujitsu is delivering comprehensive value for over 500 retailers in 52 countries and powering over 82,000 stores worldwide. With more than 30 years' experience in retail and a broad portfolio of retail solutions backed by enterprise ICT products and services, we are focusing on three core capabilities that ultimately deliver retailers a differentiated customer experience under the ethos of 'Connected Retail'.

- Innovative retail solutions
To support and future-proof the customer experience in today's multichannel world; this includes Fujitsu Market Place - our omni-channel PoS application - and new solutions from our innovation labs around the world.

- Connected enterprise
Linking applications, information and communication within the store, between the front and back office, and between multiple vendors to deliver a seamless and integrated customer journey, including enterprise solutions, and outcome-based enterprise services.

- Global delivery
The assets and capabilities to deliver consistent cross-border solutions.

Business and Technology Solutions

Intelligent Society Solutions

Utilization of ICT has gained popularity in social infrastructure fields such as Food, Agriculture, Health & Medical care, Transportation, Education and Energy. Aimed at addressing various social challenges in these fields, Fujitsu is continuously creating new value through innovative ICT such as cloud and mobility solutions.

- **FUJITSU Intelligent Society Solution RFID and Sensor Solution**
- **FUJITSU Intelligent Society Solution Akisai**
- **FUJITSU Intelligent Society Solution SPATIOWL**

Technical Computing Solution

Building on our long-standing history of innovation, 30 years of experience in the development of supercomputers and the exceptional depth and breadth of our offering, we provide the enabling technologies and services for a wide range of aerospace, meteorology, astronomy, healthcare and industrial projects. We have also teamed up with numerous prominent research agencies to design bespoke solutions for the most varied and challenging technical computing applications.

- **FUJITSU Technical Computing Solution TC Cloud**

Sustainability Solutions

Balancing economic, social, and environmental sustainability presents both opportunities and challenges for modern-day businesses. Organizations that understand the need to use their ICT innovatively while focusing on its optimization, resource and energy efficiency will gain from both a business advantage as well as social responsibility. Fujitsu helps your organization optimize the efficiency of its ICT equipment and data centers, saving you money and reducing greenhouse gas. Our Enterprise Sustainability services align your sustainability objectives with your business goals for sustainable growth.

- **FUJITSU Enterprise Sustainability Consulting**
- **FUJITSU ICT Sustainability Framework**
- **FUJITSU ICT Sustainability Benchmark**

Infrastructure Solutions

Infrastructure Solutions typically consist of various IT components and combine them to serve specific usage scenarios. Decades of experience and collaboration with leading software vendors have enabled us to offer platform-specific as well as platform-independent operating and management solutions and frameworks that provide best-in-class quality.

Virtual Client Computing

(For a full description of 'Virtual Client Computing', please see the 'Mobile' section on page 49.)

Note: Availability featured here may differ by region.

Cloud

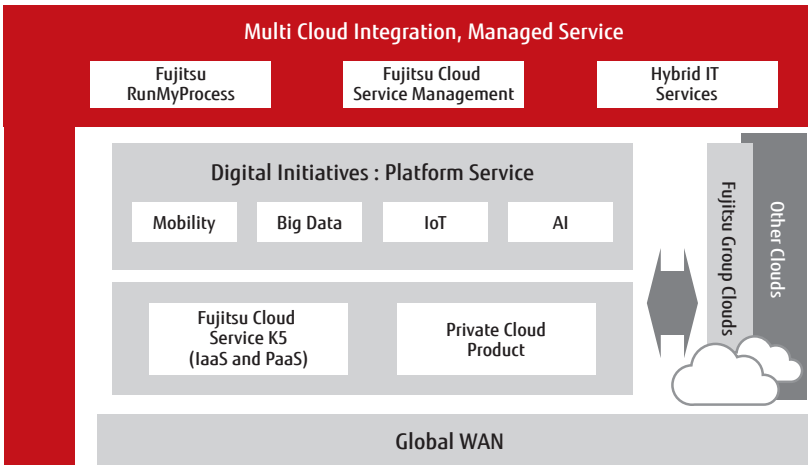
Cloud is a style of computing that enables computing resources such as servers, storage and software to be consumed easily and on-demand. Fujitsu's Cloud is the foundation of our digital services, delivered in a range of styles to meet customers' needs for security, data regulation and business agility.

FUJITSU Digital Business Platform MetaArc

MetaArc is Fujitsu's enablement platform that provides our customers with the technologies, solutions, services and capabilities to digitalize with confidence. In essence, via MetaArc, Fujitsu help customers establish a strategic cloud foundation to transform their business digitally through coordinated, 2-speed IT delivery to:

- Deliver new cloud based solutions for digital business initiatives, leveraging technologies such as enterprise mobility, big data analytics and the Internet of Things (we call these Fast IT)
- Modernize existing (Robust IT) systems, integrate these with the new Fast IT initiatives and to exploit the value from their existing investments
- Reduce the complexity and costs of effectively managing the resulting IT landscape of cloud alongside traditional IT – which we call Hybrid IT

MetaArc makes it easy for the businesses to exploit the cloud services they need to be competitive, while the organization enjoys the peace of mind from being confident that risks, costs and benefits are being managed robustly.



Services, Products and Solutions

Services

Business and Application Services

■ Software as a Service

Fujitsu offers a wide range of packaged applications as subscription-based services - supported by implementation, customization and integration services - including on-demand apps for office productivity, IT management, and other key industry and enterprise applications.

■ **FUJITSU Cloud Backup as a Service**

FUJITSU Cloud Backup as a Service replaces traditional on-site tape-based data protection solutions with one that is disk-based, agile, scalable, easy to use and secure. Delivered on-demand and pay-as-you-grow, the services include all features required of a self-service backup solution including management and reporting services via an Internet portal.
Where customers have distributed sites, network connectivity limitations or on premise data requirements, the Backup as a Service Rapid Recovery Appliance is available. The Rapid Recovery Appliance combines pre-configured hardware, storage and software to create a local backup and recovery device that can be implemented quickly, performs at LAN speeds while at the same time using the Fujitsu Cloud to provide secure cloud-based offsite protection for a secondary copy of the backup data.
All data is de-duplicated and compressed at source before being committed to the Backup as a Service Vault (the storage location for backup data on the Fujitsu Cloud or on a Rapid Recovery Appliance). Data can be encrypted at source before it is sent to the Vault, it is encrypted while in transit by default and remains encrypted when stored in the Vault therefore ensuring only the customer can access the data.

■ Platform as a Service (PaaS)

PaaS includes application platform services to support mission-critical and cloud native applications. Our PaaS comes with System Factory Services which enables organizations to design, deploy, test, distribute, operate and maintain systems. System Factory Services comprise Uforge from UShareSoft, a Fujitsu acquisition in October 2015. With UForge, Fujitsu provides customers with unique, enterprise-class application delivery software for automating the build, migration and governance of applications in multi-cloud environments.

We support the modernization of legacy resources and the transformation of systems to assure business agility with Elastic Application Works and provide Cloud Foundry for fast development and deployment of cloud-native applications. With extensive Web API management we allow the easy modernization of existing backbone legacy systems.

■ **Fujitsu Cloud PaaS RunMyProcess**

Fujitsu RunMyProcess is a unique cloud platform that enables hundreds of leading companies in over 45 countries to remove the technology barriers to digital transformation. This innovative platform empowers enterprises to rapidly create, deploy and distribute highly customized enterprise and mobile business applications designed to meet their specific needs - unifying user experiences, connecting information systems, accelerating time to value and enabling digital scale.

■ **FUJITSU Cloud Enablement Services**

This provides a platform with standard functions needed to build and operate a customer's SaaS, such as an enterprise app store, ID management and authentication, and subscriptions and fees. This service lets companies focus on developing and operating the applications and packages that are at the core of their business, increasing their productivity and dramatically speeding up the process of launching a SaaS by as much as a factor of six (from approximately one year to approximately two months, according to Fujitsu research).

■ **FUJITSU Cloud A5 for Microsoft Azure**

Fujitsu works with other cloud providers to ensure the optimal mix of private, public, on-premises and hosted cloud solutions is achieved. Fujitsu is the world's first Microsoft partner to be able to deliver Microsoft Azure as a cloud service. Fujitsu Hybrid Cloud Services links Microsoft Azure-based components to Windows Server-based components, running either on premises or on a Fujitsu cloud platform.

Services, Products and Solutions

Services

Managed Infrastructure Services

■ Data Center Services

Fujitsu's Data Center Services provide our customers with the complete range of services to ensure their IT systems are fully operational for their users as well as to improve their IT flexibility, efficiency, performance and to reduce their costs. (For a full description, please see the 'Integration' section on page 44.)

■ **Managed Hosting – cloud and non-cloud systems**

We provide a range of managed hosting services to meet your specific business needs. These cover every aspect of implementation and management for your compute and storage environment, including platform and directory services, infrastructure applications and database environment. Each service offers a range of options to allow you to select the package that is right for your business.

■ Infrastructure as a Service (IaaS)

Fujitsu Cloud IaaS deliver flexibility and value with the necessary high level of security and service quality expected from enterprise-class IT. The Fujitsu cloud IaaS portfolio includes public cloud, virtual private cloud and both on- and off-premise private cloud.

■ **FUJITSU Cloud Service K5**

FUJITSU Cloud Service K5 is our next generation cloud platform. FUJITSU Cloud Service K5 combines the value of open source technologies and Fujitsu's expertise and experience. The integrated Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) functionality supports both robust IT and fast IT through the same platform. FUJITSU Cloud Service K5 is a single standard platform which is available globally – it is based on a common architecture and can flexibly be deployed as private or public cloud, on premise or in a Fujitsu data center. FUJITSU Cloud Service K5 is based on OpenStack for IaaS and CloudFoundry and Fujitsu own-IP for the PaaS capability. The use of Open Source ensures speed of innovation, avoids vendor lock-in and delivers cost efficiencies. Fujitsu is adding enterprise-grade features to OpenStack which makes FUJITSU Cloud Service K5 an ideal platform of choice for mission-critical systems.

■ **FUJITSU Cloud Service K5 Private Hosted**

In accordance with geographical regulations governing where data is stored and processed, as well as a need for organizations to consider local customer sentiment, Fujitsu will offer Cloud Service K5 Private Hosted from Data Centers around the globe. The platform will provide tailored services specific to regional needs and makes it an ideal solution for running your enterprise class production system such as Microsoft, Oracle and SAP on a pay-as-you-use basis.

■ **FUJITSU Cloud IaaS Trusted Public S5**

Trusted Public S5 provides a pool of scalable, robust, secure and customizable, virtual IT resources, available on demand on a pay-as-you-use basis. Designed from the ground up with business users in mind, it delivers enterprise-grade performance with high availability. It is delivered via our global network of data centers - in Japan, Australia, USA, Singapore, UK and Germany- to provide cost-effective and secure access to on demand infrastructures.

■ **FUJITSU Cloud IaaS Private Hosted**

In accordance with geographical regulations governing where data is stored and processed, as well as a need for organizations to consider local customer sentiment, Fujitsu offers IaaS Private Hosted from over 30 Data Centers in 16 countries. This platform provides tailored services specific to regional needs and makes it an ideal solution for running your enterprise class production systems such as Microsoft, Oracle, and SAP on a pay-as-you-use basis.

■ Network and Communication

Fujitsu's Network services for inter-site communications, deliver a carrier-class network infrastructure combining cost competitiveness and security with high performance. (For a full description, please see the 'Mobile' section on page 49.)

■ **Global WAN Services**

Fujitsu Wide Area Network (WAN) provides global connectivity. This includes Managed WAN, Managed Virtual Private Networks, Managed Wavelength and Managed Firewall Services together with Campus LAN and Distributed LAN services.

Products

Integrated Systems

■ Private Cloud Infrastructures

Fujitsu offers a range of options for quickly building and scaling private clouds and hybrid clouds. The pre-integrated IT infrastructure solutions combine high-performance and energy-efficient hardware, a holistic operating environment, an optimized deployment service together with a comprehensive professional service portfolio to reduce complexity in design, build and operation of private cloud infrastructures.

■ **FUJITSU Integrated System PRIMEFLEX for VMware vCloud**

This solution is based on a reference architecture consisting of servers, network and storage hardware, plus VMware virtualization and management software for building an Infrastructure as a Service platform. The reference architecture leverages Fujitsu design and configuration best practices. It is optimized to reduce complexity in the design and build phase of a VMware vCloud environment – and at a significantly lower cost compared with do-it-yourself approaches.

■ **PRIMEFLEX vShape**

The Solution for virtual infrastructures FUJITSU PRIMEFLEX vShape is an infrastructure solution for VMware or Hyper-V environments integrating the expertise and technologies of leading manufacturers of servers, storage systems, and networks. These are PRIMERGY servers from FUJITSU, ETERNUS storage systems from FUJITSU or FAS systems from NetApp and switches from Brocade. All these components are ideally synchronized for defined software packages and validated as a single solution. vShape reduces integration and implementation time and risks of building virtual infrastructures.

■ **FUJITSU Integrated System PRIMEFLEX Red Hat OpenStack**

In order to reduce the various risks that can impact time lines and budgets in the implementation phase of a complex private cloud project, Fujitsu and Red Hat jointly invented a converged infrastructure solution for OpenStack private cloud IaaS deployments. FUJITSU Integrated System PRIMEFLEX for Red Hat OpenStack provides an enterprise hardened OpenStack platform and combines a high-performance and energy-efficient Fujitsu/Brocade hardware stack, the market leading RedHat Enterprise Linux OpenStack Platform, one stop support and a comprehensive professional service portfolio – all in one package. PRIMEFLEX for Red Hat OpenStack is the most reliable way to deploy a highly flexible, open and cost-effective OpenStack private cloud IaaS platform.

■ **FUJITSU Integrated System PRIMEFLEX for VMware VSAN**

PRIMEFLEX for VMware VSAN uses the local storage capabilities of FUJITSU Server PRIMERGY to achieve a logical central storage. In order to overcome complex compatibility and best-fit issues, Fujitsu has generated the pre-tested reference architecture PRIMEFLEX for VMware VSAN (cf. 'VSAN Ready Nodes'). The reference architectures are approved by Fujitsu and VMware and reduce the implementation time and risks involved in building virtualized infrastructures. This solution provides simple, delicate and linear scalability that is unmatched.

■ **FUJITSU Integrated System PRIMEFLEX for Cloud**

PRIMEFLEX for Cloud includes a Starter Kit as an all-in-one start up solution for easy-to manage and reliable cloud infrastructure with minimum deployment effort. This pre-tested solution provides configuration templates for server, storage, network, virtualization and cloud resource management software. This will allow the customer to remove the need for complex design requirements, reduce deployment time and enable smooth transition from their traditional systems.

Note: Availability featured here may differ by region.

Mobile

Fujitsu's mobile solutions help to empower people and raise productivity – anywhere, at any place - by delivering a personalized services experience. Using desktops, laptops, or smart devices, employees can access the applications, data, and tools they need, while organizations have peace-of-mind security.

Services, Products and Solutions

Services

Managed Infrastructure Services

■ End User Services (EUS)

EUS enables change, underpins business agility, and delivers business value while driving out costs and improving the user experience. We achieve this by offering a single blended service that allows us to provide the best-fit service model to meet industry specific challenges and to satisfy the different roles and requirements of your users. Virtual and Mobile Workplaces are architected to be integrated and so provide a seamless end user experience that maximizes individual productivity.

■ **Virtual Workplace**

Fujitsu's proven approach to desktop virtualization provides a workplace platform which enables your workforce to securely and seamlessly work and collaborate from anywhere, at any time via devices of their choice. We can deliver services based on hosted solutions or solutions that are deployed on premises, we offer on-demand multi-tenant or dedicated infrastructures - designed and managed to provide the high levels of availability needed to underpin the productivity goals of any business; while protecting the key information assets precious to that business.

■ **Mobile Workplace**

Fujitsu can help to manage the growing complexity of non-standard, geographically dispersed mobile infrastructure environments, while safeguarding corporate data and protecting privacy. Our approach to mobility provides enterprise-class, cloud-based, modular services for securely managing mobile devices, and access to applications and data.

■ Network and Communications

Fujitsu's Network services for inter-site communications, deliver a carrier-class network infrastructure combining cost competitiveness and security with high performance. An innovative alternative to traditional networks, our cloud connectivity services are based on an aggregate bandwidth pricing model. Cloud-based Enterprise Communication Service offers consumption-based voice and unified communication applications hosted in the cloud, including Hosted Voice over IP, Collaboration, Contact Center and Mobile Device Management.

■ **Global WAN Services**

Fujitsu Wide Area Network (WAN) provides global connectivity. This includes Managed WAN, Managed Virtual Private Networks, Managed Wavelength and Managed Firewall Services together with Campus LAN and Distributed LAN services.

Products

Client Computing Devices

Fujitsu is a leading provider of mobile and stationary devices for corporate customers. Fujitsu's tablets have become the standard in a wide variety of environments including government, healthcare, sales force automation, and education. In addition, customers have come to depend on the reliability, quality, innovation and human centric technology of Fujitsu products. Furthermore, Fujitsu offers a complete range of environmentally conscious products and uses environmentally friendly technologies and processes throughout the entire product lifecycle.

■ Notebooks and Tablets

The FUJITSU LIFEBOOK Notebook and STYLISTIC Tablet portfolio empowers the user through powerful performance wherever the workplace, whatever the industry or sector. Premium technology, unique biometric security, a comprehensive family concept, configuration options and innovative solutions interconnect to grant our customers the freedom and reassurance to work with competence, stamina and style.

■ Desktops

The FUJITSU ESPRIMO family brings a complete range of fully featured and highly expandable desktops that dependably run the office applications of today and tomorrow. Their superior reliability comes from best-in-class Fujitsu development and outstanding production quality. The world's most efficient power supplies lower your energy bill and reduce your environmental footprint. With individual configuration options and the unique manageability solution, ESPRIMO Desktops help to reduce deployment costs and flexibly manage each system for years to come.

■ Workstations

Engineered and built in Germany and Japan, CELSIUS workstations from Fujitsu support creativity, simulation, calculation and visualization at the highest professional level. Thanks to the end-to-end capabilities from design, engineering to production, CELSIUS workstations have gained a great reputation for being whisper quiet, offering ingenious thermal management and cooling as well as reaching world-leading benchmark results. All mobile, desktop and rack workstations are optimized for use with a host of leading workstation applications, like Autodesk, Dassault Systèmes, Siemens PLM or PTC.

■ Thin Clients

For optimized server-based computing or desktop virtualization, choose customizable FUJITSU FUTRO Thin Clients. Every device is designed and engineered to support best performance, security, easy manageability and cost-effectiveness. They also deliver significantly lower TCO over their lifecycle compared with a standard PC. Plus, ease-of-use, standardization and quiet operation ensure maximum user comfort.

■ Smart Devices

Fujitsu offers a diverse lineup of smart devices that can be tailored to customer needs. Fujitsu's smartphones and tablets are equipped with proprietary human centric technology that enables ultimate connectivity and smart functions for daily lives, such as 4G/LTE connectivity and intuitive touch-panel operation, and other features.

■ Peripheral Devices

Efficient working requires seamless interaction between your IT systems and users. Fujitsu delivers a comprehensive range of intuitive, useful peripheral products covering displays, human input, storage, connectivity, carrying cases, biometric security, multimedia, dot matrix printers and wearables. All peripheral products guarantee optimal compatibility across all Fujitsu systems. This consistency, together with the comprehensive range of peripherals available, enables "one-stop shopping". That adds up to time and money saved during purchasing and compatibility verification.

Solutions

Infrastructure Solutions

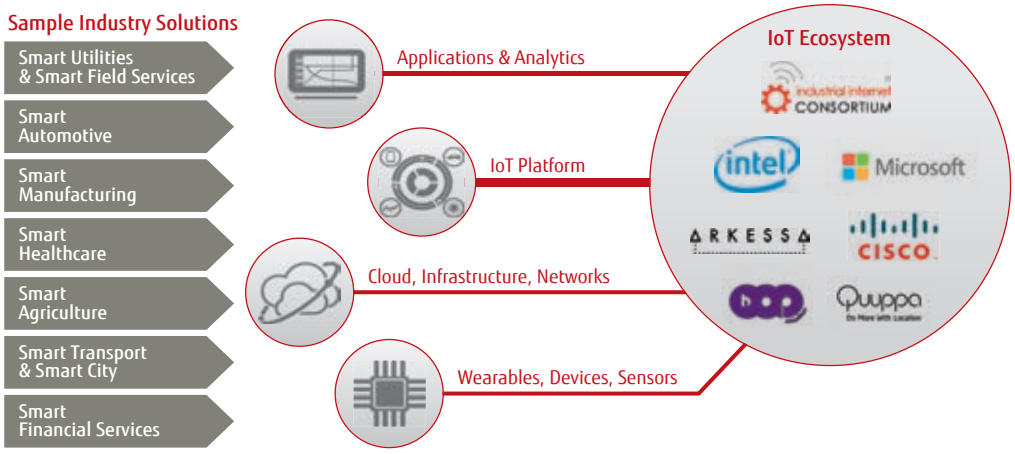
■ Virtual Client Computing

Desktop virtualization helps to improve service quality and security, increase flexibility, and reduce costs. Fujitsu provides desktop virtualization solutions based on best-in-class virtualization technologies, proven infrastructure products, and end-to-end lifecycle services from a single source. Customers benefit from rapid implementation and reduced risk resulting from Fujitsu's extensive project experience.

Note: Availability featured here may differ by region.

IoT

IoT is a core driver of digital transformation & business innovation and is centered on the benefits of merging people, processes, and things. Fujitsu aims to create an environment to support innovation on a proven IoT platform, powering digital transformation with IoT solutions and services for the transformative enterprise. Our strong portfolio of our own intellectual property is combined with a broad ecosystem of partners. Our IoT solutions range from enterprise wearable devices, middleware applications, to standardized business solutions for customer verticals.



Services, Products and Solutions

Services / Solutions

Industrial IoT Solutions

Fujitsu's long and comprehensive global experience means we have been able to develop expertise across a number of industries. Working together with customers we drive value by utilizing industry specific expertise to provide standardized business solutions that fit their industry needs.

Smart Utilities & Energy
Field Worker Monitoring and Alerting: Sensors monitor personnel, guide workers through the environment and alert in man-down scenarios. The presence of noxious gases and radiation is also detected and alerts are sent immediately.

Smart Manufacturing
Predictive Failure, Remote Maintenance & Support Services: By collecting and visualizing the current condition of industrial/ engineering machines, failures can be predicted and proactively addressed during normal maintenance cycles
Factory Management Optimization through Data: By collecting environmental and production data and displaying key indicators and/or changes to management, decision makers are able to make timely adjustments to optimize production of the factory

Smart Transportation & Logistics
Shipping and Storage of Sensitive and Perishable Cargo: Sensors placed on highly sensitive cargo to monitor the environmental conditions and tags to track the progress of cargo trough the supply chain.

Smart Retail
Retail Engagement Analytics: By collecting customer location information as they visit the store, retailers are able to understand customers trends and customer locations within the store for optimizing interior layout, etc.

Other Industries include: Smart Automotive, Smart Financial Services, Smart Cities (see SPATIOWL on page 46), Smart Agriculture

Applications & Analytics

Connections create data. Real-time access to information and insights are crucial in optimizing business models. We provide various applications that can be used to power and derive value from IoT-generated data. Fujitsu's Enterprise Applications services cover the design, development, configuration, implementation, rollout and ongoing management of IoT solutions based on packaged software applications. Additionally our Application Development and Integration Services ensure a smooth and efficient integration of all building blocks, as well as the integration of the overall solution into the customer's IT landscape.

IoT Platform

The core of Fujitsu's IoT capability is the cloud based IoT Platform offered as part of Digital Business Platform MetaArc. This platform provides data management, aggregation, and analytics alongside application development and device management capabilities.

Cloud, Infrastructure, Networks

Today's hyperconnected world means billions of elements generating data and a huge increase in the number of people using streaming services. The network of the past is no longer adequate. The entirety of computing, wide-area networking, and M2M communications will be abstracted and controlled by intelligent software. Fujitsu offers a range of options for quickly building and scaling private clouds and hybrid clouds, in addition to our next-generation public and private hosted cloud services based on open source technologies.
(Please see Cloud section on page 47and Network section on page 55 for more information)

Enterprise Wearables, Devices, Sensors

Ranging from embeddable sensors to smart tags and badges, to fully integrated Vital Sensing Bands and Head Mounted Displays, while building on the base of its Human Centric Engine, we offer UBIQUITOUSWARE as the front-end interface for Human Centric IoT.

Analytics

Fujitsu helps organizations to ensure their business is generating maximum ROI across their customers and operations by placing data and analytics at the heart of what they do. Fujitsu delivers end-to-end smart data and analytics approaches, based on advanced technology and analytical expertise.

Services, Products and Solutions

Services

Business and Application Services

■ Business Consulting

■ **Big Data Consulting Services**

Fujitsu's Big Data Consulting Services are designed to identify the opportunities and implications of Big Data for the business. Business- and customer-specific use cases, and their business implications and value are jointly elaborated and prioritized. Fujitsu supports the development of Big Data strategies and detailed evaluation of required capabilities and technologies.
Business and IT prerequisites to achieve the business goals are made transparent.

■ **Analytics Services**

Our SMART Analytics services blends statistical, marketing, strategic, and consultative knowledge to help customers achieve their business objectives profitably and efficiently.
SMART Analytics are based on capabilities about Data Enhancement, Customer Intelligence, Customer Management, Channel Optimization.
We deliver tried and tested analytical programs providing key building blocks to enable you to gain a competitive advantage across a number of areas in addition to bespoke Analytics approaches.

■ Application Development and Integration

■ **Integration Services and Maintenance Services**

Big Data infrastructure solutions are typically combinations of concepts and technologies. Fujitsu Integration Services ensure a smooth and efficient integration of all building blocks, as well as the integration of the overall solution into the customer's IT landscape. In addition, Fujitsu will take over the maintenance of the overall solution.

■ Software as a Service

Fujitsu offers a wide range of packaged applications as subscription-based services. (For a full description of 'Software as a Service' and offerings, please see the 'Cloud' section on page 47.)

■ Platform as a Service

FUJITSU Cloud Service K5 provides a rich set of Platform as a Service capabilities which provide customers with rapid application development and deployment so they are able to quickly respond to new market requirements.(For a full description of 'Platform as a Service' and offerings, please see the 'Cloud' section on page 47.)

Managed Infrastructure Services

Fujitsu's Managed Infrastructure Services for Big Data comprise the complete range of services to ensure our customers' IT systems are fully operational while improving their flexibility, efficiency, performance and reducing costs.

Products

Software

Fujitsu provides a systematic lineup of software products designed to facilitate the use of Big Data. This lineup features software products that customers can easily use on-site. Fujitsu has developed, through implementation of Platform Services for Data Utilization, a cloud service for utilizing Big Data. In addition, we have helped customers utilize Big Data by making it simple to install and operate, and by providing an ecosystem that makes it easy for customers to combine software with other products including open-source software.

■ Middleware

- **FUJITSU Software Interstage Big Data Parallel Processing Server**
- **FUJITSU Software Interstage Big Data Complex Event Processing Server**
- **FUJITSU Software Interstage Terracotta BigMemory**
- **FUJITSU Software Symfoware Analytics Server**

Integrated Systems

Under the name of FUJITSU Integrated System PRIMEFLEX, Fujitsu provides a broad lineup of Integrated Systems for customer's marketing innovation. (For a full description, please see the 'Integrated Computing' section on page 53.)

■ Big Data and Analytics

■ **FUJITSU Integrated System PRIMEFLEX for Hadoop**

PRIMEFLEX for Hadoop is a powerful and scalable platform analyzing Big Data volumes at high velocity. PRIMEFLEX for Hadoop combines the advantages of pre-configured and pre-tested hardware based on industry standard components with open source-software provided by Cloudera and Big Data analytics software provided by Datameer. PRIMEFLEX for Hadoop is provided as a ready-to-run integrated as well as a Reference Architecture for flexible deployment, and enables business users to uncover hidden information from huge amounts of data. In addition, strategic Big Data consulting, analytics consulting, consulting for Hadoop, and integration and maintenance services, are supplementing the offering.

■ **FUJITSU Integrated System PRIMEFLEX for SAP HANA**

PRIMEFLEX for SAP HANA enables simplified, fast and secure implementation and operation of SAP HANA. The pre-defined and pre-tested infrastructure solution is based on SAP-certified components and supplemented by a broad services portfolio. It helps customers fully exploit the potential of SAP HANA and accelerate and innovate their business processes. In addition PRIMEFLEX for Analytics and PRIMEFLEX for Oracle Database are available for Japan.

Note: Availability featured here may differ by region.

Security

Fujitsu helps organizations to manage their information security and continuity risks effectively, in-line with their business strategy, providing flexibility in the way they work and enabling secure and resilient business.

Services, Products and Solutions

Services

Business and Application Services

Information Management

Cyber Security Services – element of both Business and Application Services and Managed Infrastructure Services

In today's world of dynamic and mobile computing, advanced and rapidly changing threats, and other challenges such as Big Data and cloud are becoming much more common and the reactive approach to Cyber Security is no longer enough. Businesses need to adopt a whole lifecycle approach to how they deal with security and it's the joining up of things such as context, proactive intelligence feeds and enhanced visibility that help that happen. To keep up with the aggressive pace of change within an ever changing digital world and to counter the ever expanding threat landscape businesses need to continually evolve their security capabilities. The strength of our strategic vendor relationships, proven experience and global scale means we can optimize our customers' approach to security, protecting their revenue and reputation. We provide organizations with real intelligence and visibility on the state of their environment – identifying vulnerabilities and allowing investment to be prioritized according to where it is needed most. Fujitsu's goal is to enable organizations to operate as productively and securely as possible. This enables organizations to flourish securely with secure access to information on an anytime, any location basis; providing rapid visibility and protection against new threats; or allowing controlled usage of social media.

Fujitsu is a proven global security partner with 40 years of demonstrated capability in providing intelligent security solutions to organisations. Fujitsu's security professionals are trusted advisors with the expertise to enable organizations to prepare for and respond to cyber security incidents effectively and efficiently. Fujitsu also provides guidance on the most appropriate security controls to protect organisations, ongoing management of cyber security capabilities on behalf of customers and undertakes 24/7 security monitoring from its global Security Operations Centres. We use market leading security products and expert professional services to support the assessment of risk, define requirements, provide technical and service design and architecture, as well as ensuring effective deployment and operation of the Managed Security Service. Fujitsu also provides Cyber Threat Intelligence and Threat response services to proactively mitigate against threats as well as providing timely and expert response services to mitigate the impact of security incidents to our customers. As a global security and service integrator, Fujitsu provides security and resiliency consultancy services across the full delivery lifecycle delivered with the expertise and experience gleaned from years of security and service integration. This allows us to achieve service intimacy with our customers and enables us to shape tomorrow with them. The breadth of customers and partners that Fujitsu works with provide us with a clear understanding of the changing security model and threat landscape and our continually evolving managed security services which are underpinned by threat intelligence services provides consistency of understanding through situational awareness. All our services give customers the 24x7 cover needed to protect their business.

Enterprise Application

Fujitsu's Enterprise Applications services cover the design, development, configuration, implementation, rollout and ongoing management of solutions based on packaged ERP applications. (For a full description, please see the 'Integration' section on page 44.)

Software as a Service

Fujitsu offers a wide range of packaged applications as subscription-based services. (For a full description of 'Software as a Service' and offerings, please see the 'Cloud' section on page 47.)

Data Center Services

Fujitsu's Data Center Services provide our customers with the complete range of services to ensure their IT systems are fully operational for their users as well as to improve their IT flexibility, efficiency, performance and to reduce their costs. (For a full description, please see the 'Integration' section on page 44.)

End User Services (EUS)

Fujitsu's End User Services are for organizations who want to securely access their workplace data and services on any device in any location. EUS enables change, underpins business agility, and delivers business value while driving out costs and improving the user experience. (For a full description, please see the 'Integration' section on page 44.)

Solutions

Business and Technology Solutions

Security Solutions

Fujitsu helps organizations to manage their information security and continuity risks effectively, in-line with their business strategy, providing flexibility in the way they work and enabling secure and resilient business - considering also the risks arising from mobility and increased connectivity. The combination of Fujitsu's user security expertise and partnerships with leading security vendors, ensures superior security. Fujitsu's extensive range of user security products and solutions are easy to integrate and can be enhanced with complementary software and hardware offerings to meet unique user security requirements. Two prominent solution examples for authentication / identity management and end-to-end secure IT systems are described as follows:

FUJITSU Biometric Authentication Solutions – based on PalmSecure technology

The Fujitsu Authentication / ID Management solutions provide high reliability and security for a wide range of applications and market segments. This hygienic, contact-less technology uses unique vascular patterns as highly secure personal identification data, increasing user safety and comfort. PalmSecure bioLock significantly improves security by monitoring and controlling SAP system operations using re-authentication at user-specific checkpoints. PalmSecure ID Match is a universal platform for reinforcing ID cards for authentication by combining them with PalmSecure technology. This innovative solution is designed for a wide range of scenarios - supported by our Software Development Kit (SDK), for easy integration within IAM applications. PalmSecure truedentity as a client-/server login/SSO solution can be used as an enhancement for human centric authentication management – based on personalized encrypted certificates, superior security for handling electronic identities and secure transfer of data providing reliable identification for people and organizations who share information. PalmSecure ID Mobile is a convenient method to authenticate, using a smart phone carrying the personal palm vein template inside. For two-factor authentication, the template is automatically transferred for matching with the personal vein pattern to a palm vein reader. New mobile workplace systems as well as desktop and ultra thin clients with integrated PalmSecure technology also increase the security level dramatically. The combination of PalmSecure technology based on Match-on-Device solutions and high level security software is ideal for secured cloud access and secure payment applications.

Additionally we offer with the new PS SL type sensor a small footprint sensor for desktop authentication beside PS mouse and we offer with PS ID ACCESS a highly secure solution for physical access control at buildings Fujitsu's PalmSecure offers customers end-to-end protection for sensitive information and secure access points for front end and data center applications.

FUJITSU Security Solution SURIENT

Transparent user-friendly end-to-end security - from terminal to data center

FUJITSU SURIENT is a family concept of innovative patented end-to-end IT security offerings. It provides secure application environments running on existing infrastructures and enables – dependent on the specific customer requirements - up to highest degree of security, especially for sensitive data and processes. High user-friendliness, easy and smooth integration in existing data center and high performance levels are characteristics of this security concept covering data centers, data transfer and terminals as well as sensors, whereby qualifying this SURIENT also as an ideal platform for future IoT projects.

FUJITSU SURIENT comprises various modules, which can be used individually or in combination. This family concept includes: SURIENT MRS (Managed Rack Solution); SURIENT SRS (Sealed Rack Solution); SURIENT EBS (Encrypted Boot Solution); SURIENT SCS (Stealth Connect Solution) and SURIENT SAS (Sealed Application Solution).

Note: Availability featured here may differ by region.

Integrated Computing

'Workload optimized autonomic computing environments' integrated with Fujitsu's technology and expertise.

Services, Products and Solutions

Products

Integrated Systems

Under the name of FUJITSU Integrated System PRIMEFLEX, FUJITSU provides a broad lineup of Integrated Systems. The fact that data center components are pre-defined, pre-tested reduces the complexity and the risk of building data center infrastructures, while reducing time to production and cost, as well as increasing operational efficiency. PRIMEFLEX encompasses factory-installed solutions which are ready-to-run and reference architectures which can be easily adjusted to customer-specific requirements. Both options are supplemented by truly attractive service offerings. PRIMEFLEX offerings are available for various data center themes such as Private Cloud, Server and Desktop Virtualization, High Availability and Disaster Recovery, Big Data and Analytics, as well as High Performance Computing. Furthermore, PRIMEFLEX includes solutions addressing SAP and Microsoft environments.

Private Cloud

- FUJITSU Integrated System PRIMEFLEX for VMware vCloud
- FUJITSU Integrated System PRIMEFLEX for Red Hat OpenStack
- FUJITSU Integrated System PRIMEFLEX for Cloud

Server and Desktop Virtualization

- FUJITSU Integrated System PRIMEFLEX vShape
- FUJITSU Integrated System PRIMEFLEX for VMware VSAN
- FUJITSU Integrated System PRIMEFLEX for Egenera PAN
- FUJITSU Integrated System PRIMEFLEX Cluster-in-a-box
- FUJITSU Integrated System PRIMEFLEX for VMware VDI

High Availability and Disaster Recovery

- FUJITSU Integrated System PRIMEFLEX Cluster-in-a-box
- FUJITSU Integrated System PRIMEFLEX for Egenera PAN
- FUJITSU Integrated System PRIMEFLEX for HA Database
- FUJITSU Integrated System PRIMEFLEX for Oracle Database

Big Data and Analytics

- FUJITSU Integrated System PRIMEFLEX for Hadoop
- FUJITSU Integrated System PRIMEFLEX for SAP HANA
- FUJITSU Integrated System PRIMEFLEX for Oracle Database
- FUJITSU Integrated System PRIMEFLEX for Analytics
- FUJITSU Integrated System PRIMEFLEX for HA Database

HPC

- FUJITSU Integrated System PRIMEFLEX for HPC

SAP

- FUJITSU Integrated System PRIMEFLEX for SAP HANA
- FUJITSU Integrated System PRIMEFLEX for SAP Landscapes
- FUJITSU Integrated System PRIMEFLEX for SAP ASE

Microsoft

- FUJITSU Integrated System PRIMEFLEX for SharePoint
- FUJITSU Integrated System PRIMEFLEX for Lync
- FUJITSU Integrated System PRIMEFLEX Cluster-in-a-box
- FUJITSU Integrated System PRIMEFLEX for Exchange
- FUJITSU Integrated System PRIMEFLEX for OfficeMaster Gate

Servers

The FUJITSU server line represents one of the broadest portfolios in the market. This enables us to talk with our customers as a trusted advisor with the target to provide them with the right combination of systems, solutions and expertise to guarantee maximum productivity, efficiency and flexibility, delivering confidence and reliability.

Industry Standard Server

Industry's most complete x86-based portfolio for companies of all sizes, across all industries and for any type of workload

- FUJITSU Server PRIMERGY

Mission Critical x86 Server

New levels of x86 server performance for in-memory computing, resource-intensive applications and mission-critical x86 uptime

- FUJITSU Server PRIMEQUEST

Unix Server

Unmatched scalability of up to 64 processors together with highest RAS features and a modular architecture

- FUJITSU M10 SPARC based server

Mainframe

- FUJITSU Server GS21, BS2000, VME

Supercomputer

Fujitsu's supercomputer provides the ability to address high magnitude problems by delivering over 23 petaflops, a quantum leap in processing performance.

- FUJITSU Supercomputer PRIMEHPC FX100

Services, Products and Solutions

Storage

Under 'Business-centric Storage' Fujitsu provides ETERNUS DX disk and ETERNUS DX200F All- flash systems, ETERNUS CD Hyper-scale and software defined storage, ETERNUS CS data protection appliances and ETERNUS LT tape systems enabling customers to align storage resources with business priorities and to manage their increasing data volumes at less costs.

- Disk Storage Systems
  - FUJITSU Storage ETERNUS DX series
- All-flash systems
  - FUJITSU Storage ETERNUS DX200F
- Hyper-scale and software-defined storage
  - FUJITSU Storage ETERNUS CD10000
- Tape Systems
  - FUJITSU Storage ETERNUS LT series
- Data Protection Appliances
  - FUJITSU Storage ETERNUS CS series
- Storage Management Software
  - FUJITSU Storage ETERNUS SF suite

Software

Fujitsu is the only Japanese vendor with a systematic software product lineup. Fujitsu integrates optimal systems according to customer needs and objectives, based on a core lineup of proprietary technologies and products combined with supplementary partner software products and open-source software.

- BPM/SOA/XBRL
  - FUJITSU Software Interstage
- Operation Management
  - FUJITSU Software Systemwalker
- Database
  - FUJITSU Software Enterprise Postgres
  - Oracle
  - Microsoft

Network

Along with in-house development of products that facilitate business continuity, security measures, and operation and management, Fujitsu can evaluate and verify third-party products. By embedding these products in networks, Fujitsu supplies optimal networks for each customer to rapidly meet their diversifying needs.

- Router
- LAN Switch
- Security
- Bandwidth Control, Load Balancer
- IP Telephony
- Unified Communication

Product Support Services

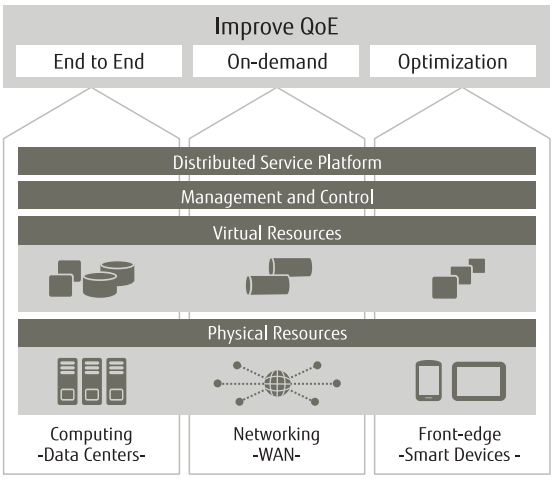
In addition to cutting-edge products, Fujitsu delivers worldwide Product Support Services. A comprehensive product support portfolio containing standard break/fix services as well as proactive support helps our customers save time and money and reduces the burden on internal IT staff. Fujitsu delivers Product Support Services through certified support engineers for individual products as well as for IT infrastructures as a 'one-stop shop' support offering. The services range from installing new products to providing fast and responsive support for Fujitsu hardware, software and IT infrastructures for solution business.

Note: Availability featured here may differ by region.

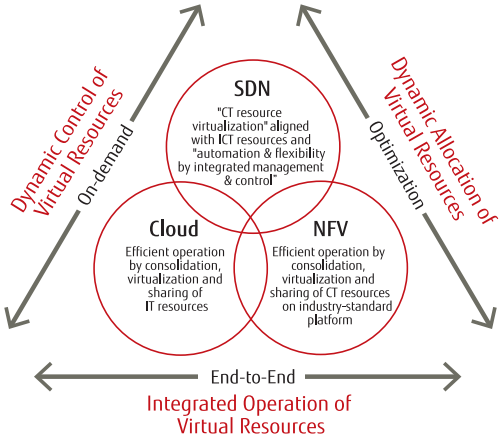
Software-Defined Connected Infrastructure

The 'FUJITSU Intelligent Networking and Computing Architecture' is a new architecture for next-generation ICT infrastructure. Fujitsu plans to release products that will conform to this architecture across various areas of technology.

Fujitsu Intelligent Networking and Computing Architecture



Technology Map for Network-wide Optimization



Services, Products and Solutions

Services

Managed Infrastructure Services

Fujitsu's Managed Infrastructure Services provides a cost effective, reliable and flexible ICT infrastructure to customers. This infrastructure may be owned by the customer or Fujitsu on their behalf. Our services comprise Data Center Services, End User Services, Service Desk, Technical & Maintenance Services, Infrastructure as a Service, and Network and Communication.

■ Network and Communications

Fujitsu's network services for inter-site communications, deliver a carrier-class network infrastructure combining cost competitiveness and security with high performance. (For a full description, please see the 'Mobile' section on page 49.)

■ Global WAN Services

Fujitsu Wide Area Network (WAN) provides global connectivity. This includes Managed WAN, Managed Virtual Private Networks, Managed Wavelength and Managed Firewall Services together with Campus LAN Distributed LAN services.

Products

Software

The penetration of broadband networks has led to an increase of digitalized data flowing through networks. As a result, a variety of services are now provided over networks, such as IP telephony and video distribution services. As next-generation networks become increasingly important to society, network infrastructure has become large and complex. This has created a host of crucial issues for service providers. Issues include network operation and management and problem resolution methods, in addition to quality assurance for network services and infrastructure operation and management. To solve these issues, Fujitsu provides network service management software that enables operation and management and quality assurance for next-generation networks.

■ Network Service Management Software for Telecom Carrier
- FUJITSU Network Proactnes series
- FUJITSU Network Netsmart series

■ Network Service Management Software for Enterprise

■ Dynamic Resource Management Software
- FUJITSU Software ServerView Resource Orchestrator

■ Network Operation and Management Software
- FUJITSU Software Systemwalker Network Manager
- FUJITSU Software Systemwalker Network Assist

■ Network Service Management Software
- FUJITSU Software Systemwalker Service Quality Coordinator

■ Network Virtualization Software
- Midokura Enterprise MidoNet

Network

Fujitsu supplies a comprehensive range of network products, including communications systems for carriers and network devices for enterprises. The former constitutes the backbone of our ICT-driven society, such as core networks, metro networks, and access networks. The latter is used to integrate internal networks within enterprises.

■ SDN/NFV related Software
- FUJITSU Network Virtuora series

■ Blade type Network System
- FUJITSU Network 1FINITY series

■ High-end Router
- Fujitsu and Cisco CSR series
- Fujitsu and Cisco XR12000 series

■ Optical Network System
- FUJITSU Network FLASHWAVE series

■ Radio Access Network System
- FUJITSU Network BroadOne series
- FUJITSU Network FRX series

■ Router
■ LAN Switch
■ Security
■ Bandwidth Control

■ Load Balancer
■ IP Telephony
■ Unified Communication

Note: Availability featured here may differ by region.

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A Note Concerning Future Projections, Forecasts and Plans
This publication contains forward-looking statements in addition to statements of fact regarding the Fujitsu Group's past and current situation. These forward-looking statements are based on information available at the time of publication and thus contain uncertainties. Therefore, the actual results of future business activities and future events could differ from the forward-looking statements shown in this publication. Please be advised that the Fujitsu Group shall bear no responsibility for any of these differences.

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