A REVOLUTION IN THE WORKPLACE

UNLOCKING THE MEANING BEHIND YOUR DATA

Semantics and Smart Data Services

As little as 20 years ago the way we worked, collaborated and communicated was analog. Now the workplace has changed beyond recognition.
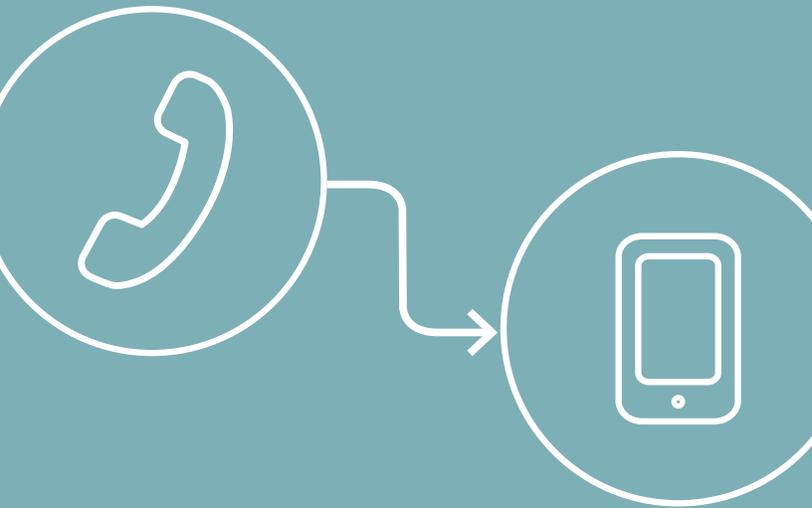
"…the future looks different, thanks to semantics and smart data services."

And while this digital revolution has transformed the way businesses operate, offering greater agility and efficiency, there is still so much untapped potential. The digital workplace is made up of the tools and technologies an organization provides to help its employees stay connected and do their jobs seamlessly – whenever they need to, wherever they are. Gartner defines the digital workplace as a network that "enables new, more effective ways of working, raises employee engagement and agility and exploits consumer-oriented styles and technologies". But there are still inefficiencies in the way we work; issues that technology must address to make employees – and more significantly businesses – more productive.

Every day, documents constantly move around an organization, changing hands between colleagues and partners and flowing in from and out to the outside world. We scan physical documents. We print digital ones. We collaborate on new drafts simultaneously online. We share files via apps. We store them to our own – and communal – filing systems.

We return to the office the next morning and begin the process of retrieving all the files we saved a day, week or month earlier before we can begin to do a productive day's work. Inefficiencies like these prevent the digital workplace from realizing its full potential. But the future looks different, thanks to semantics and smart data services.
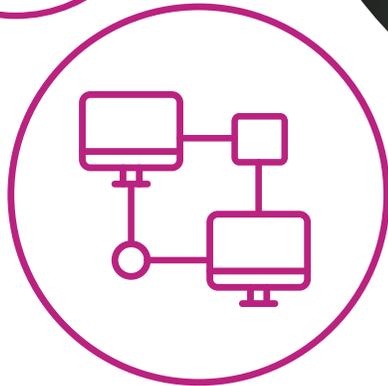
SEARCHING FOR MEANING

Semantic technology has been growing increasingly sophisticated during the last 15 years. At its simplest, semantics attempts to understand the meaning, context and relationships between data. It provides a layer of descriptive information above technologies that connect data, content and processes that can – and already is – changing the way we work, communicate and organize our personal worlds.

It has already made an impact on our daily lives. When we look at online maps we see additional traffic and weather data as well as information about road conditions and the status of construction work. When we search Google for a movie we're interested in, our screens offer up links to topics and actors related to it. Our phones tell us how long it would take us to get home from wherever we are, without us even asking, by factoring in our location, traffic conditions and varying modes of transport. Semantic technology builds a network of concepts around the idea we are searching for, expanding our personal knowledge base and helping us to make more-informed, and therefore better, decisions.

We've come to expect this sort of intelligence to be embedded into our daily lives – for information we didn't even know we were looking for to be presented to us to make everyday tasks easier. But for all its progress, semantics has yet to make an impact in the enterprise. Businesses are now beginning to see the urgent potential of semantics and smart data services – and understand the roles they play in making a truly disruptive digital workplace a reality.

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The end result is a search platform that intelligently brings a business's most relevant and valuable content to employees, cutting wasted time and boosting productivity.

ALL ABOUT THE "SELF"

Why hasn't semantics yet revolutionized the workplace? Companies that have tried to bring the technology into business operations have yet to overcome technical obstacles such as addressing the computational power and memory storage required. As a digital document company with a considerable history in printing and business services, Konica Minolta is actively establishing semantic-based smart data services in the enterprise. These services will make clients' jobs easier and businesses more profitable – and the prospects are momentous for each and every knowledge-based business.

Sparking the widespread business adoption of semantics-based services requires a shift in thinking. Typically, services take an enterprise-centric approach to semantics. They try to assimilate all available data both in the enterprise and online, and map out the relationships to create the context. This methodology leaves services prone to some of the aforementioned challenges regarding computational power and memory limitations, effectively stifling the progress of this technology. A more intelligent approach that circumvents these issues focuses on the individual user and builds services outwards based on the individual's needs and actions.

Our digital activity – that is, the digital objects we engage with, such as documents, the people we interact with and the places and events that we visit and schedule – can be grouped together and described as a "Digital Self". Typically this information is often quite disparate. By applying semantic technologies, based on well-known standards such as Resource Description Framework (RDF) and Web Ontology Language (OWL) to this grouping of information, we are able to establish implied relations and create a meta-information layer that is manageable and scalable. Semantic triplestores are a way of storing data that can read the complex relations between different pieces of information – the digital objects, people, places and events – creating a consistent, machine-readable map of a Digital Self.

If a Digital Self can be considered a trail of information, a "Semantic Self" is a type of database that logs the data trail in an organized fashion. Smart data services are then able to extract the data and make logical and valuable conclusions.
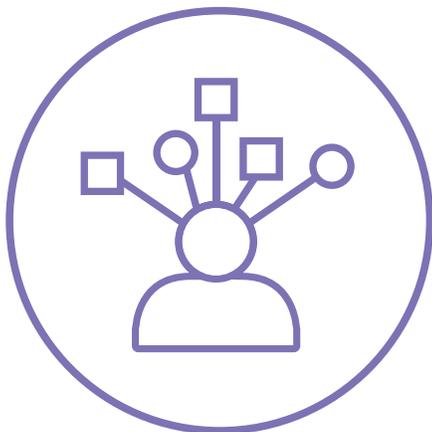
Digital Self

Digital objects we engage with, such as documents, the people we interact with and the places and events that we visit and schedule.
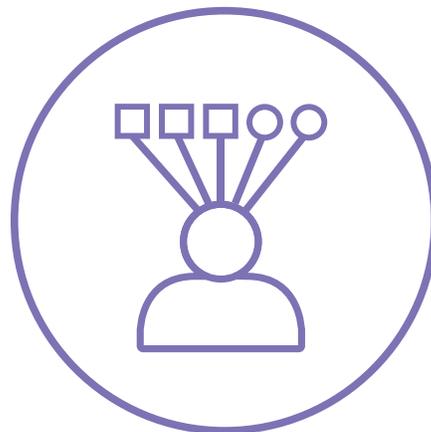
Semantic Self

A type of database that logs the data trail in an organized fashion.

FINDING THE
MEANING IN DATA

SEMANTIC LAYER

Semantic Self

DATA LAYER

Digital objects

People

Events

Digital Self

Places
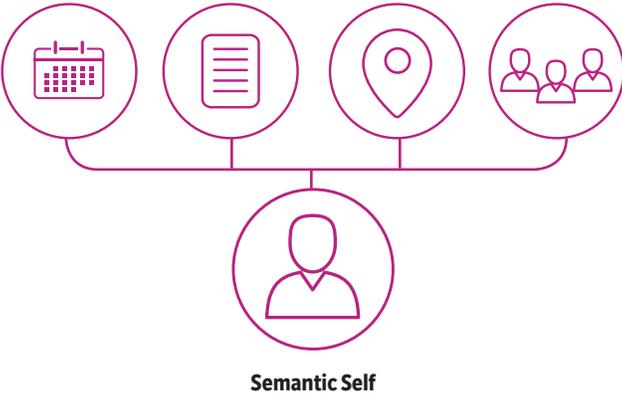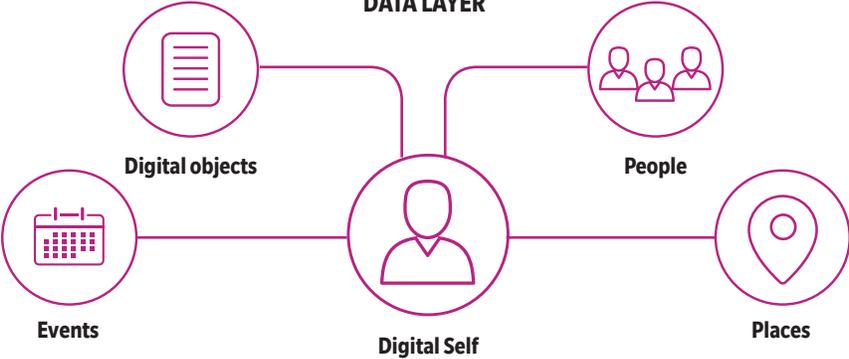
APPLICATION LAYER			
Cloud apps WWW	**COMPANY APP FACTORY**		**Personal app store**
	Enterprise apps	**Office apps**	**Personal apps**
Web	**Enterprise**	**Business**	**Personal**

SEMANTICS IN ACTION

Konica Minolta is leveraging this semantic layer of information to create smart data services that help businesses become more efficient, cut costs and ultimately generate more profit. The first innovation is a semantic calendar that provides a powerful example of the effectiveness of a Semantic Self.

By mapping out a Semantic Self with a focus on people, places and events, a semantic calendar makes life easier for the user by providing a far more engaging and contextual experience than its digital counterpart.

For example, if a company executive is scheduling a financial planning meeting for the year ahead, the semantic calendar is able to suggest attaching documents relating to the previous year's financial performance or prompt the executive to invite co-workers that they have previously contacted regarding company financials. The semantic calendar will also amend potential calendar clashes based on the strength of their relationships and the importance of that

relationship to the business. By harnessing the information available from a Digital Self and transforming that by creating a Semantic Self, the calendar knows the relationships between the data and uses it to provide contextually aware assistance to the user.

Another service ripe for disruption within the enterprise is the search engine. Web search engines already incorporate some elements of semantic search. Instead of using specific ranking algorithms, semantic search aims to produce highly relevant search results by analyzing multiple features in relation to the person executing the search. The goal is to deliver information that is tightly focused on the subject rather than offer a list of loosely related results.

Konica Minolta is developing an enterprise-grade semantic search engine that transforms a company's central document store into a dynamic and searchable knowledge base.

Once again, a comparably powerful search platform for businesses has yet to materialize. Konica Minolta is developing an enterprise-grade semantic search engine that transforms a company's central document store into a dynamic and searchable knowledge base that enables businesses to complete tasks faster and more accurately.

By leveraging the data relations uncovered through the adoption of a Semantic Self approach and combining with the use of natural language processing, machine learning techniques and rule-based systems, relevant metadata is extracted from documents such as the topic, the people mentioned, the temporal and location information and even the usage stats including who last opened or edited the document.

The end result is a search platform that intelligently brings a business's most relevant and valuable content to employees, cutting wasted time and boosting productivity.
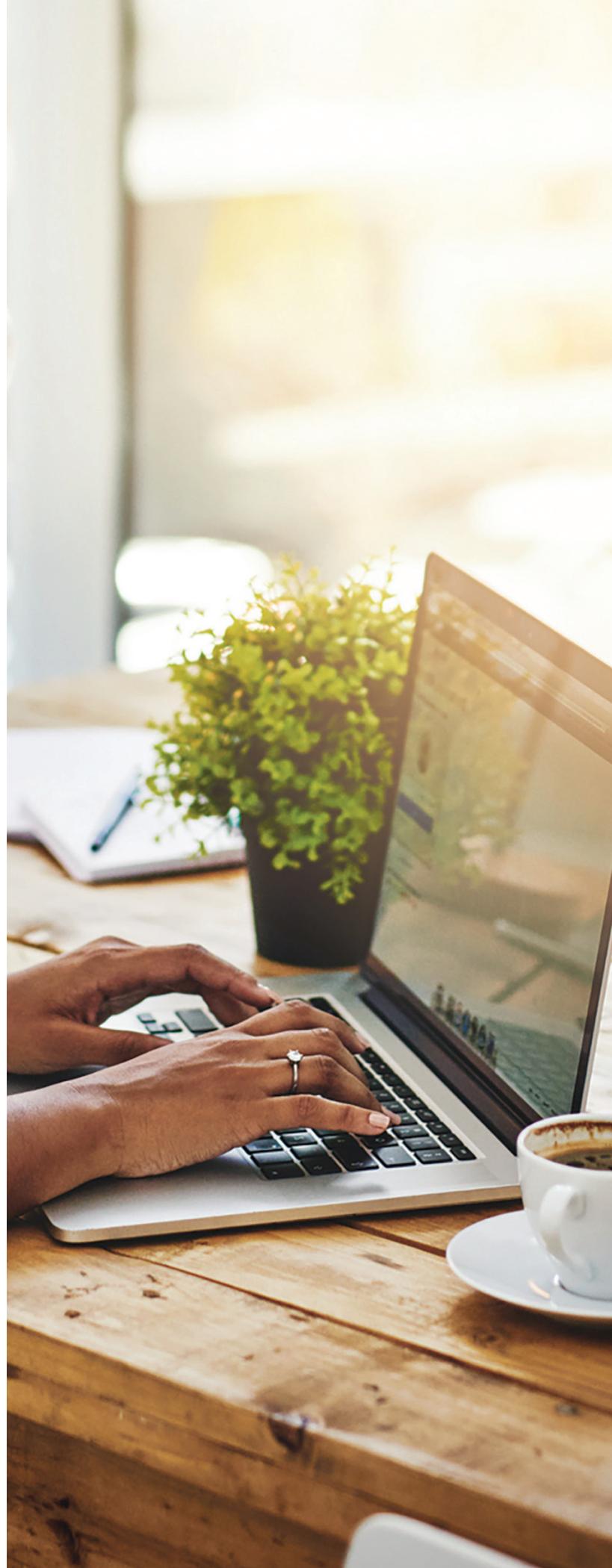
AMPLE OPPORTUNITIES

Smart calendars and search engines are just two tangible examples of how semantics is poised to disrupt the digital workplace. By harnessing the information available from our digital lives and extracting the value from documents, businesses will enhance existing processes through a range of valuable services.
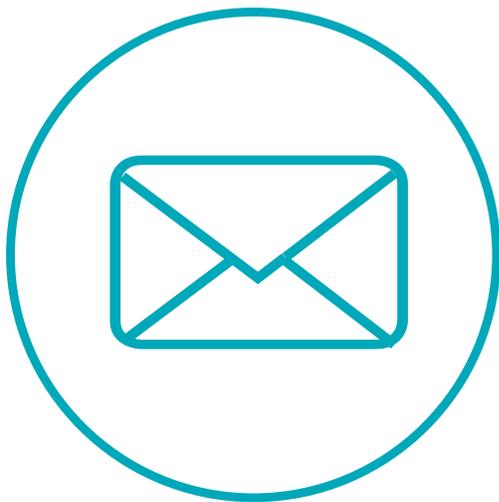
Document workflow support and automation

Scanning a document is just the start of the story – what happens next determines how effectively a business can react to a situation. A smart data service could align the scanned document, upgrade it using optical character recognition (OCR) and send it to the user by email. This is considered state of the art today. The service could recognize the document type – for example, invoice, patient consent form, order – and interpret other key details to determine the document's intent – such as who it has come from and how much money is being paid. It would then automatically trigger a workflow, from directing the document to the relevant person to updating budget forecasting. Handwriting recognition technology, in combination with semantics, will deliver more-accurate results. This is a capability that would by nature be tailored to the specific business's needs.
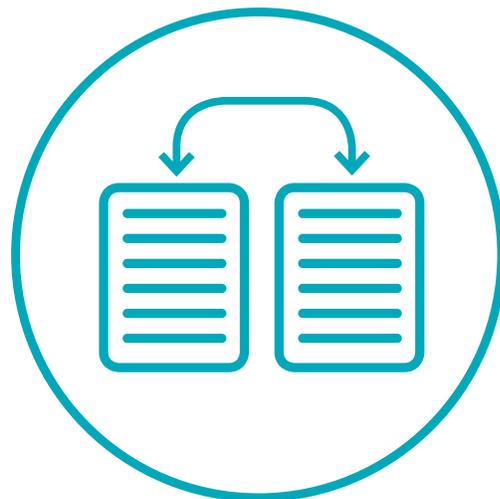
Wikification and interlinking of documents

A smart data service makes the process of gathering and digesting research materials easier for the user. When reading a heavy technical digital document on a subject we are not familiar with, it is helpful to have an encyclopaedia of knowledge at our fingertips. A smart data service is able to identify esoteric or technical terms and automatically embed links to Wikipedia definitions. Additionally, those definitions and explanations will be displayed interactively. It could also link up documents within the organization that refer to one another, preventing duplication of effort.

A smart data service reduces the upfront effort by categorizing patent documents according to relevance, based on domain-specific key terms, and presenting the user with the most useful group of patents to review.
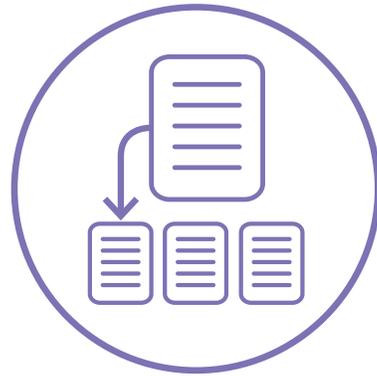
Patent analysis

A smart data service streamlines the process of patent research, enabling innovators to get on with their core work. Patent reviews are time consuming for inventors and their lawyers. They are often written in their own unique language and are hard to understand for untrained readers. A smart data service reduces the upfront effort by categorizing patent documents according to relevance, based on domain-specific key terms, and presenting the user with the most useful group of patents to review. Continual feedback would teach the service over time, thereby improving the relevance of the results.
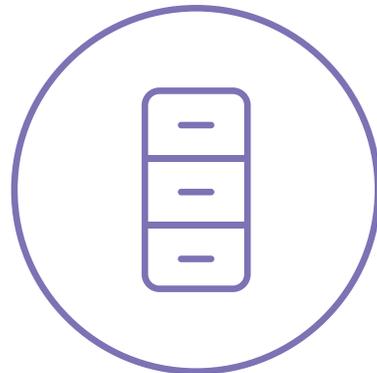
Multidimensional document structure (repository)

Any filing system becomes complicated as soon as two or three people start applying their own organizational logic to it; a smart data service will help to structure and access shared folders intuitively. The traditional file tree is just a one-dimensional way to structure shared files. A smart data service is able to apply multidimensional search terms – for example, assigning values such as project, people, faces, events and timeline to a batch of digital photos or forms – and also create a logical document name to enable users to easily find it again later. All the user needs to do is drop the file into the system.

CROSS-INDUSTRY BENEFITS

The impact of semantics and smart data services will be felt across many industries. The benefits for healthcare, for example, are immediately obvious. The UK NHS loses billions of pounds each year on wrong drug prescriptions as a result of human error. When a doctor sees dozens of patients in one day, it is easy to make a mistake and write the wrong word in a prescription, which may lead to the patient receiving the wrong medication or advice.

A smart data system will use optical character recognition and natural language processing to interpret the doctor's handwriting. It then checks the prescription against local rules for actions based on certain test results or x-rays and triggers an alert to second-guess the doctor.

The legal sector is also set to benefit greatly from smart data services. Archiving of documents is fundamental to a law firm, and many are undergoing a process to digitalize everything – usually by hand.

Healthcare Sector
Smart data systems can reduce human error and ensure patients always receive the right prescriptions.

Legal Sector
Digitizing document archives will save law firms time and boost productivity.

THE EMERGING
VALUE OF THE "SELF"

In the future, all semantic technologies and the industries they serve will be enhanced by the potential of a company-wide Digital Self network.

Even more exciting is the emergent complexity generated by a network of RDF descriptions associated with each employee, which will provide insights that we have not yet imagined. The real benefit goes beyond truly connected enterprises; it allows the enterprise to maintain and leverage the collective knowledge created by its employees and operations through the years, transforming this collective knowledge into a tangible valuable asset for the company.

Free to focus
In the coming years we will not only see these technologies being adopted into the workplace – we will take them for granted. Workers will be less bound by physical place and will interface with one another in radical new ways. There will be obstacles to overcome – the complexities of privacy and the evolution of legacy systems among them. Businesses that don't leverage semantics will lose out.

By automating low-level business operations, semantics will free the workforce from mundane, everyday processes and tasks. By giving employees quick and easy access to the goldmine of information available across the business, smart data services will boost their level of knowledge. These are significant moves, which will make the business more efficient and productive – and, crucially, allow it to focus on delivering more innovative services to clients.

The best semantic technology platforms will be invisible and unobtrusive – and they will focus on the individual. Businesses are not large, faceless enterprises – they are the sum of those who work within them on a daily basis. By unlocking the relationships between the data we produce every day and using them to create services that stay a step ahead of the competition, we will make our working lives better and our businesses more competitive.
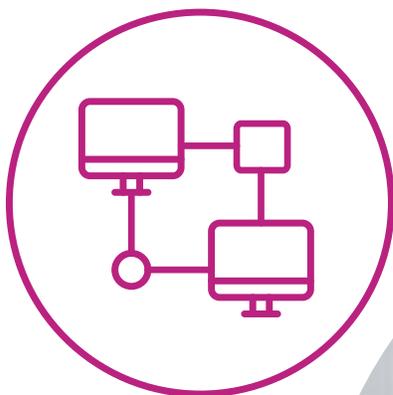
TALK TO US

Konica Minolta is working hard to make business better for its clients through innovations in semantics and smart data services. We believe in the power of many, so we would like to hear from others who are also exploring and developing technologies and services in this area.

research.konicaminolta.eu

PARTNERSHIP.

Konica Minolta can help give shape to your ideas and partner with you to achieve your corporate objectives. Contact us to realize opportunities in:

INFORMATION MANAGEMENT	IT SERVICES	TECHNOLOGY
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Document Management	Cloud Services	Commercial and Production Printers
Automated Workflow Solutions	IT Security	3D Printers
Business Process Automation	Managed IT Services	Wide Format Printers
Security and Compliance	IT Consulting & Projects	Laptops, Desktops and Computer Hardware
Mobility		Servers and Networking Equipment
eDiscovery Services		Managed Print Services (MPS)
		Managed Enterprise Services

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KONICA MINOLTA

KONICA MINOLTA BUSINESS SOLUTIONS U.S.A., INC.
100 Williams Drive, Ramsey, New Jersey 07446

ReshapeWork.com

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