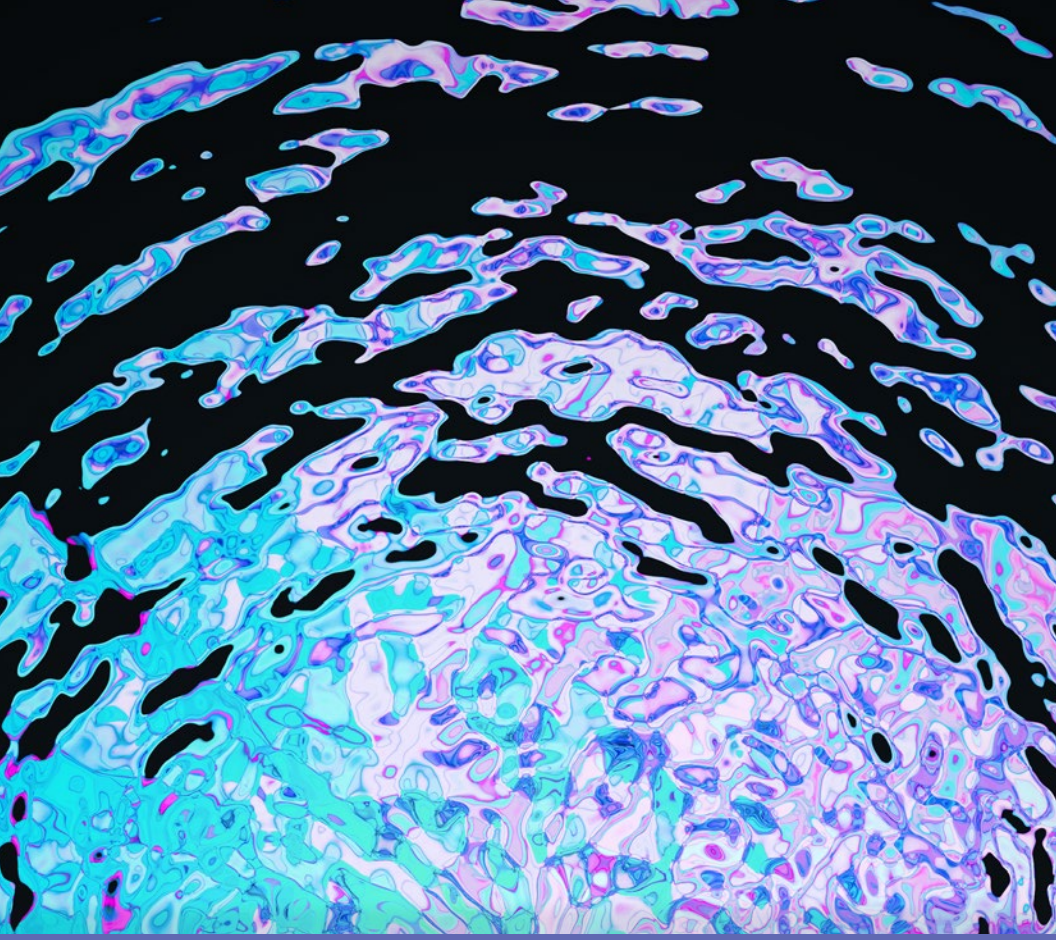


WHITE PAPER

Surviving the disruptive powers of nature

How to embrace the hyperconnected world

MarkLogic®

Introduction

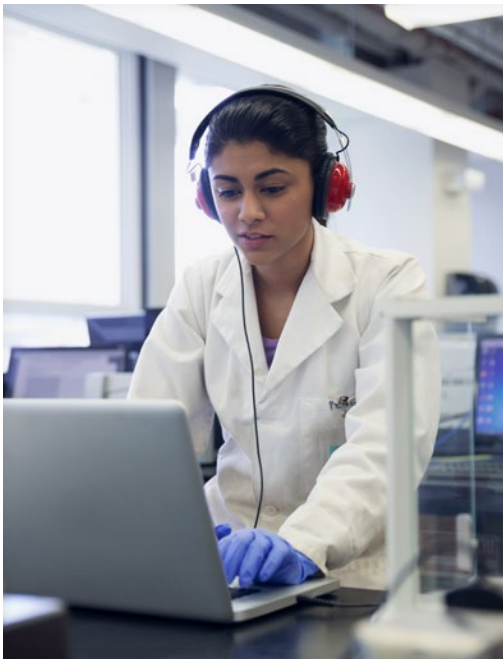
Hyperconnectivity is about a rapidly emerging reality of things, machines, computers, people and even pets being connected through wireless technology.

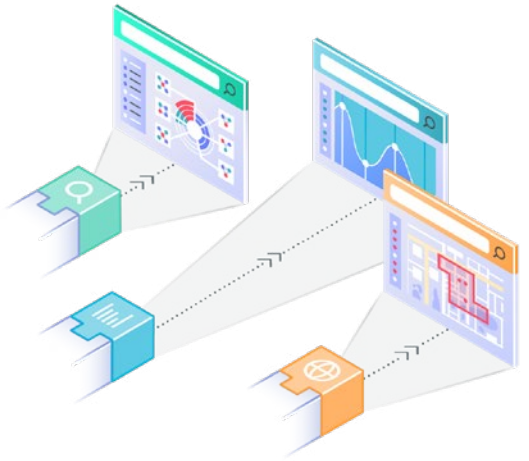
At the heart of it are the endless streams of data all these connected entities produce, and the semantic logic that feeds process, machine learning algorithms and the artificial intelligence that will not only change the economy, but the entire world as we know it. Big words? Not at all, as nature forces our hand more urgently than ever to make some drastic changes.

The hope for mankind is in world-wide virtual collaboration

It's more likely than not that your organization is going through one of the grimmest phases in its history. Most businesses suffer losses either because their business model is not prepared for the current market (or lack thereof), or because their business model largely depends on people working physically and closely together.

One way to stay in business, more or less as usual, is by having co-workers virtually collaborate. That is the current modus operandi of AbbVie, a pharmaceutical company with approximately 30,000 employees working together to help patients around the world. While the search for a covid-19 vaccine continues, AbbVie collaborates with health authorities and institutions globally on clinical research related to disease.





Clinical research on COVID-19 treatment

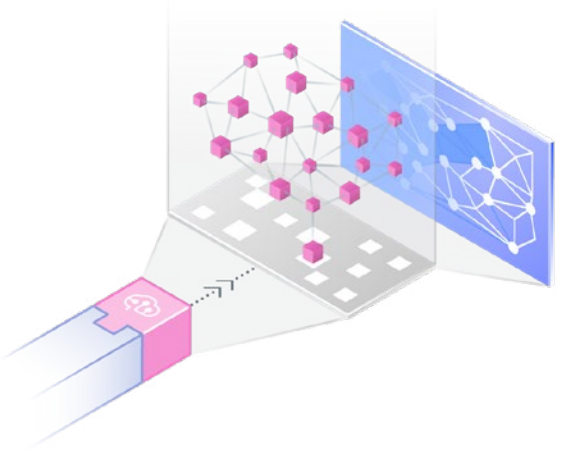
For this research, the company fully relies on MarkLogic's Data Hub. It's a cloud-based, yet infallibly secured platform that is helping the pharmaceutical giant to get new treatments to market faster than before. In essence it is a vast collection of data sources tied together through intelligent, scientifically designed relations that help researchers discover relevant data in minutes versus the hours or days that used to be required.

In recent years, the tenfold decrease in data discovery time has of course proven profitable. Today, apart from the company being able to continue research without co-workers having to collaborate physically, AbbVie is optimally equipped to conduct clinical research in general and more notably related to COVID-19, for which the company is working closely with – amongst others – European health authorities and the U.S. Centers for Disease Control and Prevention.

The hyperconnected world ties everything and everyone together

AbbVie is just one example of how industries thrive on digitalization. This year, an estimated 31 billion devices are connected to the worldwide web. The spectacular growth of the Internet of Things (IoT) is the result of a combination of factors. Mass production, standardization of protocols, and the unrestricted availability of cloud services ensure that more and more smart devices are finding their way to business in every industry.

For example, the logistics sector and the manufacturing industry rapidly discover the advantages of automated warehouse locations and self-managing production lines. The amount of data we collect in each process is invaluable for preventative maintenance without interrupting the process. Narrowband IoT, cloud, big data analytics and artificial intelligence: it all comes together – and it is both affordable and disruptive.



The disruptive powers of nature call for immediate action

Until very recently, our most common idea of economic disruption has been technologies causing disturbance and disorder in well-established business models. Only now are we coming to realize how harmless this kind of disruption actually is. And what's more, how these disruptive technologies hold the potential to save us from the turmoil, confusion, division and convolution we face when nature shows its true disruptive powers.

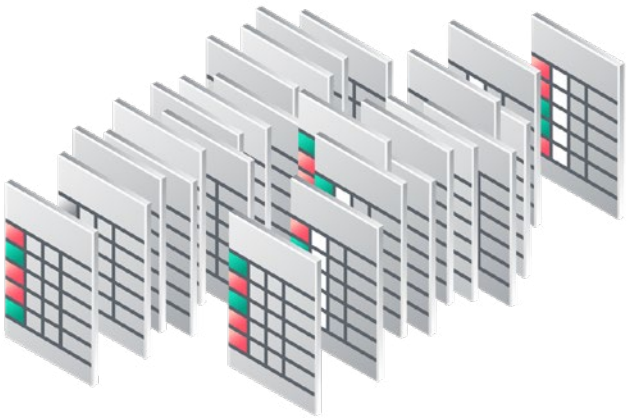
From that perspective the advancements of Industry 4.0, such as cyber-physical systems, machine learning and artificial intelligence, suddenly acquire a whole new significance. Because machines can't get sick, at least not the way we can. Where we used to advocate how digitalizing industries would make them future proof in terms of agility, efficiency and continuity, we must now face the fact that the future already is upon us, and many businesses have proven far less economically sustainable than we had hoped for.

Lack of knowledge is holding governments and businesses back

Good news or bad news? That'll depend on the perspective of whom you ask, but one thing you can say about all major change is that it won't happen without a serious crisis. While we were already steadily moving towards a new global reality, the technosphere will now even more rapidly form an augmented layer on top of the traditional biosphere.

In other words: the virtual world is becoming almost as tangible as the real world we live in.

That it is not all that easy to deal with those numerous data flows, was recently painfully demonstrated in the Netherlands, where the first round for a corona-contact tracing app from the Ministry of Health ended in a comedy of errors. The least to blame for this is probably the minister, tasked with the development of the app. Jurriaan Krielaart, Territory Director for Northern Europe and Emerging Technologies of MarkLogic, especially frowns on the demand for data to remain in the app on the phone, instead of being managed centrally.



“That’s probably the worst way to protect privacy, but it resonates with people’s fears of transferring data to a government organization. I understand even experts can succumb to popular sentiment and public opinion, but to me it seems more like a worrying lack of knowledge in the field of data management.”

One upside, says Krielaart, is the current public attention for the risks of inept management. “I see how my parents, friends, neighbors and the entire country are now being brought up to speed via talk show tables about the complex, technical problems that I have been dealing with for twenty years. The downside is, they don’t tell the right story.

> **“When I hear experts say that encrypting data securely is an extremely complex problem that needs to be designed and tested for years, I’m afraid they may have missed some rather crucial developments.”**

– Jurriaan Krielaart

Multi-model data hub is the only technique fitting hyperconnectivity

“Poor knowledge of cutting-edge data-management techniques cause people to become increasingly reluctant to share their privacy-sensitive data with governments and third parties,” adds Krielaart.

“In part rightly so, if you look at the series of affairs in which tech giants such as Google, Apple and Facebook do not show their best side. But the experts who now all have an opinion about the Dutch corona-app, pretend that a central database cannot be secured against data misuse and privacy violations, and that is cringeworthy ignorance, seeing as a multi-model database with the level of security MarkLogic offers, is in fact the only trustworthy solution.

“If you want to tap into the endless data-supply of the hyperconnected world, and advance your business in every possible way, you’d better forget about all those self-proclaimed database-gurus, and come talk to us.”

And luckily, many do. Over the past two decades, MarkLogic has grown into a role of providing solid solutions to the most challenging issues of industry-leading companies around the globe. With each year and every new emerging technology, these challenges get more interesting and complex at the same time.

Part of the interconnected world are the cars we drive, or – for a happy few – that drive us from A to B. Mitchell 1 is an automotive tech-giant, that has managed to stay in business for over a century, by timely valuing its data as a core asset and constantly tweaking their business model accordingly.

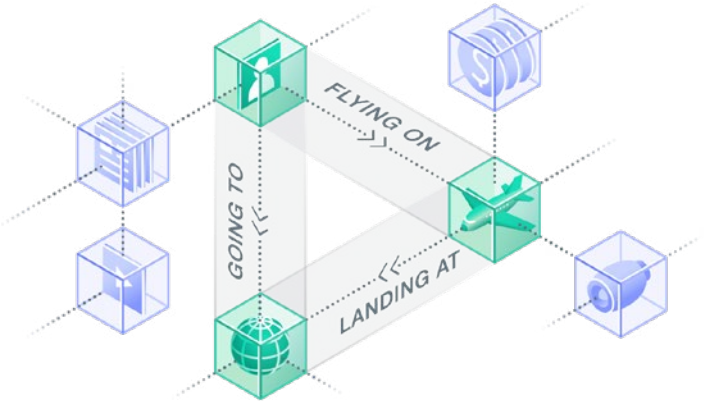
The company was founded in 1918, publishing the Reed Electrical Manual of Starting, Lighting and Ignition. After working with us to digitally deliver their traditional, printed product, the company continues to expand their use of MarkLogic to support solutions for the vast amount of data not only car manufacturers, but also the cars themselves and their connected owners, produce each and every day.

Rationalizing infinite streams of real-time data is the key

‘There is an ever-increasing number of sensors, radars, lasers and cameras that support advanced driver-assistance systems like lane departure warnings, blind-spot monitoring, adaptive cruise control and other features’, explains Ben Johnson, Mitchell 1’s director of Product Management. Making sure they have all data to maintain, diagnose and repair these systems and present that information in intuitive ways, is a massively complex operation.

‘We see communication between the vehicle, the vehicle’s shop and of course, the vehicle’s owner becoming more seamless. We needed a system that can actually receive all communication from vehicles equipped with connected car devices. And then make sense of it and present that to technicians in a way they can make correct decisions in seconds rather than hours.’

True integration between an almost infinite number of sources, each with their own almost infinite streams of real-time data. Precisely what MarkLogic’s Data Hub is designed for. The platform delivers all information for any selected vehicle in a unique graphical layout, organized in specific categories that match the way technicians approach diagnostics and repair.



Without semantic logic, data has very little meaning

The average car today runs more computer code than a fighter jet and the various streams of information required to properly service, diagnose and repair these vehicles has grown exponentially. The times where car parts could be classified by a category like suspension or electrical have long gone. In a networked environment, a wheel speed sensor feeds information that is used to provide speedometer readings, anti-lock brake actuation, adaptive cruise control regulation, traction control functions and more. MarkLogic implemented semantic logic to present search results in a way technicians understand the components related to these systems and how to diagnose them when problems occur.

Mitchell 1's search platform speeds up diagnosing by a factor of 20, from 10 minutes on average before MarkLogic, to 30 seconds today. Besides that, the company can roll out new features and enhancements in as little as two weeks, versus 6-12 months on its former relational system.

We become connected human beings, tapped into the net

Hyperconnectivity is not only about machines and sensors tapping into wireless networks. It's also about all of us rapidly becoming connected human beings. From wearables that measure heartrate, blood-oxygen and temperature, to radio-frequency identification transponders measuring bodily functions or allowing you to pay at the grocery store, the genie is irreversibly out of the bottle. And all the data they provide, are the core of a wealth of previously unthinkable business models.

Even though most of these gadgets are primarily commercial, people's safety, well-being and health are more and more at the heart of every multinational's mission. NTT DATA, one of the top system integrators in Japan, relies on MarkLogic's expertise in managing and analyzing various forms of data. We entered into a strategic partnership in 2012 and have since been collaborating to build – amongst many other cloud-based services and solutions – a system to manage data sources and advance intelligent decision-making and program development in healthcare.

Being data-driven is more than ever every industry's first requirement

Dr. Stephen Newman from CentraForce Health explains how non-traditional patient data, such as self-reported health attitudes and behaviors, are a powerful and actionable addition to the traditional electronic health records. As we see now, with COVID-19 having the world in its grip, the largest and most daunting challenge will be the assessment of rising risk in populations that seem healthy. To tackle that challenge, artificial intelligence and cognitive capabilities are absolutely essential.

Consequently, the health care industry, like any other, must first and foremost be fully digital and data-driven. MarkLogic's multi-model Data Hub Platform is the best option for addressing the healthcare industry's needs for better data. Not only does it integrate data 10x faster than legacy technology, but it has rock solid security – and supports a wide range of artificial

intelligence capabilities that the industry desperately needs. From autonomous robotics to emerging analytics for incidental findings – or even predicting the service utilization models for patients – the ability to more easily leverage artificial intelligence hinges on continued development of agile data management technology and platforms.

Hop on, or suffer the devastating effects of disruption

Using the same technology, MarkLogic built a platform to serve as the heart of HealthCare.gov (commonly known as “Obamacare”). The complexity of the project and the demands for both privacy and security against cybercriminals were unprecedentedly high.

According to Krielaart, the issue surrounding the Dutch corona-app is similar in every way to the issue that arose in 2013 when the HealthCare.gov site, offering health insurance for all Americans, was launched. “Following a series of flawed implementation attempts, MarkLogic’s proven technology and expertise were brought in to tackle the problems no one else seemed to be able to solve. And we did, as we have so many times in comparable situations.

“Meanwhile here in the Netherlands experts seem to think the wheel still needs to be invented. It is about time that all these so-called data experts, amongst whom those who advise the government, do some serious work to fast-forward their expertise by at least ten years.”

> **“The hyperconnected world is here. It’s all around us. But if you don’t have a clue as to how to bring all the data together in a meaningful way, that ship will sail without you. And what that does to business, well, just have a look at devastating effect of corona on all traditional, non-data-driven organizations.”**

– Jurriaan Krielaart

Want to know more?

Talk to our local hero.

By all means, do get in touch with Jurriaan Krielaart, our Director Emerging Technologies & Territory Director for Northern Europe. Despite being a data wiz, Jurriaan also speaks your language, so don't hesitate to give him a call.

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About MarkLogic

By simplifying data integration, MarkLogic helps organizations gain agility, lower IT costs, and safely share their data. Headquartered in Silicon Valley, MarkLogic has offices throughout the U.S., Europe, Asia, and Australia.

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