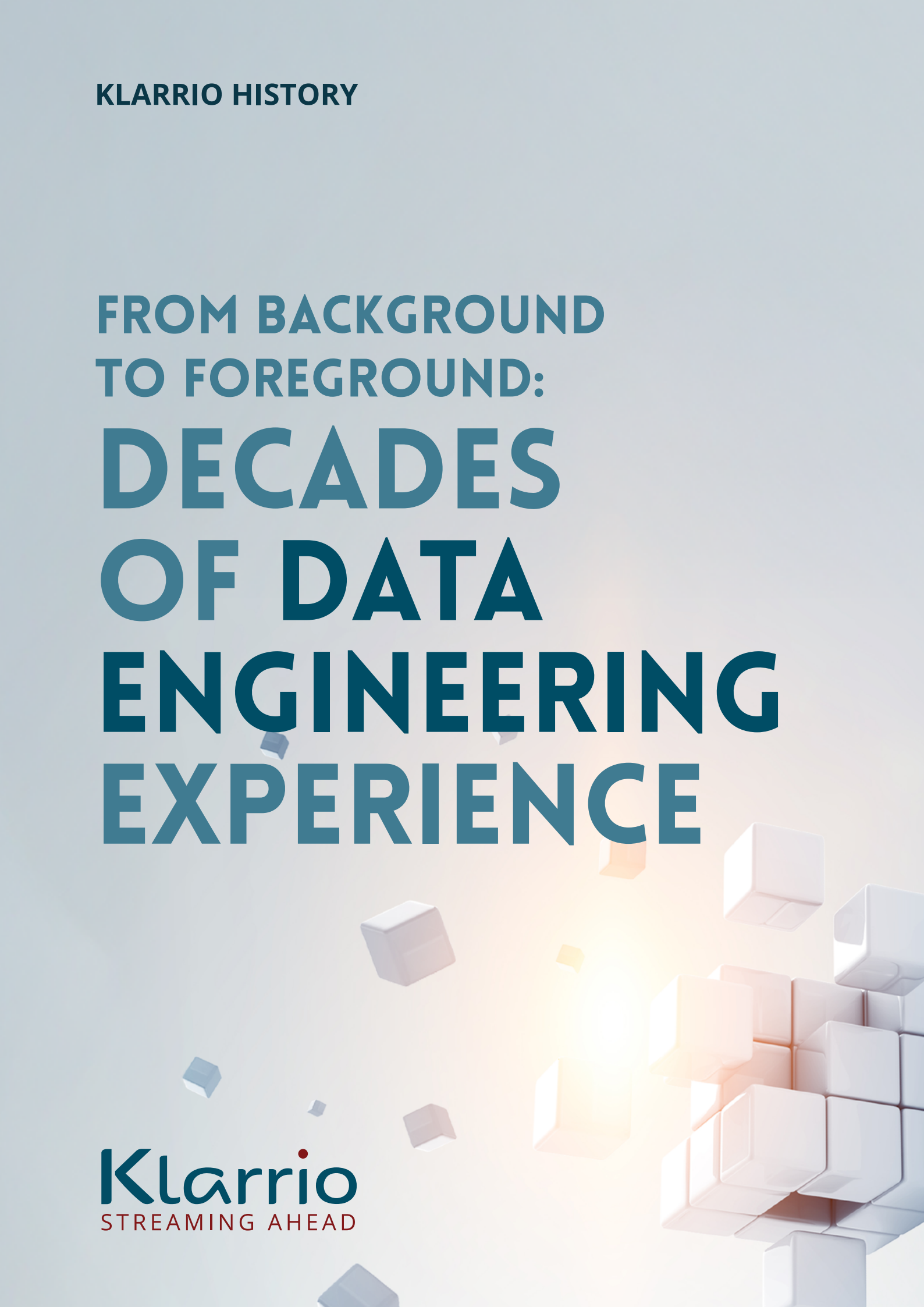
KLARRIO HISTORY

FROM BACKGROUND TO FOREGROUND: DECADES OF DATA ENGINEERING EXPERIENCE



Klarrio
STREAMING AHEAD

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CONNECTIVITY, THE CLOUD, AND KLARRIO

Sometimes you can't move forward without taking a closer backward.

The last few decades have been marked by an upheaval in information technology advancements. The rise of broadband, cloud computing, Internet of Things (IoT), and the emergence of loosely coupled architectures, just to name a few. As almost anyone in business today already knows, such innovations have literally redefined the way we live and work over the past few years.

They also created a global framework for what we now call "The New Economy," one that is based on—and run by—digital functions and data-driven customer insights.

Today, all of this is common knowledge. But sometimes you can't move forward without understanding the history behind how we got where we are now. It isn't just important for anyone working in data technology, it's equally crucial for businesses looking for ways to provide solutions that optimize, control costs, and future-proof their strategic business goals.

At Klarrio, we should know. We've been through the digital revolution from the very beginning. We've not only learned and adapted to new technology along the way, we've also partnered with countless organizations that have been forced into a new paradigm practically nobody ever foresaw.

So, let's take a few minutes to discuss why our experience matters to us—and to you.

02

THE AGE OF CONNECTIVITY BEGINS

Around the turn of the millennium, one major milestone caused a significant shift that laid the foundation for today's digital economy: **the switch from dial-up modems to broadband internet.**

Before broadband, internet connections were sporadic and slow, and few devices could even connect to it. In the early 2000s, however, broadband internet spread to households, and by 2004, the gates were unleashed for widespread usage, and the number of connected devices exploded.

As internet speeds and Wi-Fi technology improved, mobile internet options also became much faster and more affordable. The rise of 3G and 4G technologies (and now 5G) significantly accelerated usage and fueled the transition to an "always-connected" world.

The release of the first iPhone also began to redefine the way we communicate, shop, and behave with each other, while the rise of Machine-to-Machine (M2M) communication and IoT led to an astronomical surge in demand for internet-connected devices.

Anyone in the data engineering business or who runs a company today is aware of most of these changes, but what they don't know is how much of a perfect storm the timing of these innovations caused.

Not to mention why living through it matters to businesses today.

03

CLOUD TECHNOLOGY AND THE NEW ECONOMY

Over the past couple of decades, businesses were forced to confront three major game-changers within a painfully short time period:

1. The growth of broadband
2. The explosion in connectivity
3. And the introduction of the cloud.

Launched in the United States in 1998, cloud computing originated as a means of generating revenue from excess infrastructure made available to lease or rent. The amount of computing power, storage, and bandwidth available through the cloud was previously only accessible to a select few.

But the capacity of these new cloud solutions opened the door to smaller companies and startups, disrupting the status quo while creating previously unfeasible business opportunities for forward-thinking companies of any size.

This led to a new, cloud-ready economy driven by data, customer insight, and groundbreaking data architectures.

Cloud technology companies are highly disruptive and fundamentally different from the big, traditional firms that used to dominate the scene. These cloud-native companies didn't just shift to the cloud; they were born on it."

Dirk van de Poel, CPO & Co-Founder

04

THE RISE OF OPEN-SOURCE

The new economy revolution was largely due to the proliferation of open-source software. It had been around for a while through open-source software (OSS) from LINUX, but Amazon's decision to allow other companies to use its extra cloud capacity also began to fan the flames. Many new economy companies started contributing to OSS as well, and it wasn't long before the growth of the cloud gained considerable momentum.

The idea caught on like wildfire, and other firms soon followed suit. Unlike traditional licensing houses, however, the goal of open-source providers wasn't to commercialize their new technology. It was a way to strengthen their business capabilities, as well as to assimilate and create stronger communities around their specific technologies.

Instead of trying to sell anything, open-source developers shared their new architectures with the community, hoping for contributions and improvements that, in turn, were eventually driven by data centrism.

The idea worked incredibly well—so well, in fact that numerous distributed, scalable software solutions became open-sourced. This surge in open-source activity fostered a thriving community. In fact, many firms began offering both commercial and non-commercial open-source license agreements of their own, further disrupting the traditional approaches and sources of software licensing.

The foundation, framework and ecosystem for a new economy were now solidly in place. But very few people could have foreseen what this would soon lead to.

05

THE NEW ECONOMY DISMANTLES THE NORM

For all practical purposes the traditional client-server architectures and standard licensing agreements had taken a serious back seat. So had the traditional business models.

These were replaced by consumption-driven business models that, because of the cloud, allowed Saas and PaaS options, which allowed smaller companies and startups to compete against the industry giants.

These new economy companies were different from the traditional industry giants, and soon enough, some of these new start-ups and smaller companies became industry-disrupting business giants in their own right. Not by creating new products and services, but by launching new business models that delivered commonplace services via innovative and digitally driven business approaches.

For example:
• Uber replaced traditional taxis and put more power into the hands of the riders while offering the same basic transportation service.

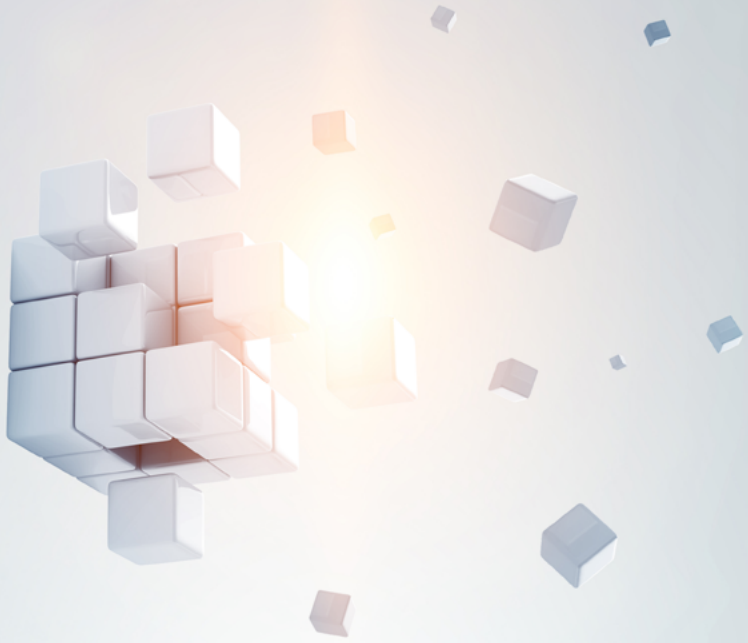
• Airbnb offered lodging—and considerably cheaper prices—than hotels, often in addition to the option of cooking at the rented unit, rather than eating at restaurants at much higher prices.

• Netflix literally put Blockbuster out of business by streaming videos directly into your home, eliminating the need to pick up and return videos in person. 6,000 Blockbuster locations were gone in 2 years, and consumers could get the programs they wanted to see faster and easier than ever before.

The list goes on, and such disruptions affected everybody. With Netflix, for example, the post office lost its biggest customer. With Airbnb, the hospitality vertical was forced to rethink and digitize its entire approach, and the entire marketing industry was forced to change its entire paradigm completely.

What's more, many companies had to start building their own software stacks and data platforms, even though they really weren't in the software business. By pushing their software into the open-source market, however, they could not only use the cloud for infrastructure, they could also go to the open-source community to get the software stacks they needed—for free.

So, after the technology disruption itself, new economy companies created their own disruptions in the market. Broadand, connectivity, and cloud proved to be more than brilliant tech innovations. They literally redefined what businesses needed to do to survive.



"The common denominator to all these changes is the disruption they made on all fronts—the vertical markets, software and platform licensing, and the entire world in general. It's an unrecognizable world today from what we saw prior to 2000."

Kurt Jonckheer, Klarrio CEO and Co-Founder

06

A CATACLYSMIC CHANGE IN DATA DEMAND

The common denominator to all these changes is the disruption they made on all fronts and the effect they had on the need for data.

In the past, with fewer connected devices and users, data demands were modest or moderate at best. But in the new data era, demand skyrocketed dramatically, and the traditional client-server architecture could no longer accommodate increasing volumes of data.

Consider the last few years alone. According to AI Overview, the "exploding data capacity" in recent years has been so staggering that in 2024, 149 zettabytes of data were generated worldwide, and they're expected to reach 400 zettabytes by 2028.

To put this into perspective, a zettabyte is a measurement of digital information storage that is equal to one sextillion bytes. That equals a trillion gigabytes or, in numerical form, 1,000,000,000,000,000,000,000 bytes.

Such growth in the demand for data is not only mind-boggling—and virtually unforeseen around the turn of the century—it's hard to believe any organization could have had the knowledge and resources to adapt to such incredible changes in a relatively short time period.

But because of a fundamental change in how some software would soon be developed and shared, they did.

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OUR HISTORY—AND WHY IT CAN HELP YOU

What's Klarrio's place in all of this? While the company wasn't founded until 2016, our roots go back to around 2,000—the very time when this whole new world started to emerge.

All of our core leadership team—Kurt, Dirk, Martin, and Bruno—started their careers in the telecommunications industry. They developed gateway firmware for broadband equipment, embedding full triple-play TCP/IP stacks into compact, cost-effective hardware, and were involved in the standardization of remote device management protocols like TR-69.

For example, in 2010, while working at Technicolor, the future founders of Klarrio got the opportunity to launch an incubation program called Virdata, which set out to build the first PaaS for Disruptive/ Distributed Management as a Service (DMaaS), which became IoT-driven.

This multi-cloud IoT platform demonstrated horizontal scalability for hundreds of millions of connected devices at unprecedented low infrastructure costs. At the same time, they leveraged the cloud-native, distributed computing, open-source frameworks developed and propagated by the new economy companies.

They worked with open-source tools and the cloud to overcome the enormous cost of full-blown data centers or expensive, proprietary distributed solutions.

Our specific experience was particularly fortuitous for three distinct reasons:

1. The team got deep, hands-on experience with open-source from its earliest stages.

2. Our experience as software developers in broadband technology gave us a head start and a clear vision on what the market would need as demand for multi-device network connectivity continued to explode.

3. And perhaps most importantly, from a strategic perspective, we also learned how to develop complex functionalities on small embedded systems even before the cloud—a skill that would become absolutely critical as data-driven businesses via the cloud became the norm.

The combined experience of the Klarrio leadership team led to an intuitive approach and discipline in data engineering that, if not unique, was—and still is—very rare to find.

For example, as early as 2008, we realized the embedded software architectures inside routers we were building at the time were reaching their limit in terms of capacity and scalability. The only solution, they concluded, was to fundamentally change the middleware in the gateway.

So, long before it became commonplace, they launched a project called Revolution to create a distributed middleware architecture that, unlike most systems today, had nothing at all to do with the cloud.

It was innovative, smart, and prescient because it laid the groundwork for the kind of thinking—and distributed architectures—the digital landscape would soon require.

"The intense focus on efficient software development, while working with limited resources like memory, computer power, and storage, has always influenced Klarrio's approach to software development. It forces us and our clients to think twice before adding new functionality."

Dirk Van de Poel, Klarrio CPO and Co-Founder

08

2016: KLARRIO TAKES OFF

In 2016, after the Virdata project ended, the core team decided to put our collective insights and hard-earned experience to good use in a new service-oriented entity of our own. Klarrio.

At the time, our open-source framework approach was still somewhat unique. We weren't just using open-source tools, but were also engaging with the creators of the tools themselves, helping to overcome initial challenges while learning and growing alongside them.

The same is true today.

Although Klarrio has grown from a small group of founders to an international company with more than 100 employees and offices in several different countries, our primary role remains to help, learn, and grow with clients who want to create cloud-agnostic innovations that allow them to control their own data, success, future, and freedom.

Why it matters to our clients today is that:

• We understand the dynamics of the broadband, connectivity, and cloud revolutions because we lived and worked our way through it.
• We've also been working hand-in-hand with organizations for more than 20 years as they—and we—have been forced to develop new tech architectures and solutions where everybody wins.
• We specialize in creating solutions that involve massive amounts of data that continue to require more and more and more volume, speed, and storage capabilities.
• We understand how to build redundant solutions that eliminate the possibility of downtime.
• We know where you're coming from and understand your core needs—whether you're looking entirely new cloud-native solutions or hybrid architectures that protect your previous investments.
• And most importantly, we develop systems that allow YOU to own your data, giving you the freedom and flexibility to change vendors and access your data whenever and however you please.

We have always been a team of innovators who embrace change, adaptability, and opportunity, and will continue to do so as we move forward. For more information on Klarrio and our entire team, please contact us today.

25 YEARS OF GROWTH & INNOVATION

2000

TECH
- Launch of Broadband
- Triple Play
- VoIP
- IPTV
- Internet
- AWS Cloud
- Rollou
- TR-69 Protocol

MARKET
- Wikipedia
- LinkedIn
- Splunk
- Facebook
- YouTube
- Reddit

LAW
- Freedom of Information Act
- Patriot Act

KLARRIO
- Deep Broadband Experience:
  - Alcatel,
  - Siemens,
  - MetaVector,
  - 2Wire
- Full firmware SW R&D

ALCATEL
SIEMENS
Broadband4Homes

2005

TECH
- Big Data Launch
- CPE SW Distributed Middleware
- Relaunch of pub / sub
- Bidirectional messaging
- iPhone
- 4G
- VDSL & Fiber

MARKET
- Streaming
- Social Media
- Speed
- Always ‘on’
- AirBnB
- Whatsapp
- Uber

LAW
- Safe Harbor
- EU Fundamental Data Right

KLARRIO
- New CPE SW R&D & Remote management:
  - Thompson Telecom
  - Technicolor
  - Broadband4Homes
  - 2Wire

2WIRE
THOMSON MULTIMEDIA

2010

TECH
- Surge new Open Source Frameworks
  - Kafka
  - Spark
  - Flink
  - DC/OS…
- IoT
- New SAAS and PAAS models
- Lamdba vs. Kappa architectures

MARKET
- Instagram
- Spotify
- Zoom
- Snowflake
- Databricks
- Slack

LAW
- Personal Data Protection Act
- Data Privacy Act

KLARRIO
- Virdata
- Conferences
  - CES
  - IFA
  - IBC Cloud…
- 1st Databricks Belgian certification
- Partner of Berkeley AmpLab
- NetApp EMEA Innovation

virdata

2015

TECH
- Widespread Adoption of Cloud-Computing Platforms
  - AWS
  - Google
  - Azure
- Crypto
- K8
- Docker
- 3d Printing
- High Performance Compute
- In Memory

MARKET
- Alphabet
- TikTok
- 1st trillion US$ companies
  - Apple
  - Amazon
  - Microsoft
  - Alphabet

LAW
- EU Privacy Shield
- CloudAct
- GDPR
- Invalidation EU Privacy Shield

KLARRIO
- Founded Klarrio BE (2016)
- Klarrio NL
- Klarrio US
- Top 10 EMEA Analytics Services company
- Klarrio Germany

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2020

TECH
- AI Acceleration & Disruption
- Quantum Computing
- Robotics
- Mobility as a Service
- Real Deep Fake
- 5G
- Data Privacy & Governance

MARKET
- Unicorn Phenomenon:
- From Startup to $1 Billion
- 5-Year TimeFrame
- Drata
- Airbyte
- Cyber
- Merama
- Beyond Identity

LAW
- NIS 2
- EU AI Act
- Cyber Resilience Act
- Cyber Security Act

KLARRIO
- IDSA
- Day 1 Gaia-X
- Formal Security Level
- tutorrio Academy
- Klarrio Spain
- Top 10 company Big Data
- ISO27001

2025

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This document is edited by Klarrio.
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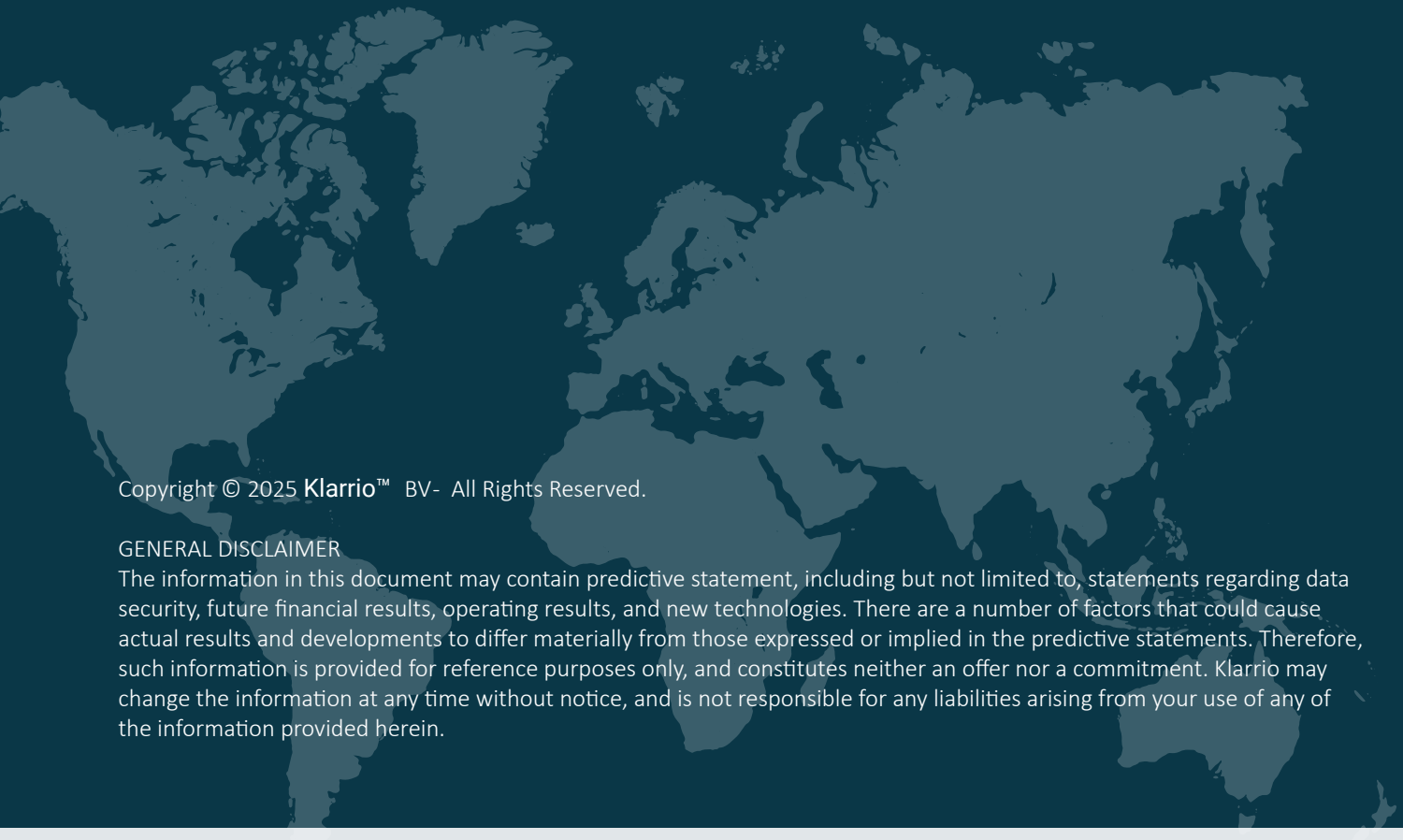
Klarrio is specializing in large scale and real-time data processing implementations. Not only expertise, but more importantly, experience.

We go beyond being a mere software solutions provider for enterprises, embracing openness to let you control your destiny: no vendor lock-in, all open-source, with proactive and sustainable solutions.



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