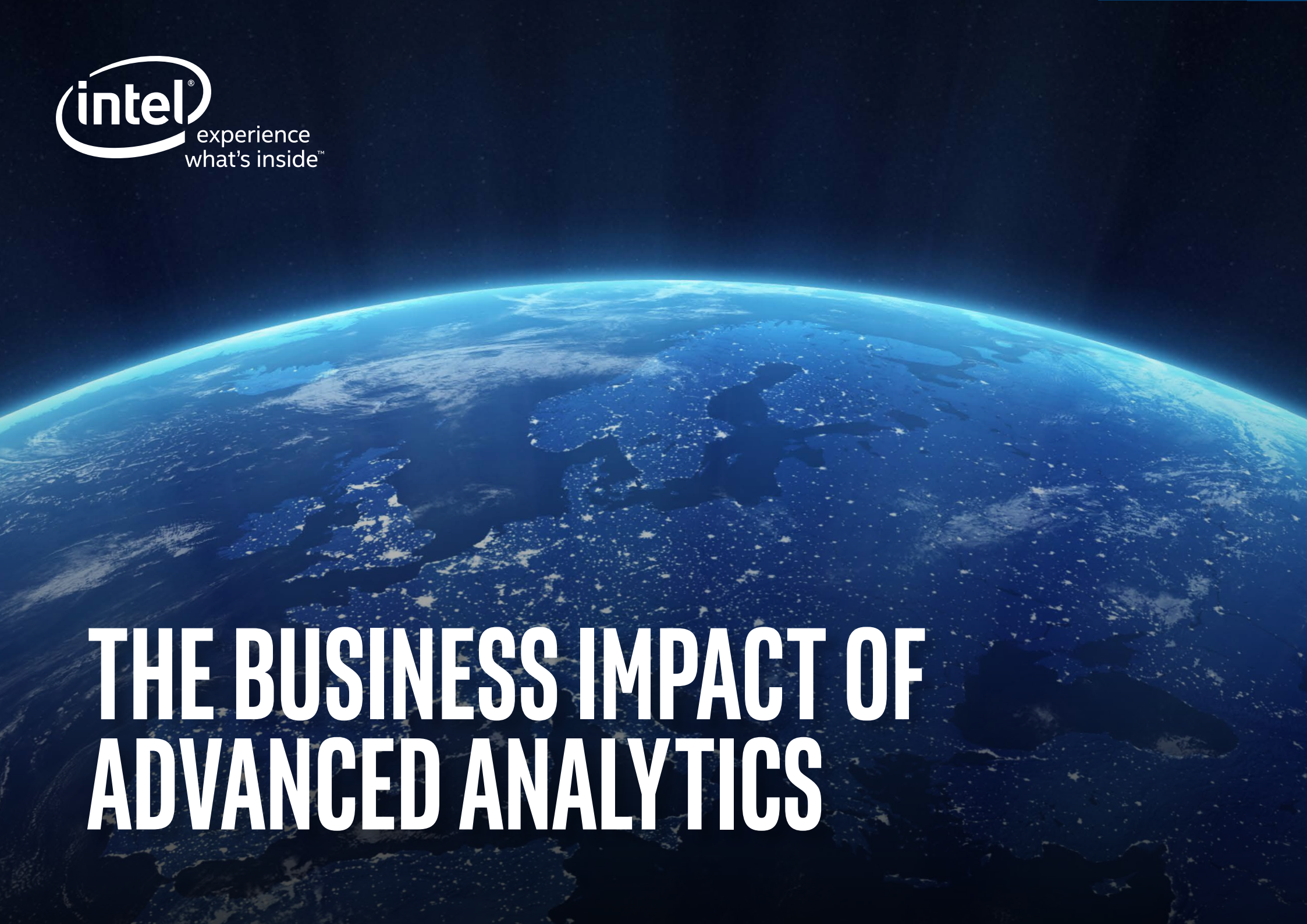


THE BUSINESS IMPACT OF ADVANCED ANALYTICS

THE BUSINESS IMPACT OF ADVANCED ANALYTICS

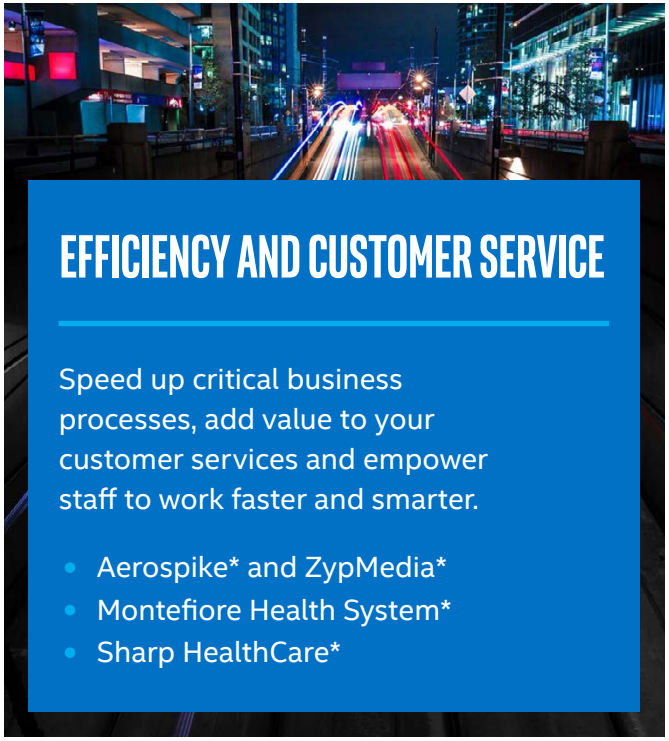
The increasing pace of change and innovation in every industry is inextricably linked with the rising volume of data all around us. Many organizations now hold a gold mine of detailed information about their customers and processes, but tapping into that resource can be challenging.

It is worth the effort.

Using advanced analytics techniques like machine learning and predictive analytics can help boost efficiency, drive innovation, reduce risk and improve customer experience.

Whatever industry you're in, analytics can have a big impact on your business.

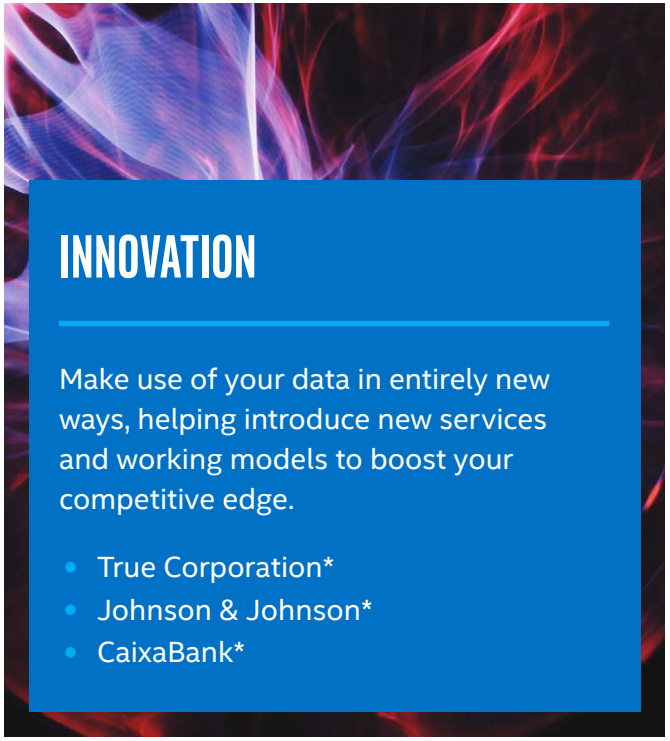
Explore each of the stories below for inspiration on how advanced analytics can help transform your business. Then click through to delve deeper into these real-life examples.



EFFICIENCY AND CUSTOMER SERVICE

Speed up critical business processes, add value to your customer services and empower staff to work faster and smarter.

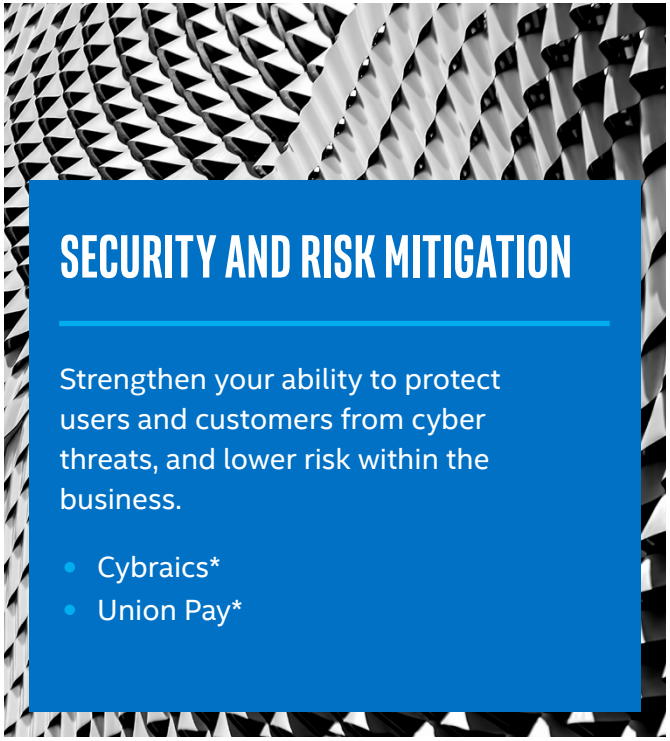
- Aerospike* and ZypMedia*
- Montefiore Health System*
- Sharp HealthCare*



INNOVATION

Make use of your data in entirely new ways, helping introduce new services and working models to boost your competitive edge.

- True Corporation*
- Johnson & Johnson*
- CaixaBank*



SECURITY AND RISK MITIGATION

Strengthen your ability to protect users and customers from cyber threats, and lower risk within the business.

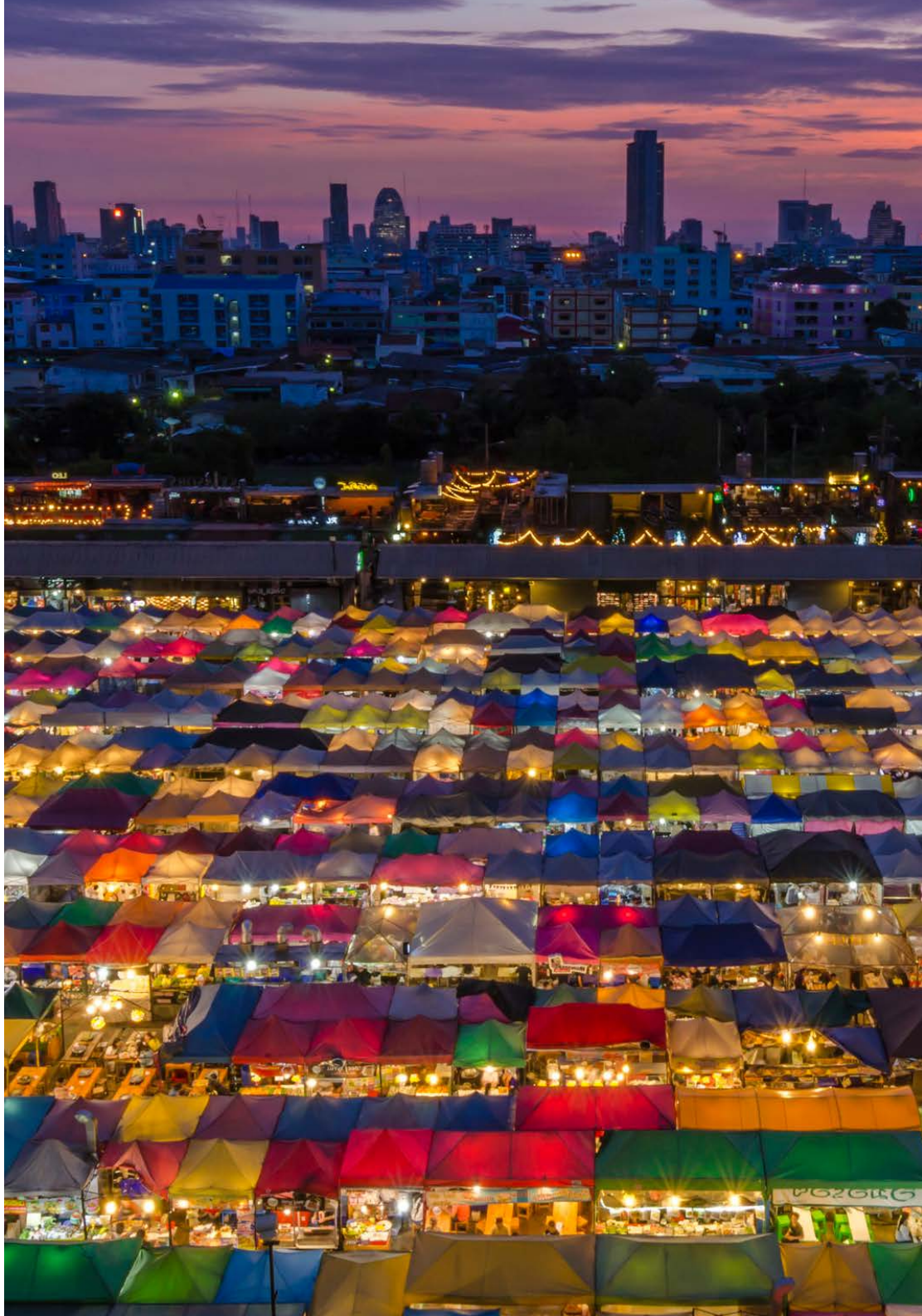
- Cybraics*
- Union Pay*

EFFICIENCY AND CUSTOMER SERVICE

For service-focused organizations – from media companies to hospitals – being able to respond quickly and accurately to customer or patient needs is essential. As volumes of data grow, this becomes a more complex challenge. Read the customer examples to see how some organizations are using advanced analytics solutions based on Intel® technologies to help make processes more efficient and enhance the customer experience.

Efficiency and customer service examples to explore:

Aerospike* and ZypMedia*
Montefiore Health System*
Sharp HealthCare*



HELPING LOCAL COMPANIES REACH NEW CUSTOMERS WITH ANALYTICS-INFORMED ADVERTISING

The digital advertising industry is an increasingly complex and high-stakes environment. As consumers use more devices to access content – from mobile phones and tablets to connected TVs – it's essential for advertisers to ensure they're getting the right ad to the right person, at the right time, and on the right device.

ZypMedia* offers national advertising products to local companies, and wanted to ensure that with around **500,000 transaction requests a second,** needing a half-millisecond response time, it had the speed and flexibility to deliver this high quality of service.

It worked with Aerospike*, a database company committed to helping its customers tackle Internet-scale problems while retaining the flexibility of an on-premise solution. Running its software on Aerospike's database and Intel® Xeon® Scalable processors, ZypMedia achieved a significant performance improvement .

"With Intel Xeon Scalable processors, our software delivered about a **4x benefit**[1]," says Brian Bulkowski, Cofounder and CTO, Aerospike. "This means we can bear more data in less time and help ads run faster." The company also has lower latency now, which is important for its real-time ad auctions.

To find out more watch the video **here**, or click back to the **contents page** to explore more examples for inspiration on how advanced analytics can help transform your business.

[1] Aerospike Server Enterprise 3.12.1, Aerospike Benchmark Application, OS: CentOS 7.2 with kernel updated to 4.4.59. Testing by Intel April 2017. The database was populated with 400 M records of 100 bytes each and benchmarked with the Aerospike Java Benchmark tool (https://github.com/aerospike/aerospike-client-java). The workload simulated 95%/5% read/update ratio. Two Aerospike instances were launched on a single server forming a cluster.
BASELINE: Intel® Xeon® processor E5-2699 v4, 2.2 GHz, 22 cores, turbo and HT on, BIOS SESC610.868.01.01.0016.033120161139, 128 GB total memory, 16 DIMMs/8 GB/configured clock speed: 1866MHz/DDR4 DIMM, 2 x Intel® 82599ES 10 gigabit ethernet controllers – all 4 ports on the 2 network controllers were bonded for an aggregate 40000MB/s bond. No storage: in-memory workload.
NEW: Intel® Xeon® Platinum processor 8180, 2.5 GHz, 28 cores, turbo and HT on, BIOS SESC620.868.01.00.0412.020920172159, 384 GB total memory, 12 DIMMs/32 GB/configured clock speed: 2666 MHz/DDR4 DIMM, 2 x Intel® 82599ES 10 gigabit ethernet controllers – all 4 ports on the 2 network controllers were bonded for an aggregate 40000MB/s bond. No storage: in-memory workload.
Clients: 8 client systems were used to concurrently submit queries to the servers and drive the workload. The same clients were used in both 'baseline' and 'new'. The clients were configured as follows: CentOS 7.2 with kernel 3.10.0-327, Intel® Xeon® processor E5-2697 v4, 2.3 GHz, 18 cores, turbo and HT on, BIOD SESC610.868.01.0 1.0016.033120161139, 128 GB total memory, 8 DIMMs/16 GB/configured clock speed: 2400 MHz, 1 x Intel® 82599ES 10 gigabit ethernet controllers.
For further details see: https://youtu.be/JndYUfQiLhg
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Intel® technologies:
Intel® Xeon® Scalable Processors

"Aerospike aims to provide more data at the point of the spear for companies looking to do more analytics on transactional data... With Intel® CPUs and capabilities, we're finding that millions of transactions per second, from network to storage...can be provided. And that really helps solve our customers' problems."

Brian Bulkowski,
Cofounder and CTO, Aerospike

WATCH THE VIDEO

Intel® technologies:
Intel® Xeon® Scalable Processors

"You have to have the appropriate information on the person sitting in front of you to make sure that you're serving them correctly. If that's not saving lives, I'm not sure what is."

Andrew Racine,
System Senior Vice President and Chief Medical Officer, Montefiore

WATCH THE VIDEO

Montefiore Health System

DELIVERING CARE SOONER WITH THE SEMANTIC DATA LAKE

Montefiore Health System* runs a number of healthcare facilities in the Bronx, New York. As it, like many other healthcare providers, moves towards precision medicine and the delivery of more personalized care, the patient data that it holds is growing rapidly. At the same time, it faces government pressure to reduce costs and strict industry regulations to keep all its data safe.

The hospital created a Semantic Data Lake solution that pulls together data from multiple sources and in many different formats so that it can be analyzed holistically. The data ranges from clinician data, demographic, environmental, behavioral and wellness research findings and population demographics to medical imaging files and doctors' notes. Montefiore has worked with **Intel, Cloudera*, and Hadoop*** to apply predictive and prescriptive analytics algorithms to its data, and to use machine learning to optimize its insights over time.

In its first project, Montefiore used the solution to identify patients who were most at risk of death or needing intubation over the next 48 hours, which is the window of opportunity to complete a successful intervention. It achieved accurate prediction at a rate of more than **70 percent**[2], helping physicians deliver treatment earlier to prevent fatal episodes or respiratory failure.

To find out more watch the video **here**, or click back to the **contents page** to explore more examples for inspiration on how advanced analytics can help transform your business.

[2] For further details see: https://www.intel.co.uk/content/www/uk/en/healthcare-it/solutions/documents/montefiore-advance-patient-care-solution-brief.html

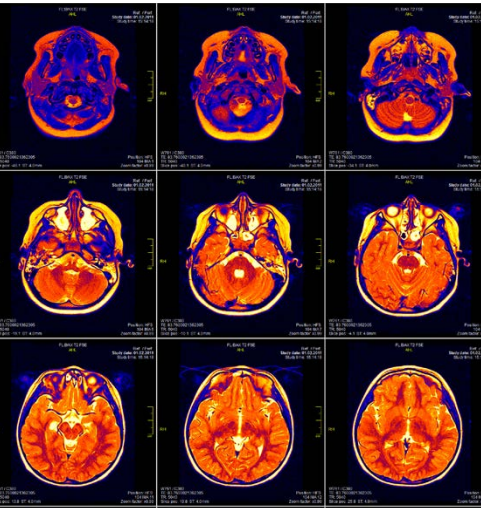
DRIVING REAL-TIME CLINICAL INTERVENTIONS WITH PREDICTIVE ANALYTICS

Based in San Diego, California, Sharp HealthCare* has established specialized rapid response teams that react to medical emergencies in the hospital. However, emergencies can be hard to predict, so the teams could spend a lot of time manually reviewing charts to spot a potential event.

Wanting to see if it could speed up this analysis, Sharp developed a predictive model to detect patient health decline and identify patients at risk sooner. It worked with **Intel, Cloudera*, and ProKarma*** to build the solution, which analyzes a wide range of data – including blood pressure, temperature and pulse rate – from the hospital's electronic medical records (EMR) system, and trains the model using machine learning.

In a proof of concept (PoC), Sharp tested the model against historical data and found that the model was **80 percent** accurate in predicting the likelihood of a rapid response team event within the next hour[3], demonstrating the potential to drive real-time clinical interventions, improve outcomes, and enhance resource utilization. This has helped the organization to not only take more proactive steps in patient care, but also to capture additional value from its previous investments in EMR technology.

To find out more read the case study **here**, or click back to the **contents page** to explore more examples for inspiration on how advanced analytics can help transform your business.



[3] For further details see: https://www.intel.com/content/www/us/en/healthcare-it/solutions/documents/using-machine-learning-and-emr-data-to-predict-patient-decline-case-study.html
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Intel® technologies:
Intel® Xeon® Processor E5 Family

"With surprising accuracy, we found you really can predict when a patient is heading in the wrong direction, just from analyzing the EMR data that is available in real time ...There is a lot of potential for this type of technology to deliver a clinical and financial return on investment."

Brett MacLaren,
Vice President of Enterprise Analytics, Sharp HealthCare

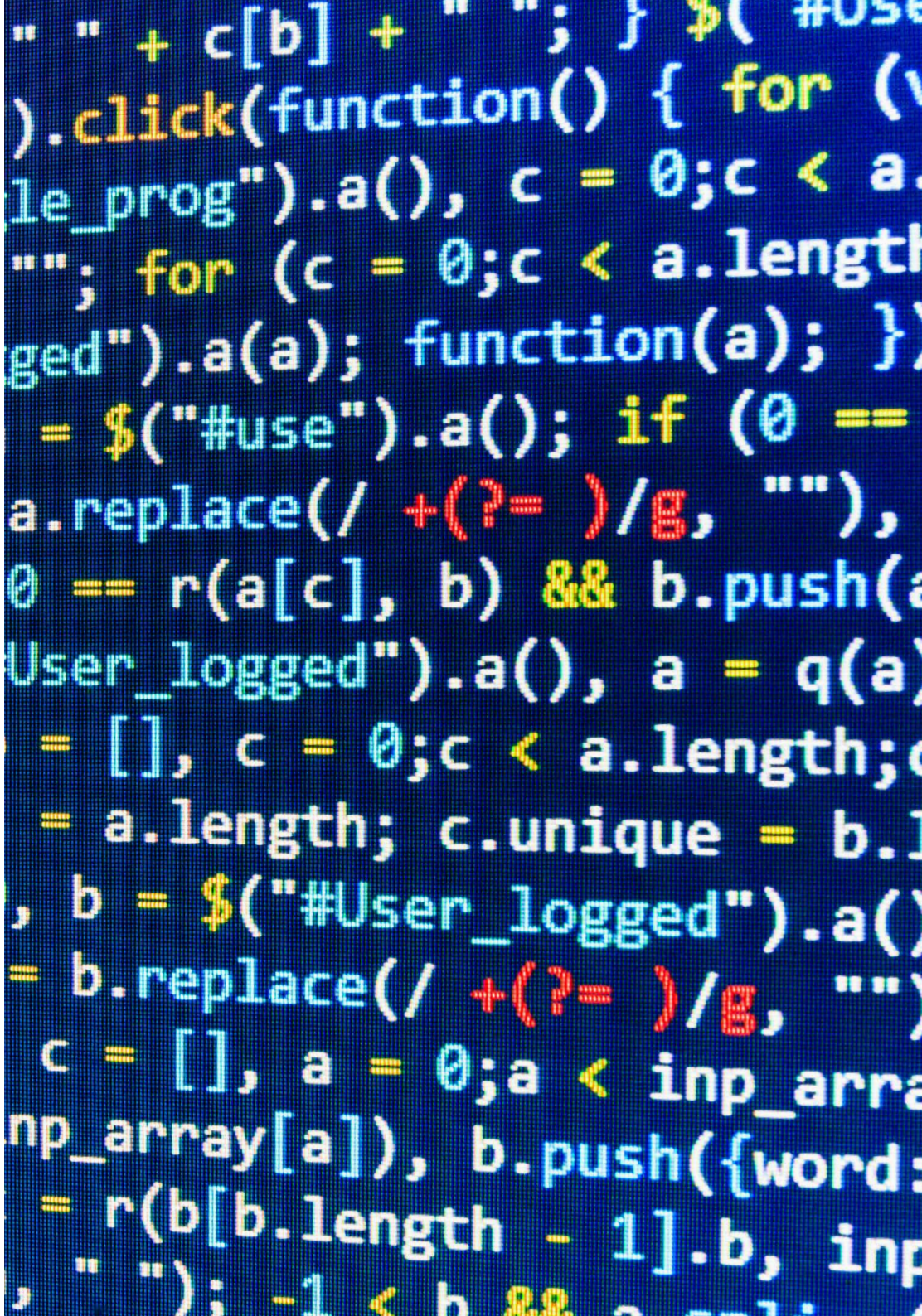
LEARN MORE

INNOVATION

Competing in the digital economy means being willing and able to adapt. It means making the best possible use of the valuable data assets that sit within your organization. Explore how some innovative organizations have used advanced analytics and data management to empower their users and businesses to transform for the future.

Innovation examples to explore:

True Corporation*
Johnson & Johnson*
CaixaBank*



True Corporation

GAINING A 360 VIEW OF ONE MILLION CUSTOMERS WITH BIG DATA AND ADVANCED ANALYTICS

One of Thailand's leading communications providers, True Corporation* serves over a million customers. It wanted to investigate usage patterns among customers of its TrueMove H* mobile service, but to do this it needed to improve its ability to store, interrogate and understand its big data resources across the business. It also planned to use this expanded visibility to better reach customers with offers and campaigns, and boost the return on investment (ROI) of its customer engagement activity.

The organization created a big data platform powered by the Intel® Xeon® processor E5 Family and running the **Cloudera Distribution including Apache Hadoop* (CDH*)** open source distribution platform. As a result, it was able to apply analytics across its data to gain a **360-degree view** of one million customers, offering behavioral insights that helped it deliver more relevant services to each customer.

With greater insights, it is able to drive more innovation across the company, and improve the efficiency of decision making. It has also **saved on its data management costs** by investing in an enterprise-class big data environment rather than scaling its existing data warehouse.

To find out more read the case study **here**, or click back to the **contents page** to explore more examples for inspiration on how advanced analytics can help transform your business.

[4] For further details see: https://www.intel.com/content/dam/www/public/us/en/documents/case-studies/true-corp-casestudy.pdf
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Intel® technologies:
Intel® Xeon® Processor E5 Family

True Corporation achieved **40 percent faster** query times with big data analytics running on Intel® technology and CDH, enabling quicker, more informed decision making[4].

LEARN MORE

Intel® technologies:
Intel® Xeon® Processors

Johnson & Johnson has **reduced provisioning times** from three months to under an hour using hybrid cloud and machine learning.

WATCH THE VIDEO

Johnson & Johnson

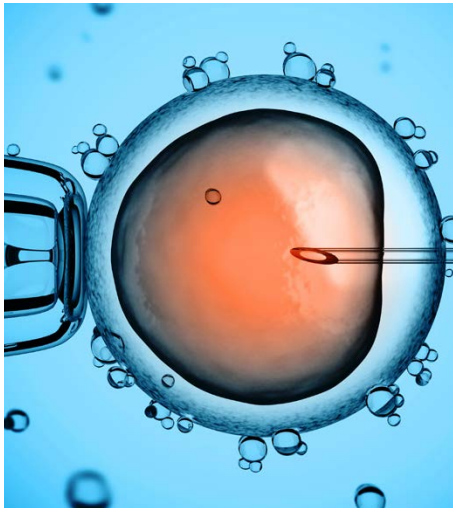
SPEEDING TIME-TO-INSIGHT WITH HYBRID CLOUD AND ADVANCED ANALYTICS

Johnson & Johnson* (J&J) is the world's largest healthcare provider, touching a billion people every day. Its vision is a world without disease, and it aims to achieve this by addressing prevention, interception and curing of diseases.

Data is at the heart of all this. For J&J this means a diverse mix of structured, unstructured, voice, video, and image data sets, which are spread across over 200 operating companies in 65 countries. Each of these companies also has its own discrete processes and marketing conditions to consider. This made it hard to bring all its data together and enable enterprise-wide insights and decisions.

The organization uses a hybrid cloud architecture with advanced analytics like machine learning to explore and understand its data on a near-real-time basis and at scale[5]. It has been able to identify patterns and relationships that have helped it better maintain inventories of medical devices or forecast revenue opportunities. It has also **decreased provisioning times** from three months to under an hour, enabling it to make quicker, more accurate decisions.

To find out more watch the video **here**, or click back to the **contents page** to explore more examples for inspiration on how advanced analytics can help transform your business.



[5] For further details see: https://www.intel.com/content/www/us/en/big-data/johnson-and-johnson-gains-improved-outcomes-video.html

BECOMING AN INFORMATION COMPANY WITH CLOUD AND BIG DATA

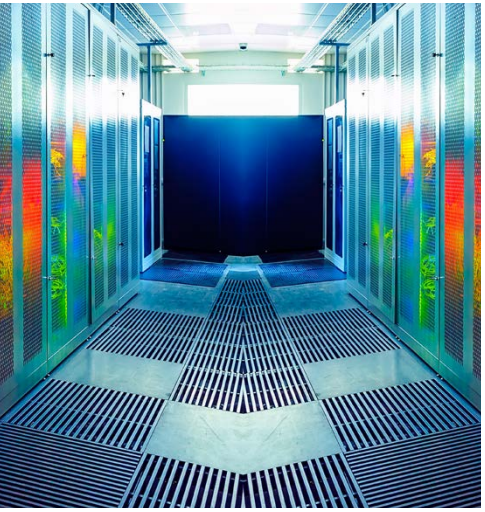
The growth of online and mobile banking over the last few years has driven a huge increase in data volumes for CaixaBank*. Being able to properly collect, manage, and analyze this data is now key to everything the bank does, from delivering compelling, personalized services to customers, to identifying and combating fraud attacks and meeting compliance requirements.

To effectively meet this data-driven challenge, CaixaBank believes that it – like many other banks – must rethink its identity. As Xavier Gonzalez Farran, director of big data tools at the bank, explains: "We're taking the necessary steps to become an information company. We believe that's the key to success in the near future."

The bank has implemented a big data solution based on **Oracle Appliance*, Exalytics* and Exadata***, and powered by the Intel® Xeon® processor E7 Family. The solution pulls all its data together into an interconnected platform that enables the bank to load data into the environment that most suits the data type or how it is used by the business. The bank can then build applications that are easily able to access the data they need, wherever it is.

With a more cohesive view of its data, CaixaBank can apply advanced analytics to generate insights that will **drive innovation and streamline operations.** For example, the bank can now provide offers to customers that are personalized to the individual, rather than tailored to a customer segment. It's also using predictive models to help improve its risk management[6].

To find out more watch the video **here**, or click back to the **contents page** to explore more examples for inspiration on how advanced analytics can help transform your business.



[6] For further details see: https://www.intel.com/content/www/us/en/big-data/caixabank-analytics-in-banking-video.html

Intel® technologies:
Intel® Xeon® Processor E7 Family

"Big data is here to stay. It is not a departmental solution. Big data is our new mainframe at CaixaBank, and we have to change the culture, so that people transition from the transactional world to the informational world."

Luis Esteban Grifoll,
Chief Data Officer, CaixaBank

WATCH THE VIDEO

SECURITY AND RISK MITIGATION

The growth in volumes and sources of data brings with it new challenges and threats, as well as opportunities. Organizations must ensure they are protected and compliant by minimizing risks and proactively combatting cyber threats. Learn how some organizations in heavily regulated industries are using advanced analytics to help bolster their security profiles.

Security and Risk Mitigation examples to explore:

Cybraics*
Union Pay*

Cybraics

HELPING TO PROTECT CONNECTED DEVICES FROM CYBER ATTACKS WITH ARTIFICIAL INTELLIGENCE

Cyber attacks are constantly evolving and increasing, and healthcare organizations – holding a plethora of sensitive data – are often prime targets for cyber criminals, especially as the number of connected healthcare devices also continues to rise. A multi-site healthcare system in the United States had already taken a number of steps to combat these sophisticated threats to its own and its patients' data. However, it wanted to do more to detect unknown malware and zero-day attacks.

The organization used the Intel technology-based Cybraics nLighten* platform, which **combines artificial intelligence (AI) with advanced analytics.** The platform analyzes the behavior of networks, users, devices, and other elements within the environment. It identifies any unknown, advanced, or insider threats, as well as vulnerabilities, infections, or targeted attacks.

The platform successfully identified a number of issues that had previously been unidentified[7]. For example, some medical devices were found to be infected with unknown ransomware. In this way, the health system avoided potentially disruptive and costly breaches that could have threatened patient safety and privacy. At the same time, the IT team avoided alert overload and **reduced the total cost of ownership** of its cyber defences by using the analytics-as-a-service model offered by Cybraics.

To find out more read the case study **here**, or click back to the **contents page** to explore more examples for inspiration on how advanced analytics can help transform your business.

[7] For further details see: https://www.intel.com/content/dam/www/public/us/en/documents/case-studies/strengthening-security-with-cybraics-ai-based-analytics-case-study.pdf
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Intel® Solid State Drive

"Medical devices are critical to operations and patient care... It's a good thing nLighten* was able to detect this [advanced] threat."

Head of Security,
Large US Healthcare System

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Intel® Xeon® Processors

China UnionPay has been able to deliver up to **60 percent greater accuracy** with machine learning versus its rules-based risk control systems.

LEARN MORE

Union Pay

PROACTIVELY MITIGATING RISK WITH MACHINE LEARNING

China UnionPay*, an international financial institution based in China and specializing in banking services and payment systems, handles up to **20 billion payments every year** across emerging channels such as mobile, online, and social media. With traditional security risk models creating loopholes that could be exploited by criminals, it needed a more agile, proactive, and intelligent threat response system.

It moved from a rules-based risk control model to a neural network model based on **Apache Spark*** and powered by Intel technology. This had several key benefits for China UnionPay:

- China UnionPay can now identify non-linear patterns in large data sets, with automatic updates ensuring new information can improve risk prediction accuracy.
- Whereas a rules-based system takes a binary view of whether a set of criteria have been met or not, a neural network based model applies machine learning to update its system in tandem with new, evolving risks.
- China UnionPay has moved away from pre-configured alerts, and can now use historical data to swiftly analyze, aggregate, and correlate data through machine learning and an evaluation model in real-time to evaluate risks.

As a result, China UnionPay has been able to deliver up to **60 percent greater accuracy** versus its rules-based risk control systems[8]. The system has also enabled the in-house team to develop valuable insights for the application of analytical tools and data science practices to its raw data.

To find out more read the case study **here**, or click back to the **contents page** to explore more examples for inspiration on how advanced analytics can help transform your business.

[8] For further details see: https://www.intel.com/content/www/us/en/financial-services-it/union-pay-case-study.html

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Estimated results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.

Intel does not control or audit third-party benchmark data or the web sites referenced in this document. You should visit the referenced web site and confirm whether referenced data are accurate.

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