How to harness MACHINE LEARNING

Tap into the BrightCloud DNA for security at scale

BrightCloud®
Threat Intelligence

Machine learning DNA

Powerful threat intelligence powered by machine learning can help process the enormous volume of data that is overwhelming traditional IT security infrastructure and human researchers. The right threat intelligence integrated into devices can reliably block a majority of threats automatically, freeing up humans to focus on the few (most dangerous) threats that get through. Artificial intelligence (AI) is about emulating human intelligence. Machine learning sorts through and analyzes large quantities of data at the speed and volume that is simply impossible for humans alone to process.

But not all machine learning technologies are created equal.

We'll investigate five of the most pressing issues facing cybersecurity professionals today and how BrightCloud's 6th generation machine learning can help stop these sophisticated attacks today and in the future. After all, machine learning is in the BrightCloud DNA and we've been working with the technology for over a decade.

Today's security solutions are not keeping pace

10% increase in attacks from 2020 to 2021.[1]

Phishing spiked by 510% from January–February 2020 alone.[2]

86% of malware is unique to a single PC.[2]

The total installed base of IoT connected devices worldwide is projected to amount to 31 billion units by 2025.[4]

Phishing analysis by F5 Labs found scans of phishing sites from BrightCloud® Threat Intelligence showed that 72% used HTTPS.[3]

Approximately 1 in 10 malicious sites is hosted on a benign domain.[2]

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[1] CVE Details

[2] 2021 Webroot BrightCloud® Threat Report

[3] 2020 Phishing and Fraud Report, F5 Labs

[4] Statistica

Today's threat landscape

Information security today is a data flood that's getting deeper.

Organizations are inundated with an avalanche of information flowing in, out and across the corporate network in real-time—each data point a potential clue into an impending attack. Miss the needle in a haystack and malicious actors suddenly have access to sensitive data. Just one slip up can result in significant financial loss, a loss of public confidence and significant PR headaches that can put a company out of business.

Attacks aren't slowing. And today's threat landscape is building at a sophisticated, persistent pace.

People want to be praised. They want to be entertained. Everyone has a fear of missing out. And because of this, people are trusting. Too trusting. Unfortunately, traditional security infrastructure hasn't evolved enough to protect users from themselves. As a result, today's front lines are being fought by users—untrained in cybersecurity tactics and intelligence, just trying to do their jobs. In fact, 90 percent of successful network breaches are the result of user error.

Major Headaches for a Health Clinic

VICTIM PROFILE

40+ year-old neurology clinic

$75 million annual revenue

40-45 employees

While investigating a ransomware attack, the clinic's IT team discovered a separate data breach that exposed patient records—including names, Social Security numbers, driver's licenses, addresses, phone numbers, medical data, prescriptions and insurance data—to an attacker for 15 months.

Up to 400K patient records may have been compromised. The average healthcare data breach cost $408 per record in 2021.

Loss is more than

$163 Million

Existing solutions aren't effective or efficient enough to meet these threats

Cybersecurity is labor intensive.

Take a look at the steps involved:

1. **Research threats**
2. **Identify attacks**
3. **Contain breaches**
4. **Remediate the damage**
5. **Restore systems**
6. **Get systems back online**
7. **Take steps to ensure the vulnerability is fixed**

This step-by-step task list doesn't even take into account proactive cybersecurity tactics such as creating blacklists and website categorization and the related help desk resources needed to tackle false positives. Traditionally, this has all been done manually with a lot of human interaction. Software simply wasn't smart or adaptable enough to mimic the critical thinking that goes into threat intelligence and response. Risk-averse organizations have elected to err on the side of caution and just lock everything down—but again, this is expensive and saps user productivity.

Organizations are locked into a reactive state.

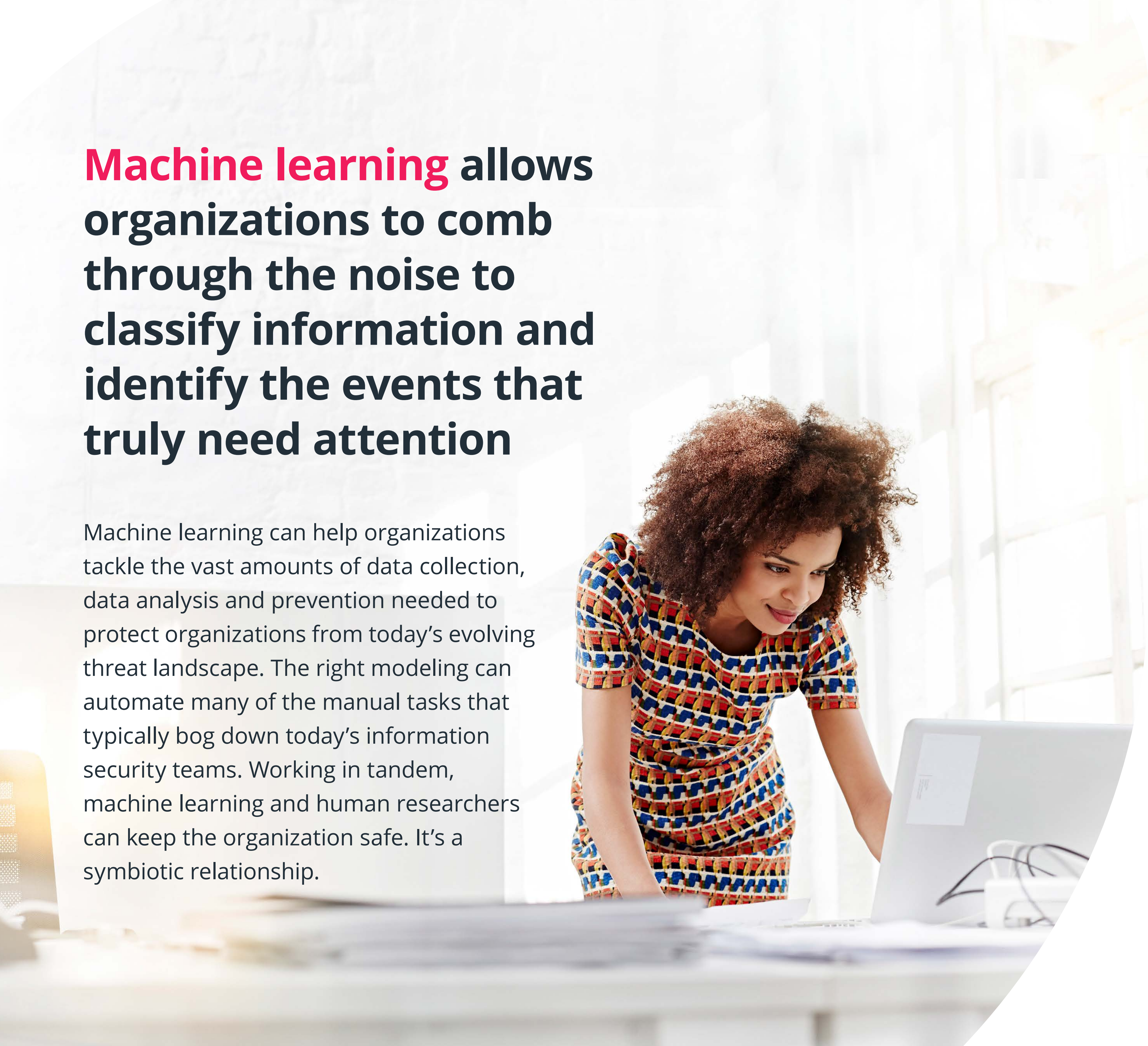
Just consider the rapid expansion of new variants of polymorphic malware and crypto ransomware. It's fast-moving, sophisticated and nearly impossible to stop in real-time. To make matters worse, security researchers are forced to rely on data that they can't authenticate while fighting these attacks with manual identification, classification and pattern matching techniques. The result is that information security teams now find themselves inundated with alerts—many of them false positives—forcing them to chase after an ever-increasing number of security incidents that often seem like wild goose chases. Often, the alerts that are handled are those making the most noise while better disguised (and the most dangerous) threats remain hidden in the haystack.

The

SOLUTION

The Power of Scale and Machine Learning

BrightCloud®
Threat Intelligence



Machine learning allows organizations to comb through the noise to classify information and identify the events that truly need attention

Machine learning can help organizations tackle the vast amounts of data collection, data analysis and prevention needed to protect organizations from today's evolving threat landscape. The right modeling can automate many of the manual tasks that typically bog down today's information security teams. Working in tandem, machine learning and human researchers can keep the organization safe. It's a symbiotic relationship.

Categorize websites

Make load determinations

Automate manual tasks

BrightCloud Machine Learning DNA

Machine learning is part of the BrightCloud DNA as we have been applying the latest machine learning technology to our advanced cybersecurity solutions for more than ten years. BrightCloud collects several terabytes of real-time security events daily which is supplemented with petabytes of historic security data to continuously train and update cloud-based models. Because of this history and scalability, URLs, IPs, files and apps are classified faster and more accurately—serving to both speed up and improve the accuracy of the threat intelligence that powers BrightCloud's and our partners' solutions.

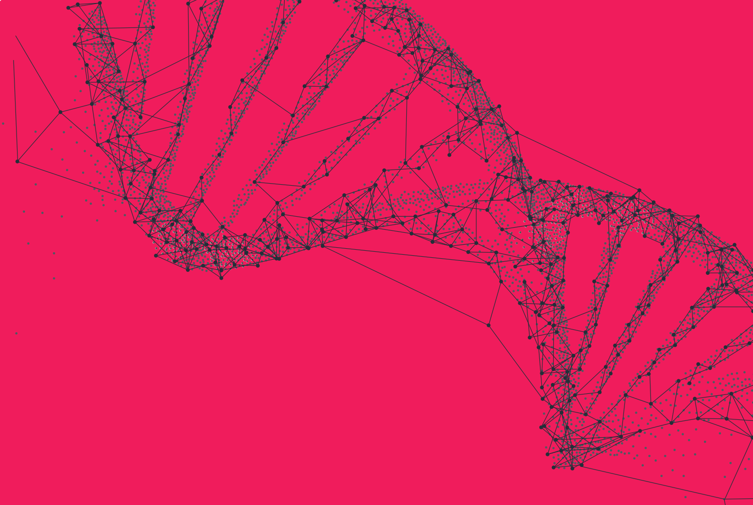
The result is that humans and BrightCloud machine learning work together to keep Webroot's and our partners' customers safe. Humans are constantly training machines to be more accurate while machines improve human effectiveness and enable scalability.

As an industry leader, BrightCloud laid the groundwork for using machine learning in cybersecurity and is currently using 6th generation machine learning to include deep learning.

BrightCloud deep learning allows us to more accurately and autonomously identify relevant patterns and concepts within continually growing amounts of telemetry from BrightCloud customers and partners—continuously updating and retraining our models to keep up with the rapidly evolving threat landscape.

Machine learning can be a powerful tool to help solve today's pressing cybersecurity issues. But many companies' machine learning strategy might be categorized as vaporware. It's theory. It's future roadmap stuff. As you have learned, BrightCloud has a long history of leveraging our machine learning platform to power threat intelligence for our entire portfolio of security solutions.

Let's take a look at how BrightCloud machine learning can help organizations navigate this new threat landscape.



BrightCloud Machine Learning has evolved to its sixth generation.

- **1st Gen:** Bayesian
- **2nd Gen:** Support Vector Machines (SVM)
- **3rd Gen:** Maximum Entropy Discrimination (MED)
- **4th Gen:** Active Learning Combined with MED
- **5th Gen:** Active Feedback Combined with MED
- **6th Gen:** Deep Learning

The threats are GROWING

How to navigate the top 5 security threats

BrightCloud®
Threat Intelligence

1

Threat actors go after the most vulnerable target: People

Email and web-based malware are the most common attack vectors today. Attackers can purchase ready-made phishing templates on the dark web for just a few hundred dollars and unleash a barrage of innocuous-looking emails and landing pages specifically tailored for each individual user. Dozens of emails can be sent with different themes, language and branding—each one preying upon a different emotion or response—change your password, approve this invoice, check out this funny video, vote for employee of the week. It's a volume business. All they need is a single click to kick start a chain reaction that ends with networks, users or data compromised.

The technology used in phishing attacks is getting more sophisticated all the time. In fact, more phishing sites are using HTTPS to better impersonate legitimate sites, making them difficult to detect. At the same time, the speed at which they can be spun up and taken down make it virtually impossible for organizations to stop them from getting through to users. The only way to prevent an attack is to analyze URLs as users are clicking on a link and make a determination in real-time whether to allow or block access.

BrightCloud machine learning provides the scalability and speed necessary to do this fast enough that it is imperceptible to the user.

Powerful models are built to identify how these sites have been created and how they behave, analyzing millions of attributes in microseconds. The IP address, hosting server, how the HTML is constructed beneath the page, the network dialog between client and server—these and thousands of other factors are used to determine whether a site is legitimate or fraudulent. Models should know, for example, what a real eBay page looks like because it's seen an eBay page hundreds of millions of times.

This insight identifies fraudulent phishing sites quickly enough that access can be blocked before a malicious connection is made. The more users surf the web and access legitimate sites, the more a cloud-based model can learn and identify how trusted sites look like and behave.

Case study:
Fashion house gets phished

Victim Profile

Privately held women's apparel company

$4–5 million annual revenue

20-25 employees

An administrative assistant received an email from the CEO who was on vacation at the time. The email had instructions to wire $500,000 to a vendor and included the account details. The assistant immediately contacted the finance team, who made the transfer at once.

The email was not from the CEO and neither the assistant nor the finance team verified any of the information before making the transfer.

When the CEO returned, they contacted the FBI at once, but the funds were never recovered.

Loss =
$500k

2

Attacks are increasingly on the rise and they're getting more diverse

It's no secret that doing business today is dependent on the internet. Users aren't able to do their job unless they can do research online, access email, engage with customers on social media and log on to cloud-based business systems. The amount of network traffic that this generates is incomprehensible. We're talking about trillions of packets that flow into, out of and across corporate networks—each one a potential ticking time bomb that can infect systems to grant access to customer data, steal intellectual property or disrupt operations. It's impossible to monitor and track it all, and if organizations could, it would be cost prohibitive or greatly impede user productivity.

Machine learning automates and scales cybersecurity to meet these growing challenges.

Successfully-built models that have been trained properly can learn to quickly and seamlessly flag the needles in a haystack that need further analysis. Researchers can look more closely, take the necessary actions and then inform the model to catch future iterations of the threat.

Instead of just flagging events that need further analysis, machine learning enabled systems can remediate these threats as well, allowing human researchers to fully focus on higher-level threat intelligence that requires a human touch.

Over time, models can be trained to do the work of thousands of threat researchers—combining the specific expertise of thousands of humans in a single, hyper-intelligent entity that can tackle these issues at scale.

3

New technologies create new threat frontiers

It used to be that organizations could shore up the network perimeter and just monitor traffic as it flowed into and out of their environments. But the move to the cloud has essentially erased any boundaries between "your" network and "their" network.

Critical business data can now sit on-premise, in the cloud or both—making it impossible to simply shore up the castle walls to prevent malicious actors from getting in. Malware can originate inside the corporate network, bypassing traditional perimeter defenses or sit undetected for weeks, months or years on a little-used on-prem server before launching an attack. Additionally, most workers are now mobile workers, taking devices home, on travel and everywhere else they can squeeze in a few minutes of work.

The business perimeter is now anywhere an employee goes.

At the same time, the Internet of Things (IoT) has also greatly expanded the threat vector to include disparate machines that are now connected, orchestrating complex processes and tasks.

The problem is that IoT security is severely lacking and default passwords are seldom changed. This gives malicious actors a weak link in which to gain access to more hardened critical systems. It's not hyperbole to think that a vulnerability in the office coffee maker may lead to a major data breach in the CRM system.

Machine learning enables the scalability to monitor all traffic—not just packets moving into and out of the network. Models are built to learn normal behavior of users, servers, systems and appliances and flag any abnormal behavior that seems suspicious—such as an email server trying to access the CRM system or an industrial system trying to connect with a website in Russia. This can be extremely difficult to do in environments that are controlled by a cloud vendor or in IoT networks where the organization doesn't fully understand normal versus abnormal behavior. Machine learning can be utilized to better understand how these systems work with each other and flag anything that seems out of the ordinary.

4

There's no precedent for increasingly unique attacks

Spear phishing is a highly-targeted attack that is engineered for one or a handful of people. Malicious actors can do basic Google or LinkedIn research to find a lot of information they can use in a phishing email to make it seem more legitimate. They can find names of co-workers, systems that the user has expertise in, the organizations they belong to–even hobbies, names of spouses and other personal details. Because the attacks are so unique to the recipient, they are often new and don't look like anything that has been used in a previous attack.

This lack of historical data can make it hard to detect—forcing the user to rely on his or her good judgment.

Machine learning doesn't need historical evidence to detect spear phishing attacks.

Models can analyze millions of attributes of the links included in an email—from the web server to the underlying HTML of the linked page—to flag a suspicious email or URL as phishing. In addition to this level of threat intelligence, machine learning can even go beyond email and network behavior and analyze the behavior of the sender. Has the CFO ever asked the recipient to wire $50,000 at the end of the day on Friday? To a human, that would seem suspicious, but a traditional email filter wouldn't even be looking at that. Machine learning is uniquely able to identify and classify the behavior of both technology and people.

5

Zero-day attacks exploit slow patch schedules

Zero-day attacks target unknown vulnerabilities and work quickly to exploit them before they are patched. By the time the vulnerability is eventually fixed, it's already too late. Malicious actors have already infiltrated systems. Traditional cybersecurity defenses aren't effective because they are simply unable to react in time.

However, machine learning can render most zero-day attacks ineffective.

Instead of monitoring for an attack that it doesn't know is coming, machine learning classification allows organizations to analyze network behavior to detect suspicious activity as a result of a zero-day attack.

In actuality, there are very few new attacks each year. Instead, most zero-day attacks are actually old attacks wrapped in something new. Most attacks have a similar goal—they all want access into a specific business system.

However, there are only so many ways to do that. It doesn't have to be the same executable or from the same source or author. But they all behave in similar ways—exporting a memory location, exfiltrating data, encrypting files or building a cryptominer. That's why machine learning models that focus on analyzing and learning behavior and then flagging irregularities are so compelling.

Let's solve it together.

Contact us today to learn more about how BrightCloud's machine learning powers cyber resilience.

Contact us

About BrightCloud® Threat Intelligence

BrightCloud was the first threat intelligence platform to harness the cloud and artificial intelligence to stop zero-day threats in real-time. The platform is used to secure businesses and their products worldwide with threat intelligence and protection for endpoints and networks. With more than 10 years of experience in building and analyzing the industry's most robust internet threat database, BrightCloud has the strongest coverage model, fewest uncategorized objects and the most historical records which others cannot replicate.

In 2019, BrightCloud was acquired by OpenText, a global leader in Enterprise Information Management. As a whole, we are a market leader in cyber resilience, offering total endpoint protection and disaster recovery for businesses of any size.

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