



# **AUTOMATION'S RISING TIDE: HOW TO MANAGE BOTS IN TODAY'S WORLD**

**THINK APP SECURITY FIRST**



## INTRODUCTION

Have you ever wished for an army of clones to do all your thankless tasks and chores? Well, that fantasy is becoming a reality—at least on the Internet. And while they may not be actual clones, bots have begun doing lots of digital dirty work.

Managing your relationship with bots—good and bad—has become an inherent part of doing business in a connected world. With more than half of online traffic initiated by autonomous programs, it's clear that bots are a driving force of technological change, and they're here to stay.<sup>1</sup>

As bot technology, machine learning, and AI continue to evolve, so will the threats they pose. And while some bots are good, many are malicious—and the cybercriminals behind them are targeting your apps. Preparing your organization to deal with the impact of bots on your business is essential to developing a sustainable strategy that will enable you to grow as you adapt to the new bot-enabled world.

<sup>1</sup> <https://www.recode.net/2017/5/31/15720396/internet-traffic-bots-surpass-human-2016-mary-meeke-code-conference>

<sup>2</sup> <https://insights.dice.com/2017/07/14/digital-assistants-greater-usage-adoption/>



91%

OF PEOPLE WITH DIGITAL ASSISTANTS SAY IT WILL MAKE THEM MORE LIKELY TO BUY ADDITIONAL CONNECTED DEVICES.<sup>2</sup>

WHILE SOME BOTS ARE GOOD,  
MANY ARE MALICIOUS—AND THE  
CYBERCRIMINALS BEHIND THEM  
ARE TARGETING YOUR APPS.



## THE GOOD NEWS: BOT INNOVATION IMPROVES CUSTOMER EXPERIENCE

What does it mean to be human on the Internet these days? Does it even matter whether you're interacting with an actual person or with an autonomous program? There are many scenarios where bots are there to help the average consumer do what they want to do—in a fraction of the time it would take to do it themselves.

Consider an online shopping scenario. If your customers already know exactly what they need, there is no reason for them to navigate your site to find it when a helpful bot can place the order more efficiently for them. This is already happening, all over the web.

Now think about the growing use of digital assistants, such as iOS-based Siri or an in-home version like Amazon's Alexa. These are also bots, and they're intended to make our lives easier. In exchange for the ease of automatically ordering more granola bars when you run out, people are giving up significant privacy, judging the reward of convenience to be more than worth the cost.<sup>3</sup> Consumer-facing sites that don't adapt to the new reality of a bot-centered world may see their market share eroded by those that do.

Designing an organizational strategy to manage the growing bot traffic on the Internet is essential, because bots are getting smarter, enabled by machine learning and neural network technology. Leading tech organizations leverage these autonomous programs to build more resilient networks and to monitor and maintain operations, making life easier for their customers. However, bots also make life easier for attackers, fraudsters, or competitors seeking to exploit weaknesses in software and business processes.

<sup>3</sup> <https://insights.dice.com/2017/07/14/digital-assistants-greater-usage-adoption/>

## THE BAD NEWS: BOT INNOVATION ENABLES CYBERCRIME

Just like any useful tool, bots can be co-opted by attackers to optimize their criminal activity. The threats being faced are constantly evolving—driven by a growing list of motivations, including direct consumer fraud, IP theft, long-tail profiteering, political ends, or petty personal grudges—and bots are doing the dirty work.

Industries with the most potential for monetary gain are the hardest hit by bad bots. Airline and ticket-sales sites are likewise ripe for attack: they rely on visibility into the “look vs. book” ratio on their sites to ensure tickets are available for customers, but bots performing content scraping register as a “look” and artificially skew the ratio.



### DDoS ATTACKS

DDoS for hire is both lucrative and highly accessible. Launching an hour-long DDoS attack using a cloud service can cost as little as four dollars,<sup>4</sup> which is much less than the cost of mitigating it. This kind of DDoS attack can be used by criminals who then demand a ransom to turn it off, or potentially by your competitors looking to interfere with your business and capture a greater share of the market. The rise of IoT botnets like Mirai means that criminals can easily outclass the defenses of most legitimate organizations.<sup>5</sup>



### INTELLECTUAL PROPERTY THEFT

Cybercriminals also use bots to duplicate proprietary information, which can then be parsed for intellectual property such as videos or PDFs of printed material, email addresses, or usernames that are then hidden in web code. They also target logos or graphic elements, which could help an attacker design a realistic phishing site, thus degrading your brand and company reputation—as well as hurting your customer relationships.



### RESOURCE HOARDING (AND RESALE)

Bots are the perfect tools for ticket scalpers, helping them easily scoop up large numbers of tickets to popular events, which they can then resell at a premium. There are also automated agents like the All-in-One sneaker bot being used by scalpers vying to get their hands on the latest pair of limited-edition Yeezys—and then offering them to sneakerheads at exorbitant prices.<sup>6</sup>



### COMPETITIVE INTELLIGENCE

With consumer goods such as airline tickets, hotel rooms, and other travel-related items where costs can fluctuate

rapidly, bots can glean information from other providers to drive prices down and create a competitive advantage in the marketplace.



### ACCOUNT TAKEOVER

Third parties can gain access to the details of a trusted user's online accounts, and pose as a real customer. Once an account has been taken over, criminals can do anything the legitimate user could do—including changing account details and withdrawing funds. Bots automate account takeover efforts through credential stuffing and password spraying attacks.

The list goes on. From malware distribution to click fraud, bots are being used by cybercriminals to make money, which has left traditional fraud investigators attempting to cope with an entirely new front in their battle against fraudulent transactions.<sup>7</sup>

<sup>4</sup> <https://securelist.com/the-cost-of-launching-a-ddos-attack/77784/>

<sup>5</sup> <https://f5.com/labs/articles/threat-intelligence/ddos/ddoss-newest-minions-iot-devices-v1-22426>

<sup>6</sup> <https://krebsonsecurity.com/tag/bot-ad-fraud/>

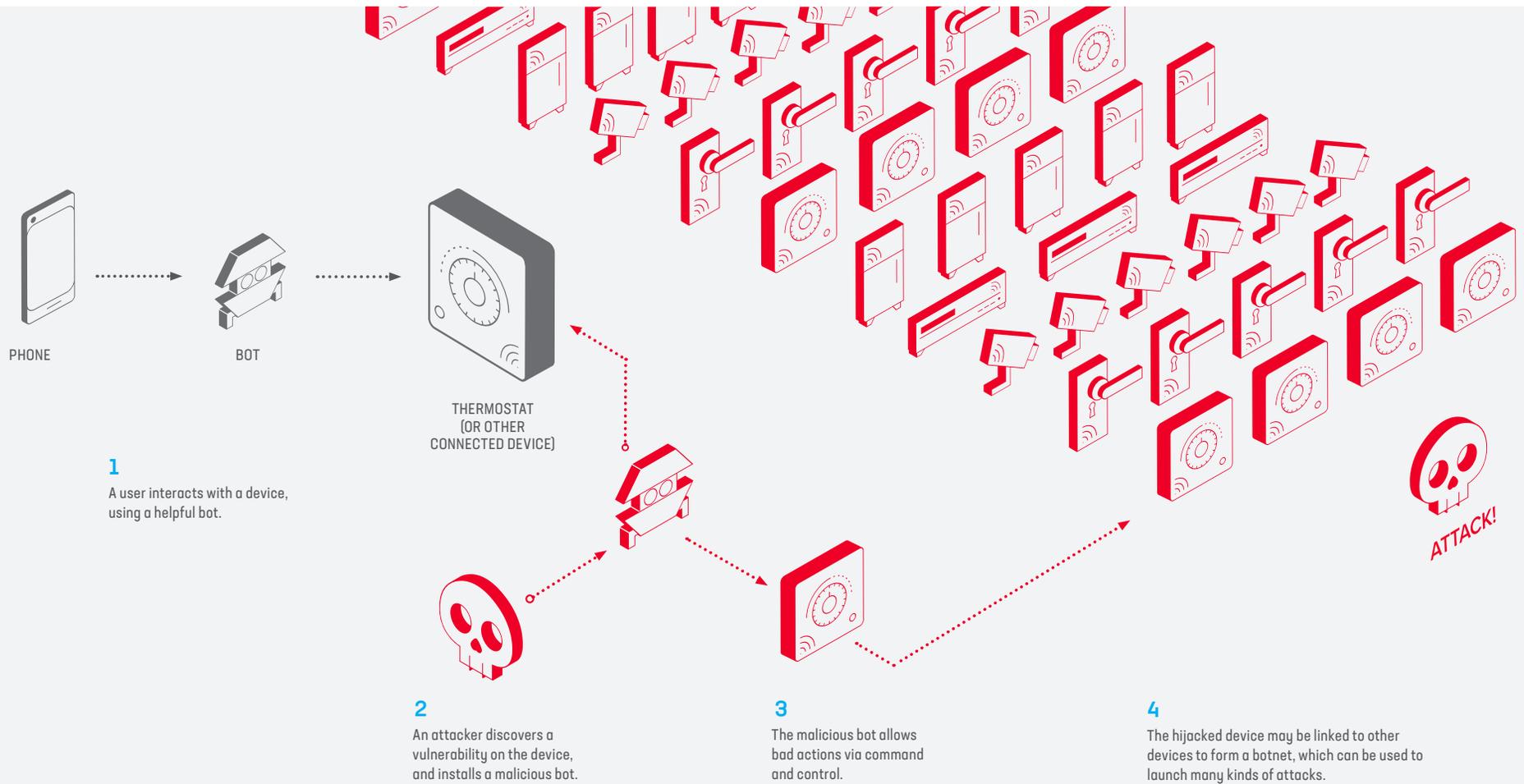
<sup>7</sup> <https://www.cnbc.com/2017/05/13/adidas-yeezy-collectors-sneakerheads-using-bots.html>



AFTER HACKERS GAIN ACCESS TO THE DETAILS OF A USER'S ONLINE ACCOUNTS, BOTS ARE USED TO AUTOMATE ACCOUNT TAKEOVER EFFORTS THROUGH CREDENTIAL STUFFING AND PASSWORD SPRAYING ATTACKS.

## RECRUITING A BOT ARMY

An example of a malicious use of bots is the coordination and operation of an automated attack on networked computers, such as a denial-of-service attack by a botnet.



## OPTIMIZING BUSINESS INTELLIGENCE IN THE AGE OF BOTS

With an understanding of the opportunities and threats posed by these digital mercenaries, it's essential to delve deeper and analyze the ratio of bots to humans interacting with their sites and applications. This may require an investment in tools and services that have the requisite intelligence to identify and distinguish bot and human traffic, but it will give you a good idea of how much money you're spending servicing the requests of other machines. Implementing tools such as web application firewalls (WAFs) that offer advanced bot management capabilities can help alleviate costs associated with serving bots.

However, overly aggressive bot deflection could have a negative impact on your customers' ability to interact with your services. If they have to spend a lot of time and effort proving that they are human, they may leave in frustration and try their luck with your competitor. Also, failing to facilitate "good" bots like digital assistants and search engine indexers for Google, Bing, etc., could result in your services not being available or visible to potential customers.

Keep in mind that successful bot management will result in some level of impact to your site statistics (like page views), and data mining will likely look somewhat different—but be more accurate—since you will be blocking some traffic. However, being aware and prepared for these changes will help give you the confidence that you're still serving your human customers.

## HOW BOTS AFFECT YOUR CURRENT SECURITY STRATEGY

With the explosion of autonomous programs on the Internet—both malicious and benign—it's necessary to rethink existing strategies for keeping applications and data safe.

While traditional IP intelligence and reputation-based filtering can help, these technologies need to evolve to keep pace with smarter and smarter bots. Looking forward, the business community should consider alternatives to IP reputation—including evaluating longer-term reputation associated with cryptographically verifiable identities—to better facilitate bot detection and management.

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## ADVANCES IN AI TECHNOLOGY MEAN THAT BOTS COULD BEGIN USING APPLICATIONS THE WAY HUMANS DO.

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Advances in AI technology mean that bots could begin using applications the way humans do, which could hinder efforts to identify them based on behavioral traits such as session and workflow profiling. Some bots are even human enabled, meaning they can outsource certain types of tasks (like solving CAPTCHA challenges) to humans when those tasks are too difficult for them.

Command-and-control systems are evolving, too. Cybercriminals have begun employing steganography techniques to relay commands hidden within images posted to public forums and social networks, a process that makes bot-enabled malware traffic very difficult or even impossible to detect. Consider the novel (but probably already imitated) case of hackers testing a piece of malware and hiding their commands in comments on Britney Spears's Instagram account.<sup>8</sup>

<sup>8</sup> <http://gizmodo.com/russian-hackers-testing-malware-with-britney-spears-in-1795912325>



IF BLOCKING ALL BOTS IS NOT AN OPTION, HOW CAN YOU DISTINGUISH BETWEEN DIFFERENT KINDS OF BOTS—AND BLOCK THE ONES THAT ARE CAUSING DAMAGE TO YOUR BUSINESS?



## SECURITY NOW: FIGHTING THE BOT BATTLE ON MANY FRONTS

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If blocking all bots is not an option, how can you best distinguish between different kinds of bots—and block the malicious ones from causing damage to your business?

There are no quick solutions that make it easy to comprehensively deal with the bot challenge, but an intelligence-enabled, defense-in-depth strategy can go a long way toward facilitating the good bots. Implement as much passive inspection as you can to minimize the impact on the application by starting with signatures, DNS checks, and browser capabilities. Then move into fingerprinting to identify beyond IP addresses. You can also employ a solution that looks at attributes like OS, screen size and color depth, and time zone in addition to non-human surfing patterns.

### HERE ARE SOME STEPS YOU CAN TAKE

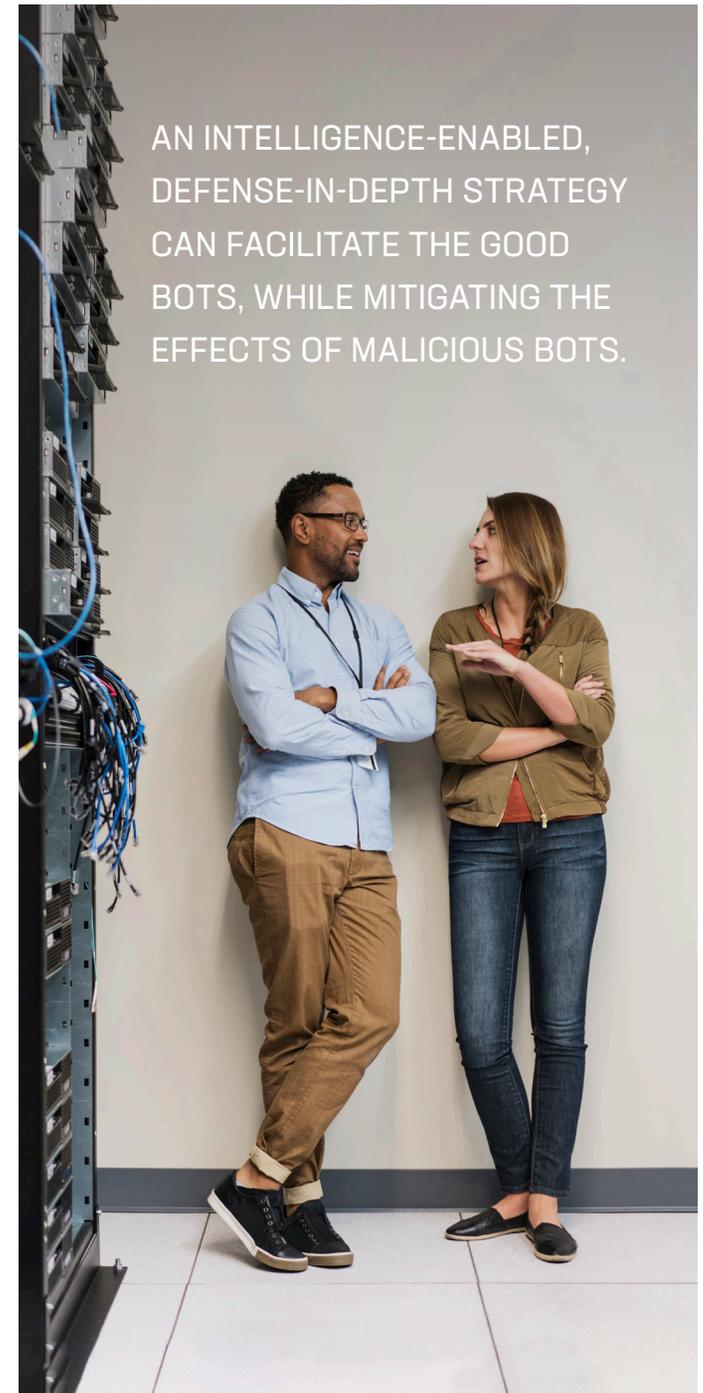
- Use identity and reputation to help classify and prioritize bot vs. human traffic.
- Create bot “acceptable use” policies to make it easier to interact with and service the benign bots, as well as manage their impact on your services.
- Review and bolster business process to more efficiently deal with fraud-related problems, making your organization more secure, and encourage fraudsters to move on to easier targets.
- Employ actionable threat intelligence to determine the likelihood of being attacked, and prioritize your response.
- Deploy a full-featured, flexible WAF to reduce and block unwanted traffic with capabilities such as proactive bot defense, headless browser detection, form and field-level encryption, layer 7 DoS mitigation, input sanitization, and behavioral analysis.
- Use traffic management tools that employ machine learning such as your WAF to quickly build and implement mitigations that help you address new and evolving threats.

## CONCLUSION

Bots are changing life as we know it online. And while it's tempting to concentrate on the multitude of malicious bots roaming the Internet, organizations should also be mindful of the opportunities these autonomous programs present.

By developing a comprehensive, flexible strategy to address the impact of bots on your business, you can protect your applications and your data while preparing your organization for sustained growth.

For more information about application protection, visit [f5.com/bots](https://f5.com/bots)



## THINK APP SECURITY FIRST

Always-on, always-connected apps can help power and transform your business—but they can also act as gateways to the data beyond the protections of your firewalls. With most attacks happening at the app level, protecting the capabilities that drive your business means protecting the apps that make them happen.

Find more security resources at [f5.com/solutions](https://f5.com/solutions)



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