



Bitdefender<sup>®</sup>

From ideas to patents.  
How visionary security dreams  
become breakthrough technologies



"Nowadays, if you stand still you won't be able to keep your edge in the market or wherever you currently are."

"You have to be restless, in a good way. The moment you start looking for solutions and start to deepen and brush up these solutions, that's where innovation is born."

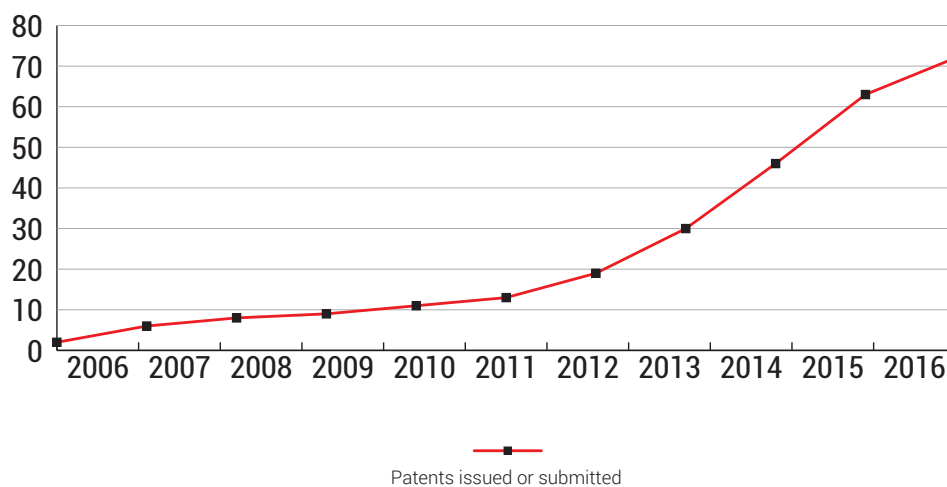
Florin Talpes, Bitdefender's CEO and founder.



Innovation has become a buzzword in all digital industries in recent years. From apps to technologies, revolutionary ideas spread with the goal of changing the world. Bitdefender started to deliver security solutions back in 2001 and, after 15 years of continuous innovation, these solutions now protect half a billion endpoints. Innovation has earned us the trust of families and corporations from over 150 countries and won us a wealth of awards.

The R&D team is at the center of Bitdefender to ensure we are fully equipped to look after our customers' interests, both now and in the future. Our team of engineers and researchers reached the 600+ milestone this year. To keep the innovation flame burning bright, Bitdefender invests 25% of its yearly research and development budget in visionary security dreams. From a total of 72 patents, Bitdefender has 42 patents issued for core technologies in past three years alone. In addition, 35 more are currently filed for examination. With almost 10 percent of Bitdefender patents pertaining to machine-learning algorithms for detecting malware and other online threats, deep learning and anomaly-based detection techniques play a vital role in proactively fighting new and unknown threats.

### How Bitdefender has accelerated its patent submissions



"There are two types of innovation – catch up, where you need to keep up with major market trends, and pioneering, which requires embracing higher risks," Bitdefender's CEO adds. " Bitdefender has successfully adhered to the latter."

This philosophy fuels Bitdefender and is driving an acceleration in patent submissions. Some 58 percent of our patents have been issued or submitted in the last 3 years alone.

Bitdefender holds patents in all major areas of interest: machine-learning, antispam/anti-phishing/antifraud, antimalware, virtualization, BOX-functionality, and hardware design, among others.

Many of the patents below hold the secrets to Bitdefender's most recent innovations - Bitdefender BOX, the breakthrough solution that protects all a user's connected devices, and Hypervisor Introspection (HVI), a revolutionary framework to secure virtualized environments from advanced targeted cyber-attacks. The dozens of patents also support Bitdefender's thought leadership positioning, helping it earn the Visionary label in Gartner's Magic Quadrant for Endpoint Protection Platforms for its completeness of vision and ability to execute.

At Bitdefender, we've been working on machine-learning algorithms since 2009, constantly developing and training them to identify new and unknown threats. Artificial Intelligence and machine learning are essential to combat a threat landscape that is larger and more sophisticated than ever. Unlike other vendors, Bitdefender has years of experience in perfecting these technologies, and the results clearly show better detection rates with fewer false positives.

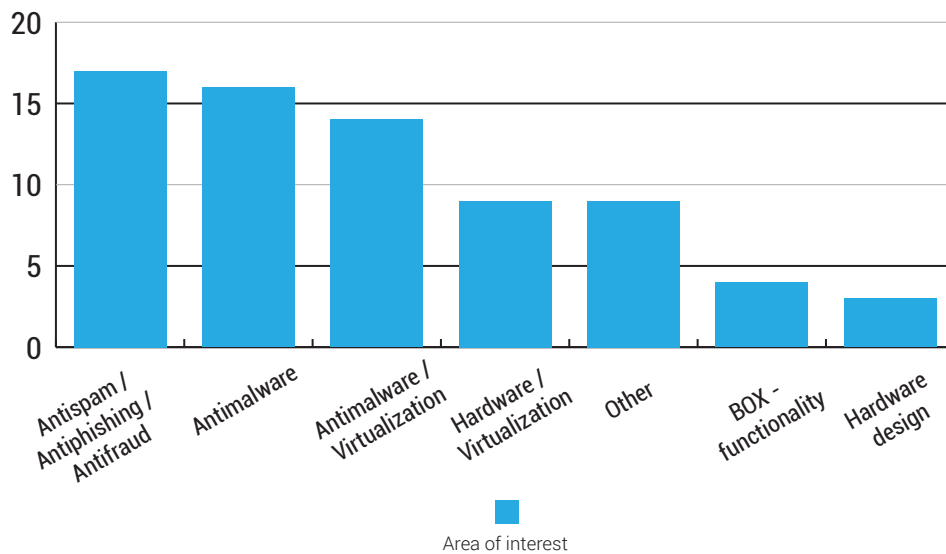


Machine-learning algorithms significantly improve detection time for modern threats, as they can analyze large amounts of data significantly faster than any human would. If trained to accurately detect various types of malware behavior, machine-learning algorithms can have a high detection rate, even on new or unknown samples.

The merging of human ingenuity with the speed and relentless data analysis of machine learning significantly accelerates reactions against new malware samples, offering protection even from previously unknown samples – APTs, zero-day attacks, and ransomware. However, it's not always just a single machine-learning algorithm doing the detection. Detecting ransomware requires several algorithms, each specialized in detecting specific families with individual behaviors. This significantly increases the chances of detecting similar-looking malware samples while reducing the number of false positives.

Antispam patents, such as Bitdefender's "Spam Filtering Using Feature Relevance Assignment in Neural Networks" filed in early 2008, show that Bitdefender has been working on using neural networks for automatically identifying spam-like behavior way before buzzwords like "artificial intelligence" or "machine learning" became popular. By developing a computer system able to assess the relevance of particular spam patterns to correctly tag spam emails, Bitdefender was able to not only significantly automate the entire spam detection process, but also cope with large volumes of spam sent globally every day. Coupled with another Bitdefender patent filed in 2008, "Dynamic Streaming Message Clustering for Rapid Spam-Wave Detection," it allowed Bitdefender to cluster spam messages in order to identify if particular emails belong to the same spam campaign. This allowed greater insight into who spam messages actually target and what types of malware they disseminate.

**Classification of patents based upon major areas of interest**



The "Anti-rootkit systems and methods" is a core patent for identifying both user-mode and kernel-mode rootkits and disabling their malicious functionality. Coupled with our "Complex scoring for malware detection" patent – also known as ATC (Active Threat Control), that presented an innovative method for identifying malware, such as Trojans, spyware, and viruses, based on constantly evaluating and scoring running processes, Bitdefender achieved award-winning protection against any type of malware, according to independent testers.

With virtualization playing a key role in the business segment, designing security technologies aimed at tackling performance and malware detection was vital for Bitdefender's long-term sustained technological superiority. With patents such as "Hypervisor-Based Enterprise Endpoint Protection" and "Memory introspection engine for integrity protection of virtual machines," Bitdefender achieved an unprecedented level of protection for virtual endpoints, and managed to push the boundaries of theoretical research into real-life applications.

Bitdefender Hypervisor Introspection, our cutting-edge technology for detecting zero-day exploits and APTs (Advanced Persistent Threats), is the result of three years of research culminating with the development of a technology that was deemed impossible to achieve by the security industry.

"Hypervisor introspection is a giant leap towards revolutionizing security as we know it, says Bitdefender's Head of Antimalware and Antispam Labs, Viorel Canja. "Virtualization technology continues to evolve, with increased levels of automation and comprehensive frameworks for managing the virtualized environment more effectively. In this context, the hypervisor-based introspection technology is a future-proof advancement with numerous applications in other fields and industries."

All these technologies are part of Bitdefender's Business security solution for enterprise environments, known as Bitdefender Gravity Zone.



"We feel Gartner's positioning of Bitdefender as a Visionary in the industry in 2016 offers powerful validation of the years of research we have put into staying at the forefront of technological advancements in endpoint security and into meeting the precise needs of businesses," says Bogdan Dumitru, Bitdefender's Chief Technology Officer. "Our recent runaway success in the enterprise space, with particularly accelerated growth in sales over the past two years, we believe firmly backs up Gartner's assessment."



While technology might be the backbone of Bitdefender's innovative drive, we've also stretched ourselves in terms of visual creativity by designing unique shapes for our next-generation security solution for protecting home network appliances and IoT (Internet of Things) devices, dubbed Bitdefender BOX. Powered by the innovative and patented technologies developed over 15 years, the Bitdefender BOX embodies more than just the future of integrated home network cybersecurity – it also shows how a security appliance should be, in terms of design and functionality. In 2015, Romania's most prominent business weekly, Business Magazin named Bitdefender the "Most Innovative Company in Romania" for Bitdefender BOX. TIME Magazine wrote in a BOX review that Bitdefender may just be the hero the Internet of Things deserves, while The Journal said BOX shows Bitdefender has the right idea about smart-home security. CNN and Fortune magazine also included BOX in the list of the coolest gadgets of 2014.

"Bitdefender's culture of innovation built in the past 15 years started in 2002 with the IST Prize – considered the Nobel of Informatics – for MIDAS, the Malware Intrusion Detection Advanced System, a breakthrough technology that was considered at that time a revolution in the security industry," Florin Talpeş comments. "Ever since then, patents and innovation have been strategic initiatives that are fundamental for our future growth."





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Full list of patents is available here: <http://patents.justia.com/assignee/bitdefender-ipr-management-ltd>

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Bitdefender is a global security technology company that delivers solutions in more than 100 countries through a network of value-added alliances, distributors and reseller partners. Since 2001, Bitdefender has consistently produced award-winning business and consumer security technology, and is a leading security provider in virtualization and cloud technologies. Through R&D, alliances and partnership teams, Bitdefender has elevated the highest standards of security excellence in both its number-one-ranked technology and its strategic alliances with the world's leading virtualization and cloud technology providers. More information is available at <http://www.bitdefender.com/>

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