

## IBM Inventors Receive Record-Breaking 8,000+ U.S. Patents in 2016

IBMers received 2,700+ cognitive and cloud computing patents during 2016  
#1 on U.S. Patent List for 24th Consecutive Year

ARMONK, N.Y., Jan. 9, 2017 /[PRNewswire](#)/ -- IBM (NYSE: [IBM](#)) today announced that it broke the U.S. patent record with 8,088 patents granted to its inventors in 2016, marking the 24th consecutive year of innovation leadership. IBM's 2016 patent output covers a diverse range of inventions in artificial intelligence and cognitive computing, cognitive health, cloud, cybersecurity and other strategic growth areas for the company.

IBM inventors were granted more than 22 patents per day in 2016, enabling the company to become the first to surpass 8,000 patents in a single year. IBM researchers, engineers, and designers generated more than 2,700 patents for inventions related to AI, cognitive computing and cloud computing.

"Leading the world in innovation for 24 years in a row is a result of IBM's unmatched commitment to innovation and R&D-reflected in this year's new U.S. patent record, breaking the 8,000 barrier for the first time," said Ginni Rometty, IBM's chairman, president and CEO. "We are deeply proud of our inventors' unique contributions to discovery, science and technology that are driving progress across business and society and opening the new era of cognitive business."

More than 8,500 IBM inventors residing in 47 states and territories and 47 countries are responsible for IBM's record-setting 2016 patent tally. IBM inventors based in New York received over 2,700 patents, while IBMers based in California and Texas were granted over 1,000 patents each. The United States is home to more than half of IBM's \$5.4 billion annual investment in research and development. This substantial commitment to unlocking new technologies is what has long propelled IBM into new markets, allowing it to create value for clients and opportunity for its employees, including the 25,000 Americans the company has pledged to hire over the next four years.

The Top Ten list of 2016 U.S. patent recipients\* includes:

1. IBM - 8,088
2. Samsung Electronics - 5,518
3. Canon - 3,665
4. Qualcomm - 2,897
5. Google - 2,835
6. Intel - 2,784
7. LG Electronics - 2,428

8. Microsoft - 2,398
9. Taiwan Semiconductor Manufacturing Co. - 2,288
10. Sony - 2,181

*\*Data provided by IFI CLAIMS Patent Services*

In the area of cognitive computing and artificial intelligence, IBM inventors patented more than 1,100 inventions that help machines learn, reason, and efficiently process diverse data types while interacting with people in natural and familiar ways. For example:

- Machine learning to secure the best answers: Providing accurate answers to questions that are posed by users is a fundamental goal of cognitive computing. IBM inventors created an approach for generating candidate answers to a question and then determining how good each candidate answer is based on a ground truth about the question - a baseline that the model knows to be true and can build on. When this process is applied iteratively, answer strength increases and the best answers for a question are identified and incorporated into the machine learning model, which can be applied across industries from financial services to retail. (US Patent #9,384,450: Training machine learning models for open-domain question answering system)
- Planning the best route for a traveler's cognitive state: Current navigation systems are programmed to change routes based on road conditions, but do not take into account a driver's cognitive state. IBM inventors have developed a method for planning a trip route based on the state of travelers that affects driving risk the most: their state-of-mind. Had a long day or easily overwhelmed? This system will help you navigate a less stressful route home. (US Patent #9,384,661: Cognitive needs-based trip planning)

IBM inventors were awarded patents on innovations that will help advance cognitive healthcare. For example:

- Using images to better gauge heart health: Cardiac disease categorization is challenging due to complexity of the heart. IBM researchers have developed a method for categorizing human heart disease states by using cardiac images to characterize the shape and motion of the heart. This could be used to aid doctors with the diagnosis of heart

disease symptoms. (US Patent #9,311,703: Method and system for categorizing heart disease states)

- A personalized hearing aid to meet your specific needs: Finding hearing aid devices personalized to meet the specific needs of individual users continues to be a challenge. IBM inventors developed a hearing aid device that can distinguish and filter voices and sounds. The device could be trained to distinguish sounds such as a smoke alarm and to listen intelligently to one's environment while filtering some sounds and amplifying others to improve the user's experience with the device. (US Patent #9,374,649: Smart hearing aid)
- Using drones to clean microbes in hospitals and agricultural fields: In this patent, surveying, testing and measuring contamination is controlled by a cognitive facility that manages drones. The drones could enter a contaminated area, collect specimens then confirm and map and sterilize contamination. This process is triggered by specific risks or performed on an ongoing basis. By collecting and sterilizing microbe samples through a drone, or fleet of drones, new insights into bacterial infections in the hospital, or farmland become possible. (US Patent #9,447,448: Drone-based microbial analysis system)

**IBM inventors also patented more than 1,600 inventions that can help advance the field of cloud computing.**

**For example:**

- Cognitive Cloud for your applications: Cloud Computing enables resiliency and availability of resources for applications. This patent pro-actively identifies hotspots in a cloud computing environment, including the server, storage and network where a resource constraint is likely to occur causing performance problems. The cloud learns parameters associated with a workload and provides an autonomic solution based on cloud resource usage for deployment or migration of applications. Another IBM innovation -- identifying a potential problem before it becomes an actual problem -- keeping your cloud computing environment running smoothly. (US Patent #9,329,908: Proactive identification of hotspots in a cloud computing environment)
- Measurement and Integrated Reporting of Public Cloud Usage in a Hybrid Cloud Environment: Using a public cloud in a hybrid cloud environment provides both cost advantages as well as the availability of additional resources. The patent teaches an approach for provisioning public cloud

resources and actively monitoring how much you are using at each public cloud. Unified usage reports describing the services supplied by multiple public cloud service providers are generated and provide detailed information on which of your users are consuming resources, who is proving those resources, and how much it costs. This innovation enables enterprises to monitor and measure employee and application usage and reduce information technology costs. (US Patent #9,336,061: Integrating metering of service usage for hybrid clouds)

IBM inventors also received patents for inventions expected to enable new cybersecurity solutions. For example:

- Pre-emptively detecting and isolating cloud application network intrusions: Developers can build and deploy new applications faster and easier than ever thanks to the self-service model of cloud computing, resulting in rapid delivery of competitive value to the business. But those new applications still need rock-solid enterprise security in an age of more frequent and high-profile network intrusions. IBM inventors have developed an approach that allows developers to declare fine-grained security policies for their applications by specifying their required degree of isolation. When network breaches are detected, networking between applications - or their subcomponents - can be locked down to minimize the impact of an attack. Enabling rapid development of cloud-native applications, without abandoning the security that modern enterprises need -- another IBM innovation at work. (US Patent #9,361,455: Security management in a networked computing environment)
- Managing incoming communications to prevent phishing and the spread of malicious content: As hackers become savvier, there is a need for more intelligent filtering of incoming communications that are sent to users. IBMers invented a system to create levels of permission and trust for inbound communications such as e-mails and text messages. This system determines a level of trustworthiness to assign to an inbound communication, and how much of that communication to forward on to a user. (US Patent #9,460,269: Communications security management)

2016 patent data provided by IFI CLAIMS Patent Services: <http://www.ificlaims.com>

Contact information:

Chris Blake

IBM Research, External Communications Lead

[blakechr@us.ibm.com](mailto:blakechr@us.ibm.com)

415-613-1120

Chris Andrews

IBM External Relations

[candrews@us.ibm.com](mailto:candrews@us.ibm.com)

914-499-5130

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Contact information:

Chris Blake

IBM Research, External Communications Lead

[blakechr@us.ibm.com](mailto:blakechr@us.ibm.com)

415-613-1120

Chris Andrews

IBM External Relations

[candrews@us.ibm.com](mailto:candrews@us.ibm.com)

914-499-5130

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