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would suggest. For example, passwords that contain a single number have a disproportionate number of digits at the end of the password.[20] Incidents On July 16, 1998, CERT reported an incident in which an attacker discovered 186,126 encrypted passwords. When the hack was discovered, 47,642 passwords had already been cracked.[21] In December 2009, there was a major password leak at Rockyou.com that exposed 32 million passwords. The attacker then published the complete list of 32 million passwords (without any other identifying information) on the Internet. The passwords were stored in plain text in the database and extracted using a SQL injection vulnerability. Imperva's Application Defense Center (ADC) performed a password strength analysis.[22] Here are some of the key findings: About 30% of users chose passwords shorter than seven characters, nearly 60% of users chose passwords from a limited set of alphanumeric characters, and nearly 50% of users used names, slang words, , dictionary words, or trivial passwords that used weak constructions such as sequential numbers and/or adjacent keys on the keyboard - for example, the most common password among RockYou account holders was simply "123456".[23] In June 2011, NATO (North Atlantic Treaty Organization) faced a security breach that led to the release of the first and last document/Username and passwords of over 11,000 registered users of their e-bookstore. The data was leaked as part of Operation AntiSec, a movement involving Anonymous, LulzSec, and other hacking groups and individuals.[24] On July 11, 2011, the servers of Booz Allen Hamilton, a large US consulting firm that does a significant amount of work for the Pentagon, were hacked by Anonymous and leaked on the same day. The leak, dubbed "Military Meltdown Monday," covers 90,000 military personnel records — including USCENTCOM, SOCOM, Marine Corps, various Air Force units, Department of Homeland Security, State Department employees, and what appear to be private contractors. [25] These leaked passwords were hashed with unsalted SHA-1 and were later analyzed by the ADC team at Imperva, revealing that even some military personnel used passwords as weak as "1234".[26] Am On July 18, 2011, Microsoft Hotmail disabled the password: "123456".[27] In July 2015, a group called "The Impact Team" stole user credentials of Ashley Madison.[28] Many passwords have been created using both the relatively strong bcrypt algorithm and hashed with the weaker MD5 hash. The attack on the latter algorithm made it possible to recover approximately 11 million plaintext passwords. CynoSure Prime password cracking group.[29] Prevention One method of preventing password cracking is to make sure that attackers cannot even gain access to an encrypted password. For example, in the Unix operating system, encrypted passwords were originally stored in the publicly available /etc/passwd file. However, on modern Unix (and similar) systems, they are stored in a hidden password file /etc/shadow, which is only accessible to programs running with elevated (i.e. "system") privileges. Initially, this makes it difficult for malicious users to obtain encrypted passwords, although despite this protection, many password hash collections have been stolen. And a shared networkSend passwords explicitly or use weak challenge/response schemes.[30][31] Another approach is to combine a site-specific secret key with the password hash, making it impossible to recover the plain text password even if the hashes are stolen. However, privilege escalation attacks that can steal protected hash files can also leak site secrets. A third approach is to use key derivation functions which reduce the speed at which passwords can be guessed.[32]: "5.1.1.2" Another safeguard is to use a salt, a random value unique to each password is contained in the hash. Salt prevents multiple hashes from being attacked at the same time, and also prevents the creation of pre-computed vocabularies such as rainbow tables. Modern Unix systems have replaced the traditional DES-based crypt() password hashing function with stronger methods such as crypt-SHA, bcrypt, and scrypt. Other systems have begun to adopt these procedures. For example, Cisco IOS originally used the reversible Vigenère cipher to encrypt passwords, but now uses md5-crypt with a 24-bit salt when using the enable secret command.[34] These newer methods use large salt values that prevent attackers from successfully launching offline attacks against multiple user accounts simultaneously. The algorithms are also much slower to execute, dramatically increasing the time it takes for a successful offline attack.[35] Many of the hashes used to store passwords, such as MD5 and the SHA family, are designed for fast computation with low memory requirements and an efficient hardware implementation. Multiple instances of these algorithms can run in parallel on graphics processing units (GPUs), speeding up cracking. As a result, quick hashes are ineffective in preventing password cracking, even with salts. Some key stretching algorithms, such as PBKDF2 and crypt-SHA, iteratively compute password hashes and can significantly reduce the speed at which passwords can be tested in such a case.The score is high enough. Other algorithms such as Scrypt are memory-intensive, so they require a relatively large amount of memory in addition to complex calculations and are therefore more difficult to crack with GPUs and ASICs. In 2013, a long-term password hashing competition was announced to select a new standard password hashing algorithm, with Argon2 being declared the winner in 2015. Another algorithm, Balloon, is recommended by NIST.[37] Both algorithms require a lot of memory. Solutions like a security token provide a formal confirmation response by continuously changing the password. These solutions drastically reduce the time available for a brute force attack (an attacker has to crack and use a password in one shift) and also reduce the value of stolen passwords due to their short lifetime. Software Main category: Password cracking software There are many software tools for password cracking, but the most popular[38] are Aircrack-ng, Cain & Abel, John the Ripper, Hashcat, Hydra, DaveGrohl and ElcomSoft. Many litigation software packages also include a password cracking feature. Most of these packages use a mix of hacking strategies: Brute force and dictionary attack algorithms proved to be the most productive. The increasing availability of computing power and beginner-friendly software to automatically crack passwords for a range of security systems has allowed script kids to take over. See also Brute force attack Cold boot attack Dictionary attack Password strength Smear attack Links ^ a b oclHashcat-lite - advanced password recovery, hashcat.net. 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