



WHITE PAPER

# Your Last Line of Defense Against Ransomware

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## CONTENTS

Your last line of defense against ransomware is not the one you think.....	3
How does ransomware get into your environment? .....	4
How do you protect your data from ransomware attacks?.....	4
Protect your protection.....	4
Is cloud ransomware protection heaven?.....	5
Is tape the last line of defense?.....	5
About Quantum's 3-2-1 approach.....	6

## YOUR LAST LINE OF DEFENSE AGAINST RANSOMWARE IS NOT THE ONE YOU THINK

Ransomware has been in the news a lot recently. Scams like CryptoLocker and Locky—you name it—have been overshadowed by WannaCry, “one the most serious ransomware attacks” according to Trend Micro. The WannaCry attack began on Friday, May 12, 2017, and within a day it infected more than 230,000 computers, spreading to more than 150 countries and infecting several major organizations around the world. Renault-Nissan, a major car manufacturer, reported stoppages at five production plants resulting from the WannaCry attack. The computers of dozens of hospitals and healthcare facilities in the U.K were also affected. US delivery company FedEx Corp. and Japan’s Hitachi Ltd. were also affected.

For those who haven’t heard of it, ransomware is a type of malware that prevents or limits users from accessing their computer system—either by locking the system’s screen or by locking/encrypting the users’ files—unless a ransom is paid (typically in bitcoins) in exchange for the deciphering key.

The first known ransomware was created in 1986, with more sophisticated RSA encryption-based schemes appearing in 2006. But since 2015, attacks have grown globally at an alarming rate. Cybercriminals are not only targeting individuals, they’re also beginning to target corporations with more advanced targeted attacks. This sort of crime against business networks is on the rise. Once this software gains a foothold in your system, due to its deceptive nature, it can infest your entire system before you can detect it.

Let’s use Locky as an example. Locky, a 100-KB malware developed in C++ and compiled with Microsoft Visual Studio, deploys itself on your system and deletes the files that usually allow Windows to alert you that suspicious items have been downloaded from the Internet. The ransomware then starts to interact with a central server to report the successful infection, and receives an RSA-2048 encryption key and an identifier relating to the corrupt system. From there, it starts encrypting your computer or server—that’s when the attackers can demand a ransom to stop the attack. There are many variants or clones of Locky or CryptoLocker around today, and while not related to the original Trojan, they all basically do the same thing.

WannaCry is another ransomware example, far more dangerous than other common ransomware types because of its ability to spread very quickly through standard file-sharing technology used by PCs called Microsoft Windows Server Message Block (SMB). Schools, universities, companies and businesses, hospitals, and any other network-oriented organization are particularly vulnerable. It also appears to be able to spread to other computers outside corporate networks.

But ransomware is not only targeting Windows systems, it also attacks other operating systems such as Mac OS with Trojans like KeRanger or Mabouia, Linux with Linux.Encoder.1, FairWare, and others, and network-attached storage (NAS) systems with SynoLocker. Mobile devices and even cloud-based file synchronization services have also been attacked. Recently, the ransomware variant ScareMeNot infected 30,000 mobile devices in just three weeks. And, you know those Windows volume shadow copies (VSS) or System Restore functions you might otherwise deploy? Ransomware can disable those as well. Attackers are now targeting administrator accounts, in particular backup ones, to start encrypting backups before the primary data.

## HOW DOES RANSOMWARE GET INTO YOUR ENVIRONMENT?

Emails with malicious links and attachments account for 59% of ransomware infections. According to a June 2016 Osterman Research survey, users are more than twice as likely to be infected by clicking a link in an email than visiting an infected website directly. Does it only happen to others? In the same survey, almost one out of every two participants indicated their organization had suffered at least one ransomware attack in the past 12 months. With the arrival of Locky and other new ransoms, Symantec reported blocking around 388,000 attacks per day at the end of 2016—just from exploit kits.

With more and more criminals attracted by ransomware as a source of easy income, ransomware authors have scrambled to meet the demand. According to Trend Micro, 50 new ransomware families were discovered in the first five months of 2016. The FBI estimates ransomware will be a \$1 billion dollar source of income for cybercriminals this year. But, the actual ransom payment totals may be even larger since many choose not to report the crime. One widely reported case involved the Hollywood Presbyterian Medical Center. The hospital publicly reported paying an anonymous hacker \$17,000 to free itself from a cyberattack, according to the New York Post.

Last but not least, Invincea researchers discovered a new ransomware variant called Cerber. This Trojan, along with encrypting files, installs a botnet capable of conducting Distributed Denial of Service (DDoS) attacks. A DDoS attack is an attempt to make an online service unavailable by overwhelming it with traffic from multiple sources. This is double jeopardy. If the ransom is not paid, not only do the files continue to be encrypted, but the targeted system is recruited as part of a botnet for DDoS attacks—another boon for criminals because DDoS is a source of income.

## HOW DO YOU PROTECT YOUR DATA FROM RANSOMWARE ATTACKS?

### Protect your protection

Given the increase of ransomware attacks, you need a strategy for defending your files against one of these debilitating events. First, you need to start with a proper data protection strategy. If you don't have a proper backup plan, you'd better have a bitcoin account ready to pay the ransom. Of course, payment is not recommended, as criminals don't always follow through with their promises to decrypt the data, as experienced by the Kansas Heart Hospital in May 2016 (reported by Healthcare IT News).

As the ransomware quietly encrypts your files, your backup program will likely back up the newly encrypted versions of the files. So, you need a program that does versioning. That's not too much of a problem as the majority of IT professionals keep multiple backups to enable applications or individual files to be recovered to a previous point in time before data was encrypted. But, even those older versions will be useless if the ransomware succeeds in encrypting all the files on your backup target, or even on a replicated distant repository (remember, ransomware can spread to other machines via your network). As long as the user has no write access to the location of the backup files (NAS share or Veeam Backup & Replication repository), the Trojan running under a user security context would be unable to encrypt specific backup files. Only 42% of IT pros who had experienced a ransomware attack reported being able to successfully recover all of their data from backups, according to a 2016 Barkly study. One of the reasons was the fact that the backups were also encrypted.

As a best practice, you should make sure that administrators aren't using their accounts with elevated privileges on a continued basis. You need to protect the protector and carefully manage backup administrator accounts. The most advanced—and motivated—attackers are now targeting backups first via social engineering or other methods to obtain administrator privileges. An example is provided by a major U.S. university recently attacked by cybercriminals. The attack was carefully planned. You can read the case study at [www.quantum.com/fighting-ransomware](http://www.quantum.com/fighting-ransomware).

An excellent approach is the tried-and-tested 3-2-1 backup rule. A 3-2-1 strategy means having at least 3 total copies of your data, 2 of which are local but on different mediums (devices), and at least 1 copy off-site. Let's go further and call it the 3-2-1-0 rule. You need 3 copies, 2 mediums, 1 off-site, and the last one needs to be offline with 0 real-time connectivity. So, the unsexy backup is becoming more and more attractive as your first line of defense for remediation.

### **Is cloud ransomware protection heaven?**

Smaller shops and end users at home rely increasingly on cloud backups as their last line of defense. It's easy to claim that using target cloud storage services such as Dropbox, Google Drive, or other enterprise cloud backup services will save your data against ransomware attacks.

Cloud-based backup is always on, but the files upload slowly. While that pace can be annoying, it adds an additional level of protection. It could be days—or even weeks—before all of the encrypted files get into the cloud. But with deduplication, compression, or bandwidth optimization techniques, access to the cloud becomes faster. The problem is that most of your files will be synchronized the moment something changes. In the event that your files are being encrypted by a ransomware attack, they will be uploaded encrypted. And if your organization uses cloud-based collaboration tools like Office 365 OneDrive for Business or Google Drive, the impact from a ransomware attack is multiplied at compute speed.

Of course, some cloud backup solutions can manage versions of your data, but the devil is in the details. As stated in a major public cloud provider's terms and conditions, "You can only restore previous versions one file at a time." Time to restore—if only one file can be restored at a time—is a key metric to include in your backup strategy.

Another issue is that attackers can now specifically target cloud storage, such as Dropbox and many more. You won't be aware that you're downloading encrypted files to one of these locations. Hackers don't even need your password anymore to get access to your cloud data. They simply steal your credentials and delete or encrypt your cloud backups, using a man-in-the-middle-like attack (now called "man in the cloud" according to security firm Imperva).

### **Is tape the last line of defense?**

Keeping a disconnected offline copy of your data is a pragmatic way to improve your backup strategy. Your last line of defense needs to be an offline backup. From an offline perspective, tape storage provides some of the best options in this regard. It's cheap, portable—and offline.

Other options include replication technologies and storage snapshots. But they're not entirely offline, just, in a sense, "out of band" from real-time propagation.

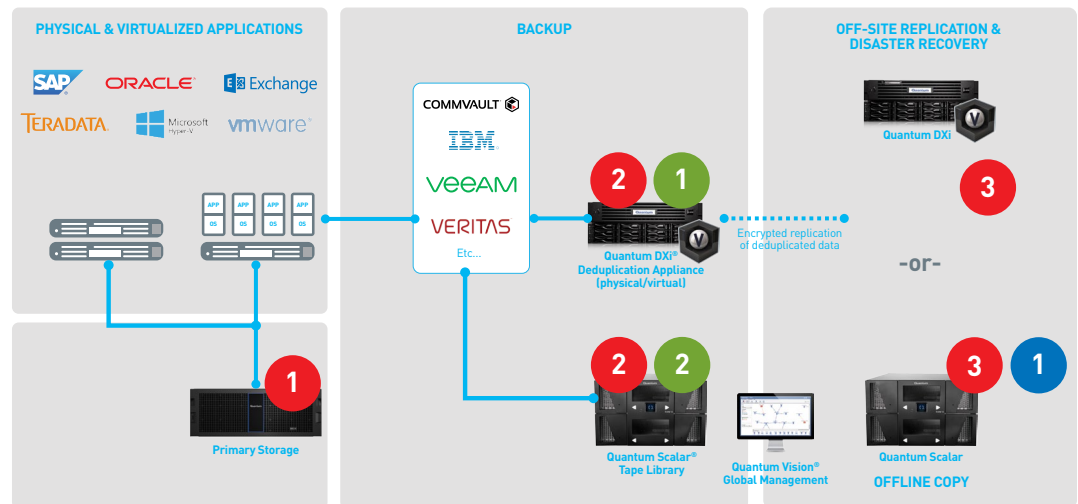
Tape is your last line of defense—simply because criminals can't delete or encrypt what they can't access over the network.

To fully protect your data against ransomware, you need to prevent the infection in the first place, and then perform regular backups following the 3-2-1 backup rule, replicating data to off-site and offline media such as tape.

If you're a victim of a ransomware attack, visit [www.nomoreransom.org](http://www.nomoreransom.org) to see if there is a decrypter tool available for the ransomware you were attacked with.

### About Quantum's 3-2-1 approach

**STORE AT LEAST 3 COPIES OF YOUR DATA**  
**ON 2 DIFFERENT TYPES OF MEDIA**  
**AND KEEP 1 BACKUP COPY OFF-SITE/OFFLINE**



Example of Quantum's 3-2-1 approach

Quantum's unique tiered solutions maximize the production system's availability and performance while cutting storage costs. At the core of our solution is the DXi deduplication appliance. DXi can be physical or virtual and use patented variable-length deduplication to maximize data reduction and network bandwidth savings, without making a trade-off when it comes to backup and restore performance. DXi® software enables fast backups and support for advanced features like Commvault Continuous Data Replicator (CDR) or Concurrent Optimized Duplication for faster replication for Veritas NetBackup users. DXi software also supports the Veeam Data Mover Service (VDMS) to manage the tasks required to execute fulls, incrementals, and synthetic fulls. It frees up resources for Veeam backup servers, and network and primary storage while maximizing data reduction with a "Veeam-ready repository" variable-length deduplication appliance. This means our customers can get the benefits of fast backups, fast replication, and fast restores while getting the full benefits of backup deduplication.

- DXi can replicate to other DXi appliances or the cloud, and it can also tier data to tape.
- Using tape as an offline backup copy is the most effective way to protect your data from ransomware attacks.
- Tape cost per petabyte (over three years) is eight times cheaper than disk—and with a 30-year archive life, tape is also the best media for long-term retention.

Quantum offers unique tape storage capabilities for many backup application environments, whether it is our direct path-to-tape capabilities in Veritas NetBackup environments, or our new converged tape solution for Veeam environments that eliminates the need for a physical Veeam tape server.

In all cases, Quantum Scalar® tape storage provides the best tape storage density at the lowest cost, simple scalability, and Scalar iLayer™ proactive diagnostics that make tape easier to manage.

For more information, visit us at [www.quantum.com](http://www.quantum.com) or call 800-677-6268.

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### **ABOUT Keeper Technology**

Keeper Technology is a strategic IT partner that helps organizations navigate between business needs and technology solutions in order to advance and support their mission, reduce costs, and reduce risks. We leverage our team of highly certified engineers and architects that use proven methodologies to design and implement innovative solutions. Founded in 2005, Keeper Technology is a Virginia-based small business and systems integrator helping to solve today's most challenging data storage and processing issues. Keeper Technology offers unique big data storage platforms in order ensure reliable and agile data access, management, and protection. Visit us at [Keepertech.com](http://Keepertech.com)

### **ABOUT QUANTUM**

Quantum is a leading expert in scale-out tiered storage, archive and data protection, providing solutions for capturing, sharing and preserving digital assets over the entire data lifecycle. From small businesses to major enterprises, more than 100,000 customers have trusted Quantum to address their most demanding data workflow challenges. Quantum's end-to-end, tiered storage foundation enables customers to maximize the value of their data by making it accessible whenever and wherever needed, retaining it indefinitely and reducing total cost and complexity. See how at [www.quantum.com/customerstories](http://www.quantum.com/customerstories).

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