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# Best Practices for Securing Your Network from Ransomware

Elevate your protection against ransomware and other network attacks

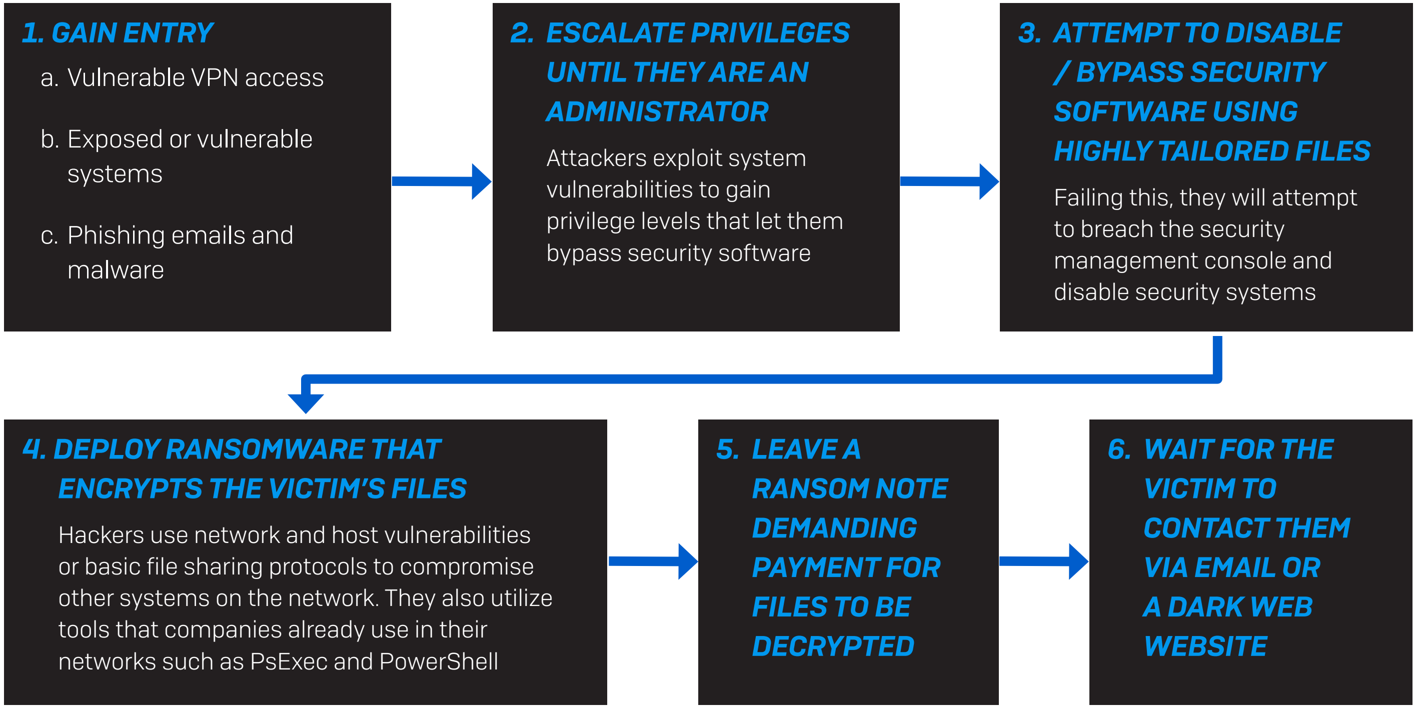
*A Sophos Whitepaper. September 2022*

## Ransomware Attacks Are Increasing in Volume and Severity

66% of organizations were hit by ransomware last year, up from 37% in 2020.[1] This is a 78% year-over-year increase, demonstrating that adversaries have become considerably more capable at executing attacks at scale than ever before. The surge in ransomware likely also reflects the growing success of the ransomware-as-a- service model, which extends the reach of ransomware by reducing the skill level required to deploy an attack.

## How Ransomware Attacks Work

To understand how to protect against ransomware attacks, we first need to examine how they work. A typical targeted ransomware attack looks like this:



**1. GAIN ENTRY**

a. Vulnerable VPN access

b. Exposed or vulnerable systems

c. Phishing emails and malware

**2. ESCALATE PRIVILEGES UNTIL THEY ARE AN ADMINISTRATOR**

Attackers exploit system vulnerabilities to gain privilege levels that let them bypass security software

**3. ATTEMPT TO DISABLE / BYPASS SECURITY SOFTWARE USING HIGHLY TAILORED FILES**

Failing this, they will attempt to breach the security management console and disable security systems

**4. DEPLOY RANSOMWARE THAT ENCRYPTS THE VICTIM'S FILES**

Hackers use network and host vulnerabilities or basic file sharing protocols to compromise other systems on the network. They also utilize tools that companies already use in their networks such as PsExec and PowerShell

**5. LEAVE A RANSOM NOTE DEMANDING PAYMENT FOR FILES TO BE DECRYPTED**

**6. WAIT FOR THE VICTIM TO CONTACT THEM VIA EMAIL OR A DARK WEB WEBSITE**

Modern ransomware attacks often use legitimate IT and end-user tools such as a VPN or Remote Desktop Protocol (RDP) to gain access. These tools are used by authorized staff as part of their jobs, making initial detection of modern ransomware attacks difficult. The root of the problem is that there's too much implicit trust in the use of these tools — anyone who can access a VPN or RDP is assumed to be trusted, a practice which has proven time and time again to be unwise.

[1] The State of Ransomware 2022, Sophos - Independent survey of 5,600 IT professionals across 31 countries.

## How to Prevent Ransomware Attacks

There are three network security measures that can help mitigate the risk of a ransomware attack.

### 1. Eliminate Exposure from Remote Access

Many believe a Virtual Private Network (VPN protects against ransomware attacks. This myth is incorrect, and VPN is an easy-to-use attack vector for malicious actors. Of course, this vector of attack has gained even more appeal recently through the enormous proliferation of remote-access VPN use, as millions of employees have transitioned to working from home over the last two years. Attackers realize these home networks are poorly protected and vulnerable, making them easy targets.

One of the highest profile ransomware attacks in 2021 involved a U.S. pipeline organization that saw fuel delivery disrupted for most of its customers in the eastern and southern portions of the country. During the attack, cybercriminals exploited a remote-access VPN.

Most outdated VPN clients also contain vulnerabilities that can be exploited, further compounding the challenge of securing your network against external threats. This has prompted law enforcement organizations like the FBI, Department of Homeland Security, and CISA (Cybersecurity & Infrastructure Security Agency) to issue warnings about the possibility of attacks on remote-access VPN infrastructure.

#### Best Practice — Replace Remote Access VPN with ZTNA

Zero Trust Network Access (ZTNA) is the modern replacement for remote-access VPN. It eliminates the inherent trust and broad access that VPN provides, instead using the principles of zero trust — trust nothing, verify everything. ZTNA offers improved security, easier management, better visibility, and a better user experience in comparison to remote-access VPN.

ZTNA eliminates vulnerable VPN clients, utilizes multi-factor authentication (MFA) and device health to control access, and only provides access to specific network applications, effectively micro-segmenting your network. It is so important that the White House created a zero trust architecture mandate that all federal agencies must comply with by 2024.

#### Eliminate exposure via exposed Remote Desktop Systems (RDP) and other systems

Remote management tools like RDP, Virtual Network Computing (VNC), and other remote management solutions allow remote staff to access and manage systems. Unfortunately, without the proper safeguards in place, these tools also provide convenient in-roads for attackers to launch ransomware attacks.

Securing RDP and other remote management solutions can leave you open to ransomware attacks. Cybercriminals often use bulk scanning and brute-force hacking tools, which try hundreds of thousands of username and password combinations until they get the right one. Sometimes, they will use those credentials to immediately launch an attack. Other times, they may sell those credentials to another group of attackers.

> *"You had an old critical Log4j vulnerability not fixed on Horizon, this is how we were able to get in initially. It was a bulk scanning; not like we were targeting you intentionally. Once inside your horizon VM, we dumped credentils, got some Domain admin, cracked the hash and [were] able to move laterlly."*

A quote from successful ransomware attackers on how they gained access

The quote above comes from a threat actor group that extorted an organization by gaining access through an unpatched vulnerability in VMware Horizon it discovered through bulk scanning. This underscores the importance of keeping system firmware and software patched and up to date.

### Best Practice — Eliminate Direct External Access

Protect access to remote systems by blocking all access through a firewall and only enabling access via ZTNA. This effectively removes direct external access.

Review all firewall rules to ensure that no RDP or remote management systems are exposed via port-forwarding or NAT rules. Also, ensure secure access is tightly controlled via ZTNA. This verifies that only authorized users and devices that have proven their identity with MFA and health status can gain access.

In addition, consider new secure authentication technologies like Windows Hello for Business.  And of course, keep your infrastructure patched and up to date to prevent old vulnerabilities from becoming easy targets.

## 2. Block Malware and Ransomware from Entering via Phishing and Downloads

Another age-old attack vector is tricking users into responding to phishing emails and/or opening malicious emails. These days, you need modern firewall, endpoint, and message protection working together with the latest machine learning and sandboxing technology to identify evolving targeted threats attempting to access your network. Ideally, you need to stop these threats before they get on your network or isolate and prevent them from moving if they get a foothold on your network.

### Best Practice — Use Zero-Day Threat Protection

Ensure you have the latest messaging protection from phishing and malicious emails to keep these threats out of users' inboxes. Also, ensure you have deep-packet inspection (DPI) technology in your firewall, including TLS 1.3 decryption to inspect encrypted payloads, machine learning analysis for new zero-day threats, and sandboxing to evaluate incoming files at runtime. Teach your users how to identify potential phishing threats. And, ensure your endpoints have the best protection available against credential theft, exploits, and ransomware.

To isolate threats that enter your network and prevent them from moving, there are several best practices you can use that we cover in the next section.

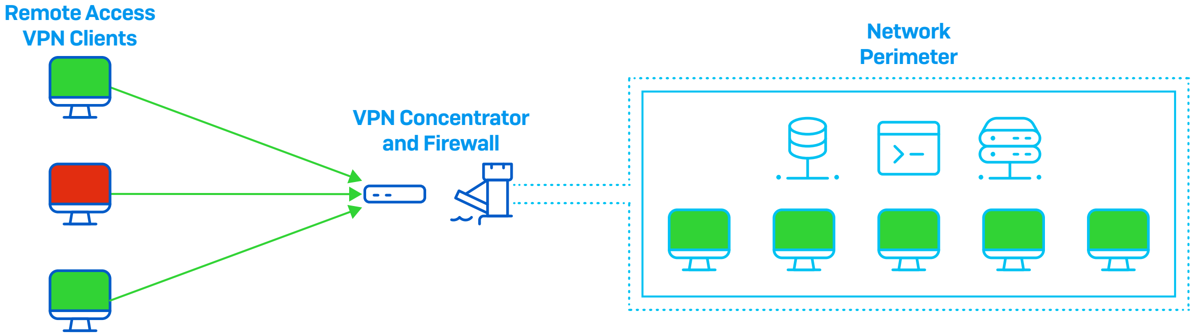
[5] The Active Adversary Playbook 2022 - Sophos

### Limit Lateral Movement

During a network attack, it's absolutely vital that your network security solution limit its ability to move around the network — or move laterally.

Unfortunately, most networks resemble a medieval fortification — with a proverbial castle wall and moat forming a secure perimeter around network resources. A VPN provides the equivalent of a secure gatehouse for authorized users to enter a safe perimeter. But, once cybercriminals access a network, they have full access to everything within its perimeter. This same freedom of movement within a network also applies to threats like ransomware.

Cybercriminals use RDP and other management systems, as well as unmanaged devices, as entry points. They also use these entry points to move laterally across a network.



### Best Practice — Micro-Segment Your Network

This is critical in modern networks, along with zero trust. There are three best practices you should use to architect your network:

1. **Segment Your Network.** Create small zones or VLANs and connect them via managed switches and a firewall to apply anti-malware and IPS protection between segments. This lets you identify and block threats attempting to move laterally on your network.
2. **Use ZTNA.** Micro-segment your network applications and only allow authorized users to access the resources they need. That way, if a user device is compromised and a threat goes undetected, the threat can quickly be eliminated. Sophos ZTNA goes one step further by completely removing access if a device is compromised.
3. **Utilize Technology Like Sophos Synchronized Security.** Synchronized Security lets you automatically respond to an active threat on your network, isolate it, and prevent it from moving laterally. It can immediately identify a threat and notify healthy devices to ignore any traffic from a compromised host while Sophos Switches automatically drop packets from an affected device and Sophos Firewall further limits access by the compromised host to other parts of the network.

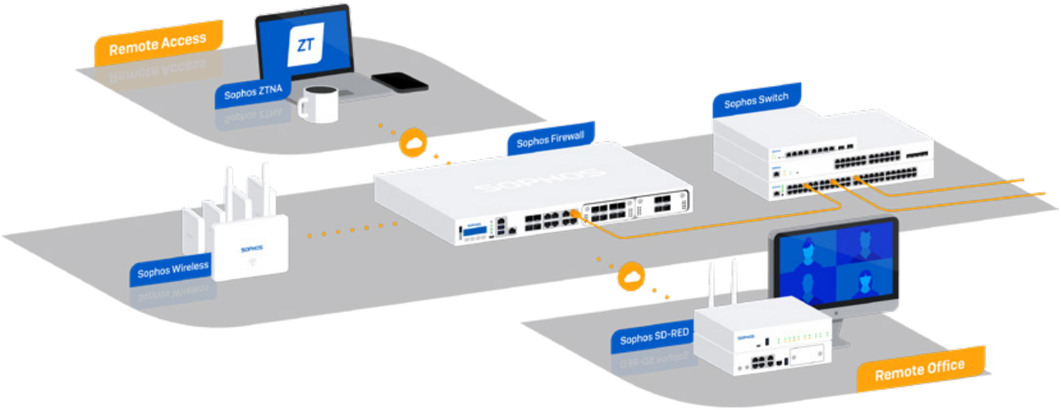
## Network Security Best Practices to Protect Against Ransomware

In summary, here are best practices that you can use to protect your network against ransomware and other cyber threats:

- **Micro-Segment Your Network.** This allows you to limit lateral movement of threats. Use Sophos ZTNA to micro-segment access to your network applications. On top of that, use Sophos Firewall and Sophos Switch to micro-segment your internal network resources. And, use Sophos SD-RED to segment and securely connect remote devices and locations.
- **Replace Remote-Access VPN with ZTNA.** Eliminate a common attack vector by removing potentially vulnerable old VPN clients. Upgrade to a modern ZTNA solution such as Sophos ZTNA, which integrates with Sophos next-gen endpoint protection to properly secure your user device, their identities, access to your apps and data, and your network with a single agent managed from a single console, from a single vendor.
- **Implement the Strongest Protection Possible.** You should implement the highest level of protection on your firewall, endpoints, servers, mobile devices, and remote access.
  - Ensure your firewall has TLS 1.3 inspection, next-gen IPS, and streaming DPI with machine learning and sandboxing for protection from the latest zero-day threats. Sophos Firewall includes all of these technologies and tightly integrates them to deliver powerful protection and performance so you're getting the most value out of your firewall investment.
  - Also, ensure your endpoints have modern next-gen protection capabilities to guard against credential theft, exploits, and ransomware. Sophos is consistently rated as the top provider of next-gen endpoint protection solutions. We cover your endpoints, mobile devices, and servers and let you manage them from the same cloud-management console as the rest of your Sophos products.
- **Reduce the Surface Area of Cyberattack.** Review your firewall rules and eliminate any remote access or RDP system access through VPN, NAT, or port-forwarding. And, ensure that any traffic flows are properly protected. Sophos Firewall makes this easy with its superior visibility, dashboards, reporting, and rule management capabilities.
- **Keep Your Firmware and Software Patched and Up to Date.** This is particularly important for any network infrastructure like a firewall or remote-access software or clients but equally important for all your systems, since every update includes important security patches for previously discovered vulnerabilities. Sophos enables you to keep all your cybersecurity products up to date automatically.
- **Use MFA.** Ensure your network operates on a zero-trust model where every user and device has to continually earn trust by verifying their identity. Also, enforce a strong password policy and consider adopting authentication solutions like Windows Hello for Business. All Sophos products support MFA from your preferred authentication provider.

- **Instantly Respond to Cyberattacks.** Use automation technologies and human expertise to speed up cyber incident response and remediation.
  - Ensure your network security infrastructure helps you automatically respond to active attacks so you can isolate a compromised host before it can cause serious damage. Only Sophos Synchronized Security is able to provide the level of response you really need, when you need it.
  - Deploy a managed detection and response (MDR) service such as Sophos MDR. With Sophos MDR, a team of threat experts is constantly monitoring and responding to incidents before they become problems, so you don't need to worry.

## Protect Your Network with Sophos



Sophos provides everything you need to fully secure your network from attacks, including firewalls, ZTNA, switches, wireless, remote-edge devices, messaging protection, MDR, and next-gen endpoint protection for all your devices and servers. And, the best part is it's all managed from a single cloud management console — Sophos Central — and integrates together to deliver Sophos Synchronized Security and cross-product threat detection and response or extended detection and response (XDR).

Synchronized Security ensures your Sophos products are constantly sharing telemetry and health data, so you can quickly respond to cyberattacks. When a compromised host is detected, your healthy endpoints automatically ignore traffic, your switches drop packets from the compromised host, and your firewall blocks access to other parts of your network until the issue is resolved. No other network security system out there can match this — we make cybersecurity easier and more effective.

Sophos XDR is the industry's only XDR solution that synchronizes native firewall, endpoint, server, email, cloud, and Microsoft 365 security to provide a holistic view of your organization's environment. It offers a rich dataset and deep analysis for threat detection, investigation, and response for both dedicated security operations center teams and IT admins.

If you're finding that cybersecurity is too complex, too difficult, and changes too fast to effectively manage it yourself, we've got you covered. Sophos MDR secures over 11,000 organizations worldwide, providing 24/7 threat hunting and neutralization delivered by a global team of threat experts.

The bottom line: Sophos offers a portfolio of cybersecurity products and services that enable you to easily protect your network from ransomware.

Learn how Sophos can protect
your network at www.sophos.com

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Sophos delivers industry leading cybersecurity solutions to businesses of all sizes, protecting them in real time from advanced threats such as malware, ransomware, and phishing. With proven next-gen capabilities your business data is secured effectively by products that are powered by artificial intelligence and machine learning.

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