# Ransomware Defence and Response

## Minimising the Risk of an Increasing Threat

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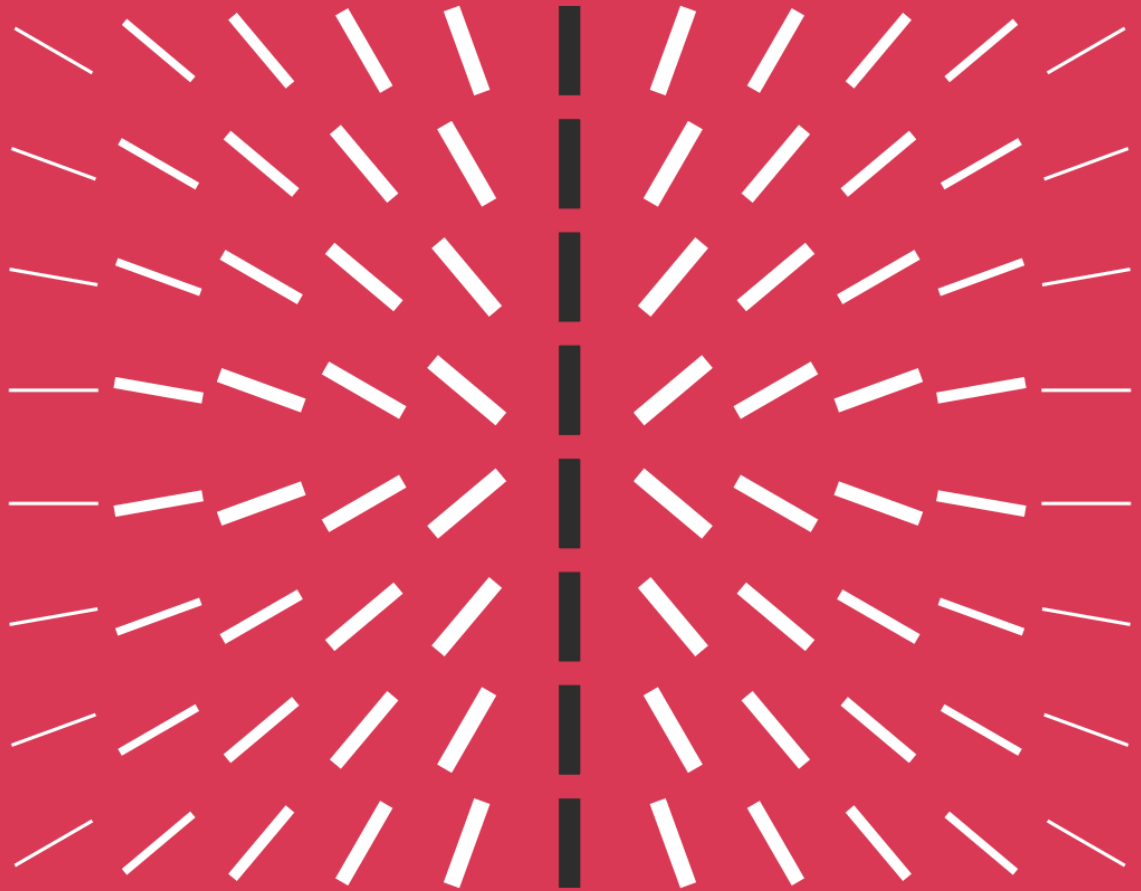

# Introduction

## Will Oram

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Lead PwC UK's Cyber Threat Advisory team

Help clients deliver rapid improvements after cyber attacks

Manage and coordinate the response to major cyber security incidents

Deliver purple team and transformation engagements

## Gabriel Currie

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Lead PwC UK's Cyber Threat Advisory team

Help clients proactively improve threat detection and response capabilities

Manage and coordinate the response to major cyber security incidents

Architect post-incident remediation programmes

# Agenda

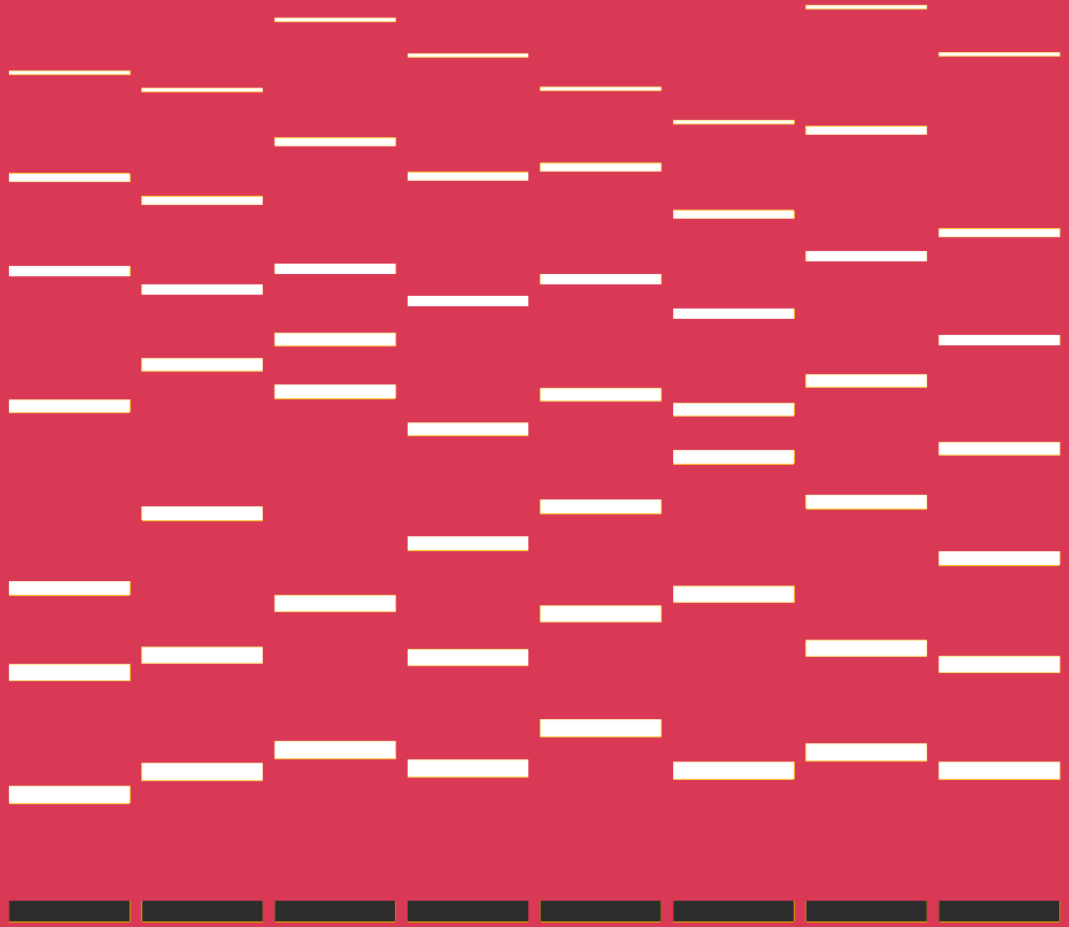
01 Human-operated ransomware attacks

02 Preventing ransomware attacks

03 Managing the response to an attack

# 01

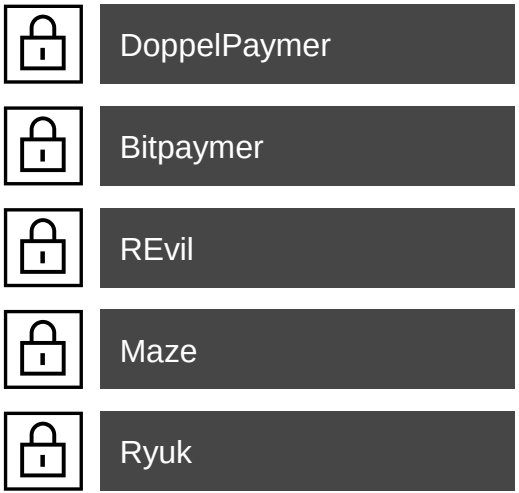
## Human-operated ransomware attacks



# Human-operated ransomware attacks

**Human-operated ransomware is now one of the top priority cyber threats faced by most organisations. These attacks represent a more challenging threat than previous well-known ransomware attacks, such as NotPetya and WannaCry.**

- The ‘human-operated’ element means there are skilled and adaptable financially-motivated people behind these attacks who can identify and overcome defences.
- Attackers use techniques commonly seen in APT intrusions to gain access, spread widely over months, and deploy ransomware for maximum impact.
- Attackers are increasingly stealing and exfiltrating sensitive data (often posted to publicly accessible leak sites) to further extort victims, significantly complicating how organisations respond.
- Organisations who have not already taken steps to understand and reduce their vulnerability to these attacks should act now.



# How human-operated ransomware attacks work

## Automated and mass scale

**Phish employees** and deploy malware to workstations

**Exploit vulnerabilities** in Internet-facing services

## ‘Human-operated’ and targeted

**Compromise privileged accounts** by exploiting common IT/AD hygiene issues

**Move laterally** and establish footholds using common offensive security tools

**Exfiltrate sensitive data** to attacker operated infrastructure

**Deploy ransomware** as widely as possible to for maximum impact

# The ransomware threat landscape

## The arrival of new affiliate schemes in 2020 has led to the growth in attacks

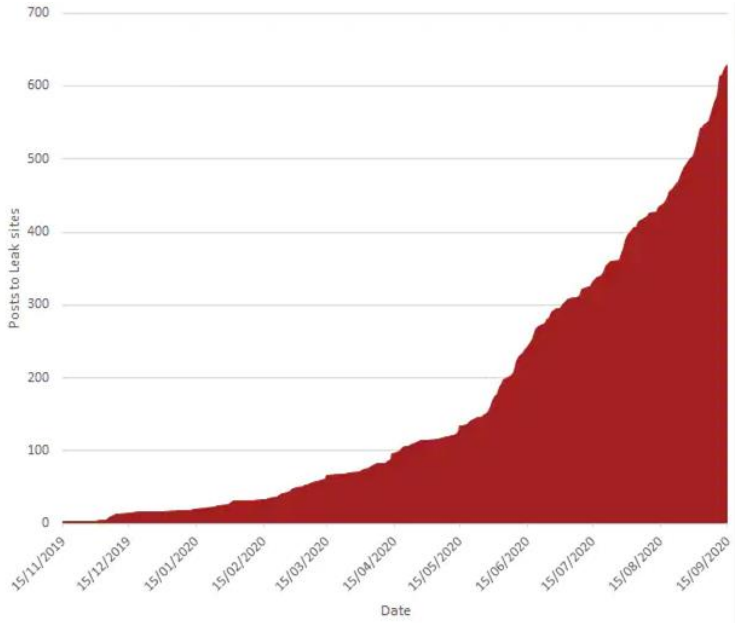
The rapid growth in ransomware attacks has been driven by:

**01** Growing number of attackers attracted by **perceived easy revenue**.

**02** Popularity of **affiliate programmes**, lowering the barrier to entry for newcomers.

**03** Emergence of **leak sites**, placing additional pressure on victims to pay ransom demands.

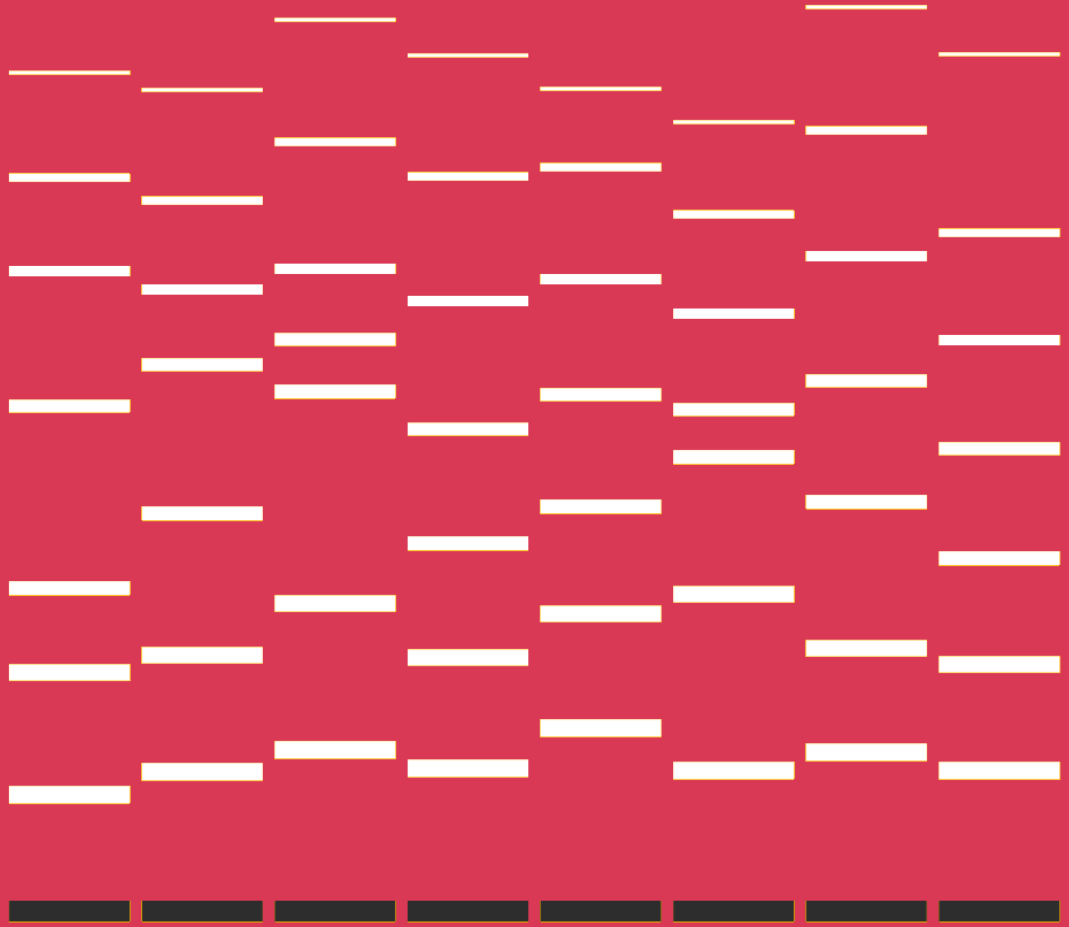
**04** Arrival of **new attackers**, some of which are highly aggressive (e.g., targeting healthcare).




**Running total of ransomware data leaks**
(November 2019 - September 2020)

# 02

# Preventing ransomware attacks



# Threat intelligence informs an effective defence

| | |
|---|---|
| Initial access is often **opportunistic** and not carried out directly by ransomware actors. Other (criminal) actors use automated and mass scale techniques to gain access. | **Reduce attack surface** |
| Almost always opportunities to **detect and contain** attacks in their early stages. Deployment of ransomware is the final stage of an often lengthy intrusion. | **Reduce attackers' dwell time** |
| Attacker seek to cause **maximum impact** by targeting as many systems as possible and causing the most disruption. | **Limit blast radius of unauthorised access** |
| There are **skilled and adaptable** financially-motivated people behind these attacks who can identify and overcome defences. | **Prepare rapid isolation and recovery options** |

# Four priorities to mitigate human-operated ransomware

## Reduce attack surface

**Internet-facing**

- External vulnerability management
- Multi-factor authentication for email and remote access

**Phishing**

- Effectively configured email and web security tooling
- Hardened endpoints to restrict execution of scripts / executables
- Restrictions on the execution of Microsoft Office macros
- Controls to prevent day-to-day usage of administrator accounts

## Reduce attackers' dwell time

- Endpoint detection and response tooling on workstations / servers
- Rules configured to detect common attacker techniques
- Security tooling to monitor for compromise of privilege accounts
- Automated remediation of 'commodity malware' infections
- Rapid and effective investigation and containment of security alerts

## Limit blast radius of unauthorised access

**Privileged Accounts**

- Controls to protect privileged accounts from compromise
- Eliminated common IT and AD hygiene issues to 'increase cost'
- Securely architectured and configured Active Directory

- Segmented networks, including high-risk networks such as OT
- Host-based firewalls on workations with inbound blocks
- Cloud-based SaaS services for employee email and file-sharing

## Prepare rapid isolation and recovery options

- Endpoint protection tooling that blocks mass file encryption
- Exercised incident and crisis management processes
- Validated offline backups with a tested recovery strategy
- Visibility of systems and ability to query and conduct forensics
- Ability to isolate parts of network and understand impact
- Ability to turn off applications and understand impact

# Preventing human-operated ransomware attack by delivering targeted tactical and strategic improvements

## 01

### Understand your vulnerability to the threat

Assess whether you can prevent / detect the techniques used in these attacks

**Recommendations**

- ✓ Prioritise techniques with threat intel
- ✓ Align to MITRE ATT&CK framework
- ✓ Assess vulnerability with security testing

## 02

### Deliver tactical improvements to immediately reduce risk

Drive at pace improvements to detect and prevent techniques, and increase “cost to the attacker”

**Recommendations**

- ✓ Collaborate with IT teams
- ✓ Use agile approaches and tools
- ✓ Driven by security testing

## 03

### Deliver sustainable cyber risk reduction

Address root-causes with strategic initiatives designed to deliver sustainable cyber risk reduction

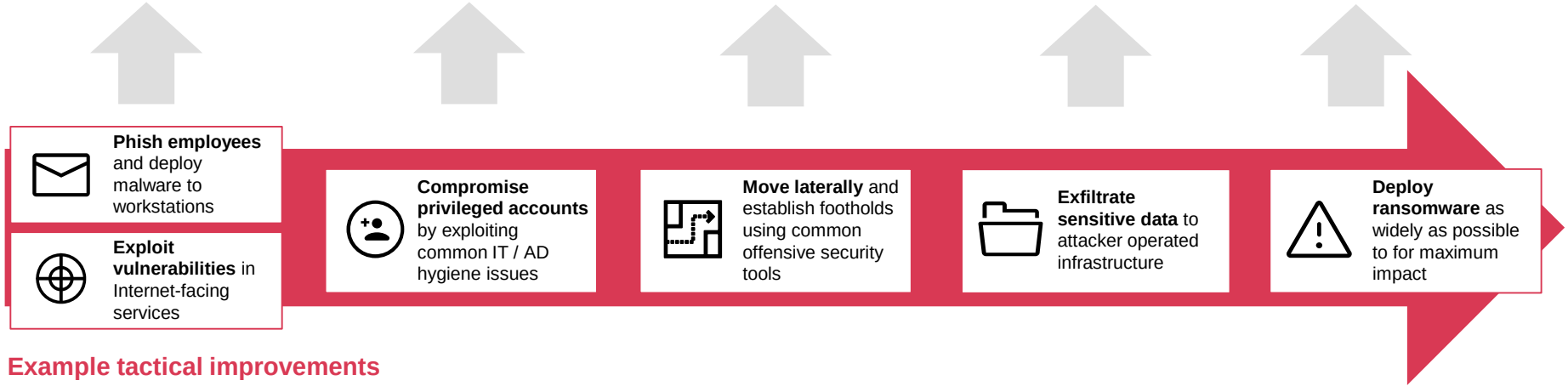
**Recommendations**

- ✓ Bring in security architects
- ✓ Engage with the wider-organisation
- ✓ Make IT securable

Provide ongoing reporting to execs on your vulnerability to ransomware attacks, clearly demonstrate the impact of improvements made, using the results of this threat-based approach - “technique coverage” + “cost to the attacker”

# Targeted tactical improvements can significantly decrease risk

**Increase ‘cost to the attacker’ at every stage**
**Create opportunities to detect and contain attacker**

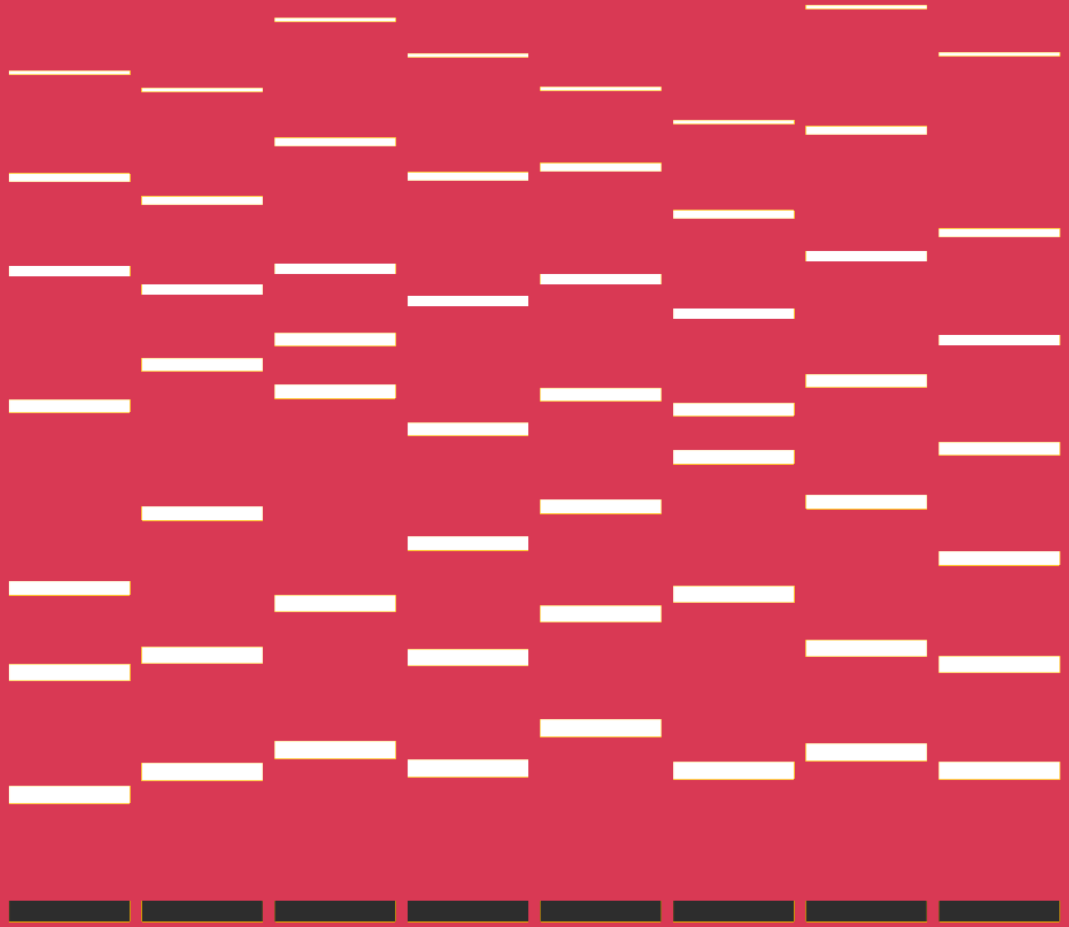



## Example tactical improvements

- Restrict files users are able to download and receive by email
- Restrict the use of domain administrator accounts
- Remove users and groups from local administrator groups
- Remove or restrict access to sensitive data on network shares
- Configure EPP/EDR tools to detect and block ransomware behavior
- Restrict the execution of scripts and macros by users on workstations
- Set strong passwords on service accounts and restrict privileges
- Remediate critical remote code vulnerabilities on internal servers
- Effectively configure rules in data loss prevention tooling
- Restrict Active Directory trust relationships

# 03

# Managing the response to an attack



# Key challenges in ransomware response

**Paying the ransom**

Conflicting ethical/legal/operational considerations, changing attacker tactics

**Relying on insurance**

Understanding whether you are covered and how you can maximise the chance of this

**“Realities of recovery”**

IT environments are complex, restoration more so

**Constructively engaging with regulators**

Understanding your obligations, managing the response, taking defensible actions

**Managing and coordinating the response and recovery**

Organisations are often not prepared for the rapid and complex response required

**Preventing further attacks and 'making IT securable’**

Effectively addressing the vulnerabilities and root-causes, and sustainably reducing risk

# The “hard basics” of ransomware response

| | What’s happened? | What’s the plan? | Who’s in charge? |
|---|---|---|---|
| **What we see:** | No clear understanding of the facts which matter | Lack of “operational rhythm” or programme management<br><br>No clear strategy and objectives driving the response efforts | Lack of leadership and accountability<br><br>No clear or suitable incident management structures |
| **Consider:** | What attacker activity has been identified (initial entry, lateral movement, data impact, exfiltration)?<br><br>What systems have been impacted?<br><br>What are the business risks/impacts? | How do we want to respond to the attacker activity identified?<br><br>How and who will deliver this response?<br><br>How will we identify if the incident escalates and how will we respond? | Who is leading the response, and who are they accountable to?<br><br>Who is leading each individual element of the response?<br><br>Do we have the right expertise and experience needed? |

# Four management tools for an effective ransomware response

## 01 Teams

The structure of a response needs to flex based on the organisation and incident.

- Senior oversight, strategic direction, challenge and decision making.
- Programme control and management with strong business input.
- Defined workstreams focused on resolving key IT and business challenges.

## 02 Artefacts

Documented artefacts can be critical to both managing the live response, and enable after-action review.

- Strategy and objectives.
- Team leadership and structure.
- Plans, including with key milestones, timelines, effort.
- Status reporting.
- Risks, assumptions, issues, dependencies.
- Tasks and actions.

## 03 Reporting

Timely and accurate reporting is critical to ensure the right people have the right information.

- Content: Who is the audience, what do they need to know and why?
- Cadence: How often is it useful or relevant to report?

## 04 Meetings

Crisis situations can result in meeting paralysis.

Properly structured and effectively run meetings to enable communications and decision making are key.

- Do we need to meet?
- What's the purpose of the meeting: decisions, discussion, or dissemination?
- How can we maximise effectiveness?

# Executing an effective response to ransomware attack

## Immediate Actions

- Establish response structures to coordinate decision making
- Identify stakeholders and develop comms strategy
- Determine extent of attack
- Determine business impact
- Rapidly identify critical business processes and enact continuity plans
- Determine ransom strategy
- Manage legal and regulatory implications

## Short-term Actions

- Fully investigate nature and extent of attack
- Prioritise business processes to guide remediation and recovery
- Securely recover and rebuild
- Analyse attack paths to identify weaknesses
- Deliver targeted protection and detection improvements
- Rapidly enhance detection and response capabilities as compensating control

## Medium-term Actions

- Assess protection and detection capabilities to identify quick-win improvements
- Build sustainable detection and response capability
- Rapidly uplift security capabilities in key areas
- Review technical and business response to the incident and implement lessons learnt

## Long-term Actions

- Understand root-cause issues
- Identify key control and capability gaps to prevent incident reoccurring
- Re-align existing strategic programmes
- Plan and deliver cyber security strategy and transformation programmes
- Make IT “securable”

# Any questions?

Ask Us (Almost) Anything About Cyber Defence @ 4:25 CDT

Or get in touch with us... @willoram
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pwc.co.uk/cybersecurity