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Modern Malware: Leveraging Its Imperfection to Design Response Methods

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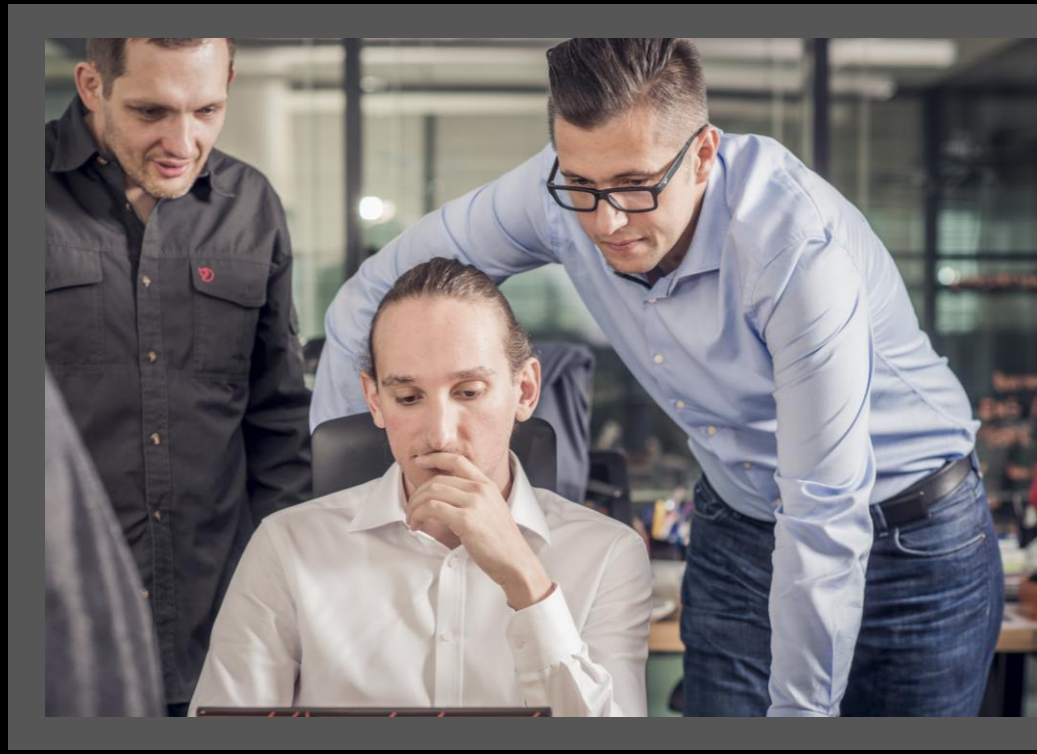

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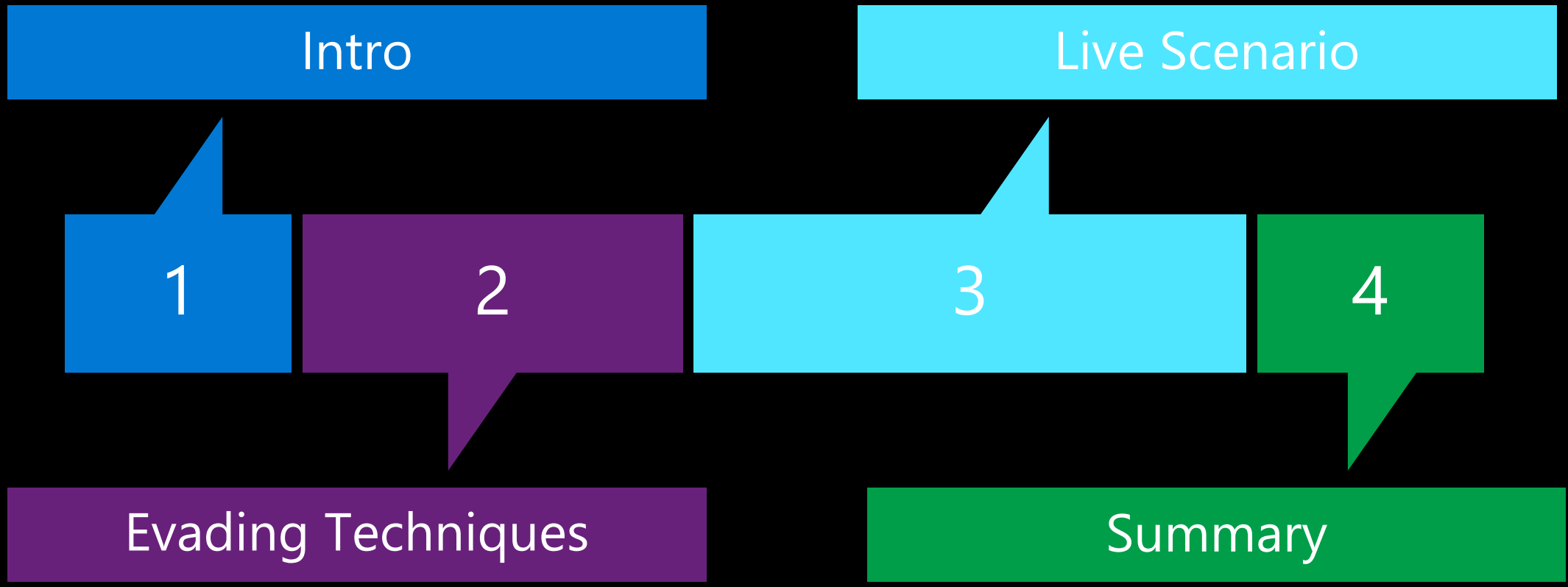
Agenda




We have the best security solutions...


...but the security landscape has changed.

Demo:

SDDL - Can antivirus be stopped?

Techniques for malware discovery

Signature-based

Can rely on the imphash" (uses library/API names and their specific order within the executable)

Behavior-based

Attempts to open, view, delete, and/or modify files
Attempts to format disk drives and other unrecoverable disk operations
Modifications to the logic of executable files, scripts of macros
Modification of critical system settings, such as start-up settings
Scripting of e-mail and instant messaging clients to send executable content
Initiation of network communications

1- Evasion Techniques Used by Malware

Packers and Encryptors

Tools used to compress and encode binary files. Packer will "unpack" the payload into memory and execute it.

Tools and techniques: UPX, PECompact, Armadillo, Encoders (Metasploit), Hyperion

Wrapping

Attaches the malicious payload (the installer or the malware itself) to a legitimate file.

Tools:

2- Evasion Techniques Used by Malware

Obfuscation

Modifies high level or binary code it in a way that does not affect its functionality, but changes its signature.

Tools:

Anti-debugging

Prevents a binary from being analyzed in an emulated environments such security sandbox etc.

Examples: ZeroAccess, sleep function.

Reflective PE Loader

- Custom code
- User Mode Loaders

Executable is extracted and decrypted in memory

Code is loaded and executed dynamically

In Powershell.exe – not every module is embedded – they can be created and loaded during the execution

In Win32API: Custom code mimics LoadLibrary()

Interesting: During the compilation, that's what helps us:

```
CompilerParameters.CompilerOptions =
"/platform:x64";
```

Demo:

Custom Reflective PE Loader - CQPELoader

Demo:

Execution through the debugger

3- Evasion Techniques Used by Malware

Targeting

Used to:

Attack a specific part of a system (IE, Firefox etc.), and act as one (Create Remote Thread etc.)

Detect specific settings (VMWare, Process Explorer running etc.) to prevent analysis.

Typical examples are:

Do not run if network card is Microsoft Corporation

Do not run if wireshark.exe is working

Do not run if windbg.exe is running

Demo:

Sample malware analysis

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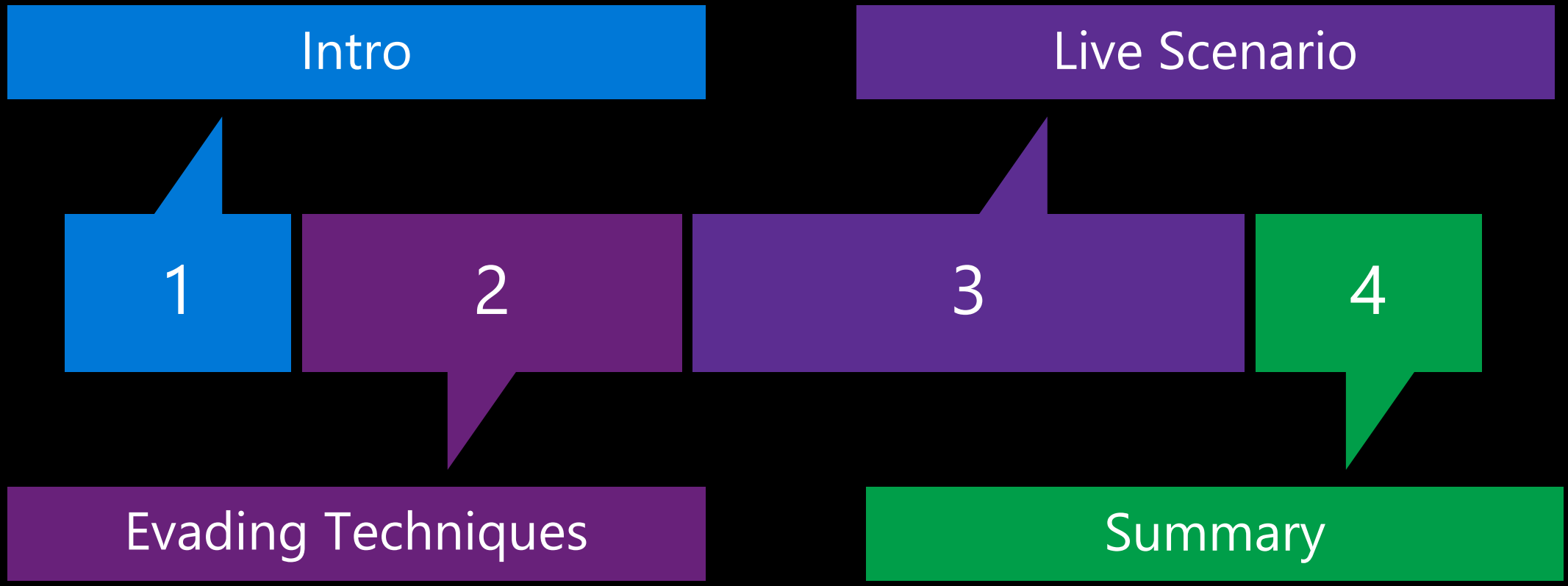

Demo:
Life scenario

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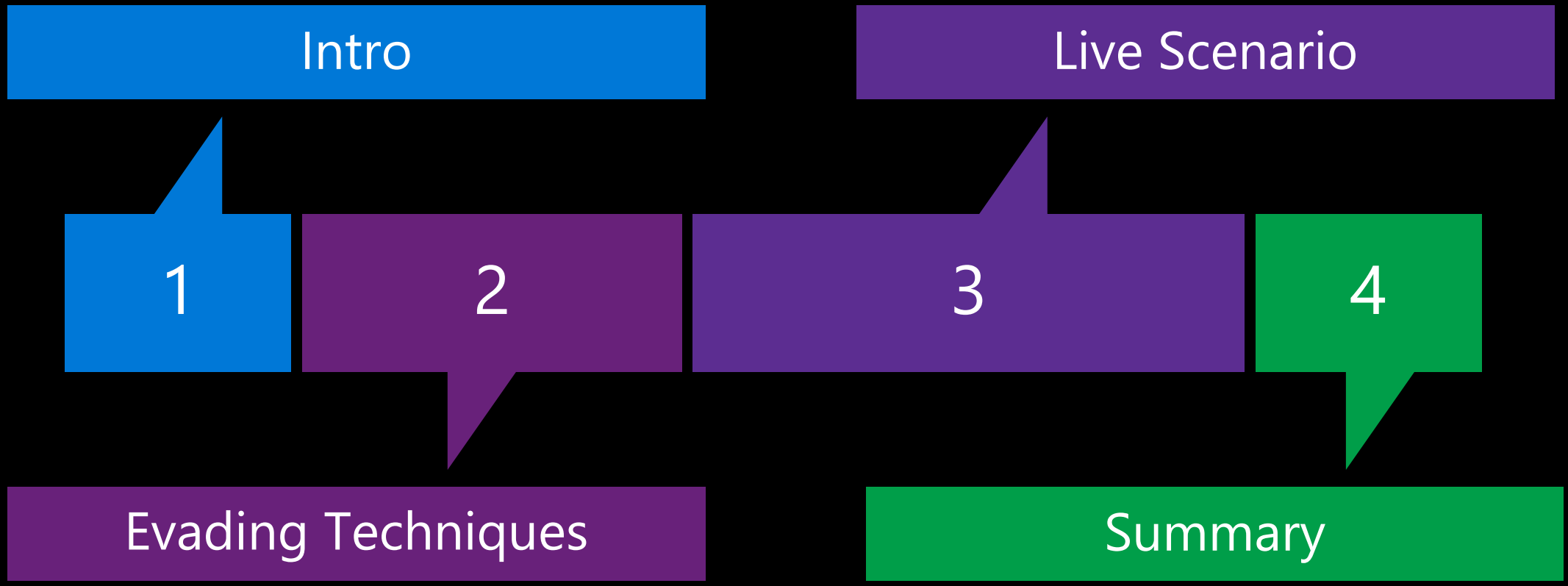

Summary: Bypassing techniques and mitigations

1. The only cure is a **_complete_** code execution prevention
2. Anti-Exploit solutions make a lot of sense
3. Sysmon
4. At the end it is a matter of budged and price
5. Code execution prevention solutions are often misconfigured

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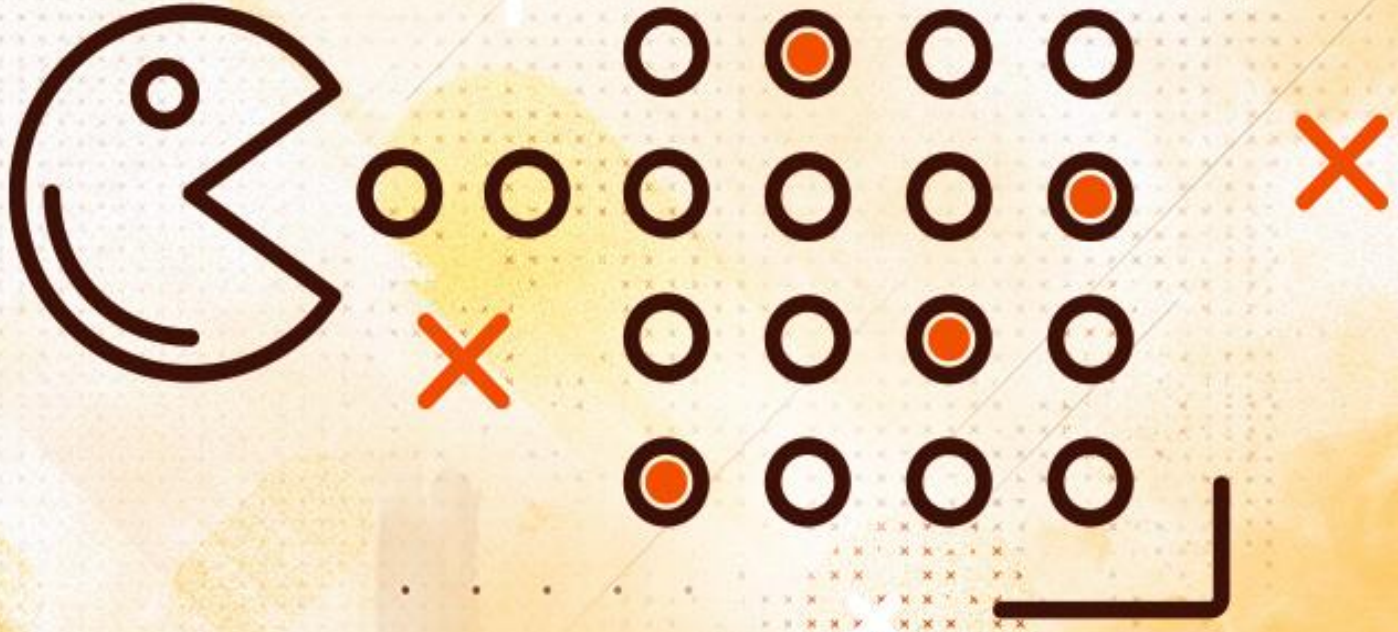

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