Microsoft | CQURE ACADEMY

Defense Against the Dark Arts:

Securing hybrid work against known vulnerabilities and attacks in 2021

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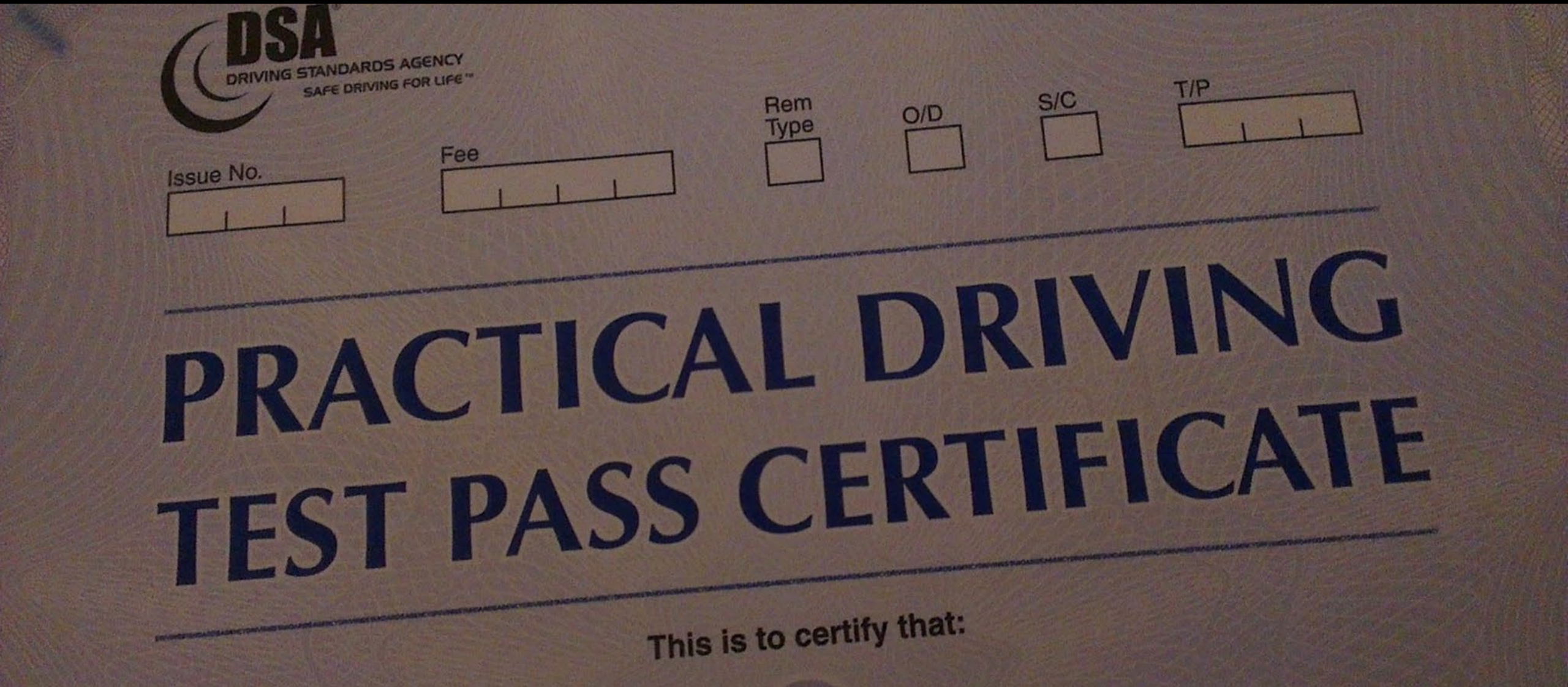
Awareness >> Behavior >> Culture

Each organization processing sensitive data must aim for a responsible security culture.

Awareness comes with experience

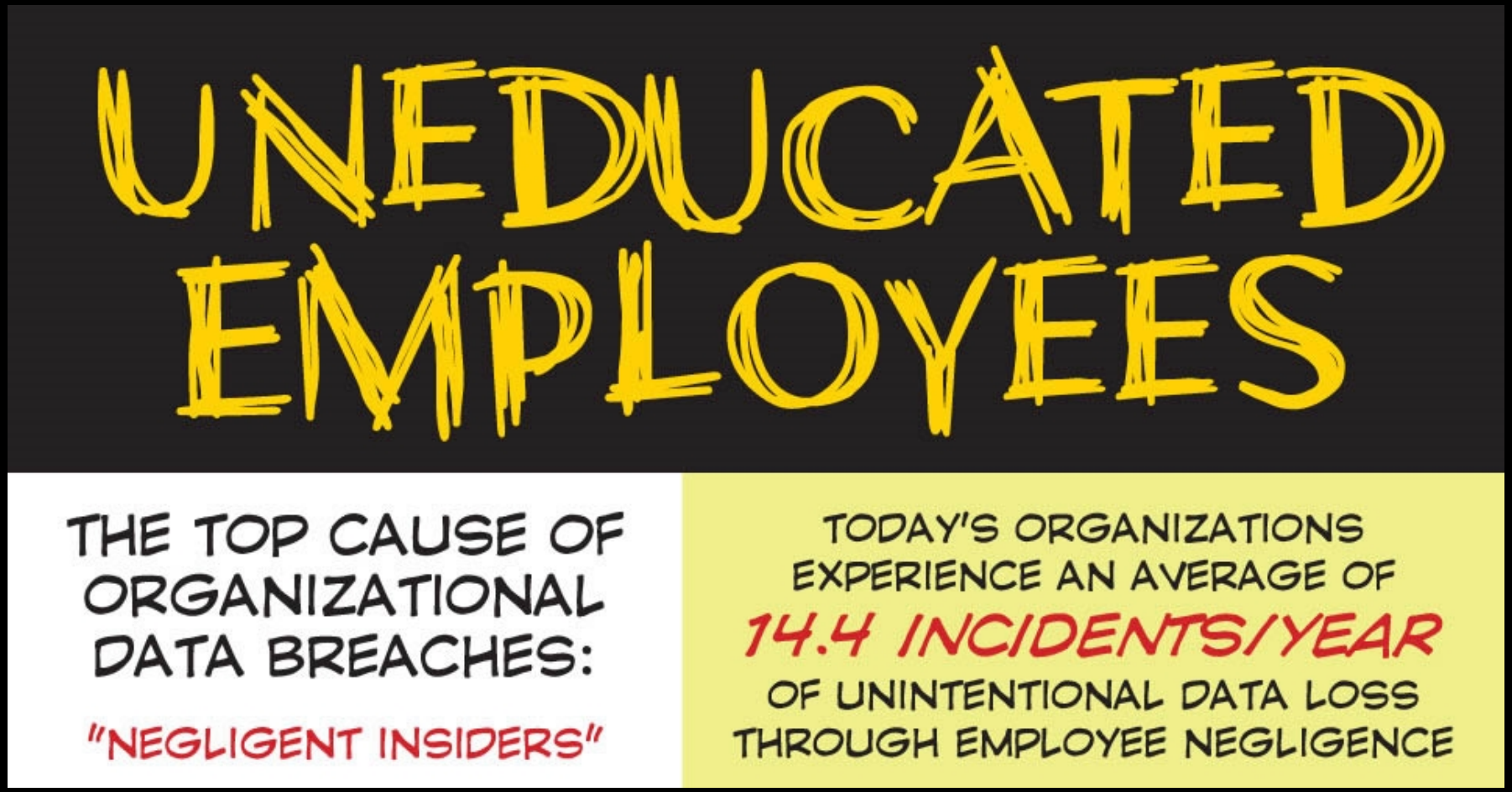


Behavior comes with awareness

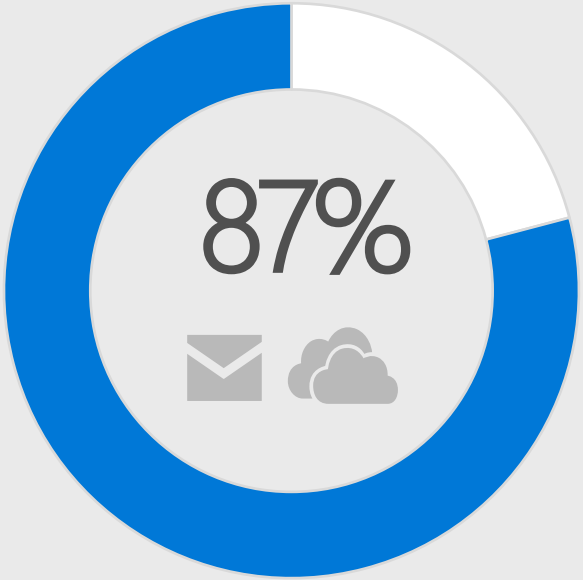
Culture comes with understanding

Culture comes with understanding

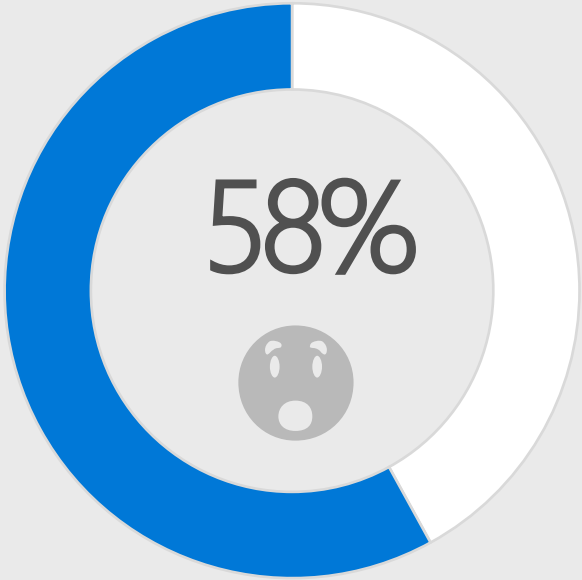
Did you know that one of the main reasons for information loss are...



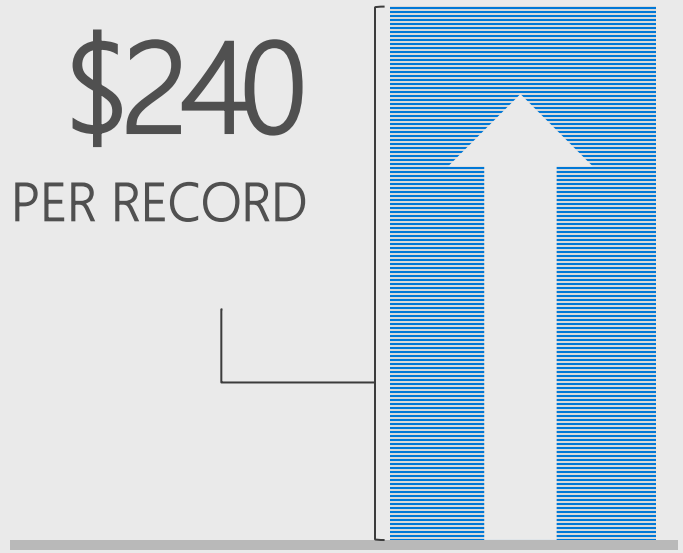
Data Leakage



...of senior managers admit to **regularly** uploading work files to a personal email or cloud account[1]



Have accidentally sent sensitive information to the **wrong person**[1]



Average per record **cost of a data breach** across all industries[2]

[1]Stroz Friedberg, "On The Pulse: Information Security In American Business," 2013

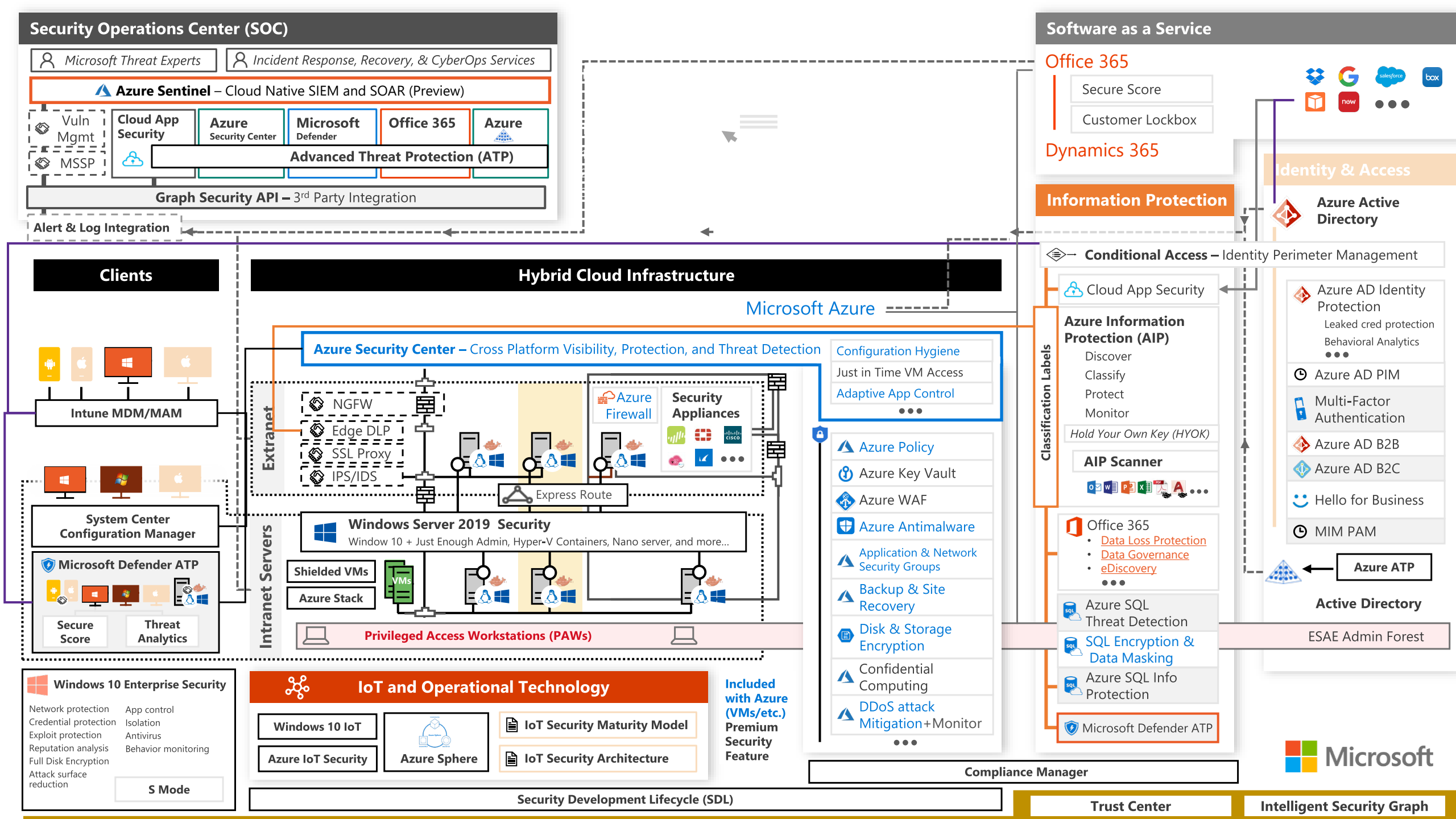
[2]HIPPA Secure Now, "A look at the cost of healthcare data breaches," Art Gross, March 30, 2012


We have the best security solutions...


...but the security landscape has changed.

Cybersecurity Ventures predicts there will be additional 3.5 million cybersecurity job openings by 2021

*Source: Cybersecurity Ventures


Security Operations Center (SOC)
Microsoft Threat Experts
Incident Response, Recovery, & CyberOps Services
Azure Sentinel – Cloud Native SIEM and SOAR (Preview)
Vuln Mgmt
MSSP
Cloud App Security
Azure Security Center
Microsoft Defender
Office 365
Azure
Advanced Threat Protection (ATP)
Graph Security API – 3rd Party Integration
Alert & Log Integration
Software as a Service
Office 365
Secure Score
Customer Lockbox
Dynamics 365
Identity & Access
Information Protection
Azure Active Directory
Conditional Access – Identity Perimeter Management
Clients
Hybrid Cloud Infrastructure
Microsoft Azure
Cloud App Security
Azure AD Identity Protection
Leaked cred protection
Behavioral Analytics
Azure AD PIM
Multi-Factor Authentication
Azure AD B2B
Azure AD B2C
Hello for Business
MIM PAM
Azure Information Protection (AIP)
Discover
Classify
Protect
Monitor
Hold Your Own Key (HYOK)
AIP Scanner
Classification Labels
Azure Security Center – Cross Platform Visibility, Protection, and Threat Detection
Configuration Hygiene
Just in Time VM Access
Adaptive App Control
Intune MDM/MAM
Extranet
NGFW
Edge DLP
SSL Proxy
IPS/IDS
Azure Firewall
Security Appliances
Express Route
Azure Policy
Azure Key Vault
Azure WAF
Azure Antimalware
Application & Network Security Groups
Backup & Site Recovery
Disk & Storage Encryption
Confidential Computing
DDoS attack Mitigation+Monitor
Office 365
Data Loss Protection
Data Governance
eDiscovery
Azure ATP
Active Directory
System Center Configuration Manager
Microsoft Defender ATP
Secure Score
Threat Analytics
Intranet Servers
Windows Server 2019 Security
Window 10 + Just Enough Admin, Hyper-V Containers, Nano server, and more...
Shielded VMs
Azure Stack
VMs
Azure SQL Threat Detection
SQL Encryption & Data Masking
Azure SQL Info Protection
Microsoft Defender ATP
Privileged Access Workstations (PAWs)
ESAE Admin Forest
Windows 10 Enterprise Security
Network protection
Credential protection
Exploit protection
Reputation analysis
Full Disk Encryption
Attack surface reduction
App control
Isolation
Antivirus
Behavior monitoring
S Mode
IoT and Operational Technology
Windows 10 IoT
Azure IoT Security
Azure Sphere
IoT Security Maturity Model
IoT Security Architecture
Included with Azure (VMs/etc.) Premium Security Feature
Compliance Manager
Security Development Lifecycle (SDL)
Trust Center
Intelligent Security Graph
Microsoft

"THERE ARE TWO KINDS OF BIG COMPANIES, THOSE WHO'VE BEEN HACKED, AND THOSE WHO DON'T KNOW THEY'VE BEEN HACKED."

-JAMES COMEY, FBI DIRECTOR

200+

Median number of days attackers are present on a victims network before detection

80

Days after detection to full recovery

$3 Trillion

Impact of lost productivity and growth

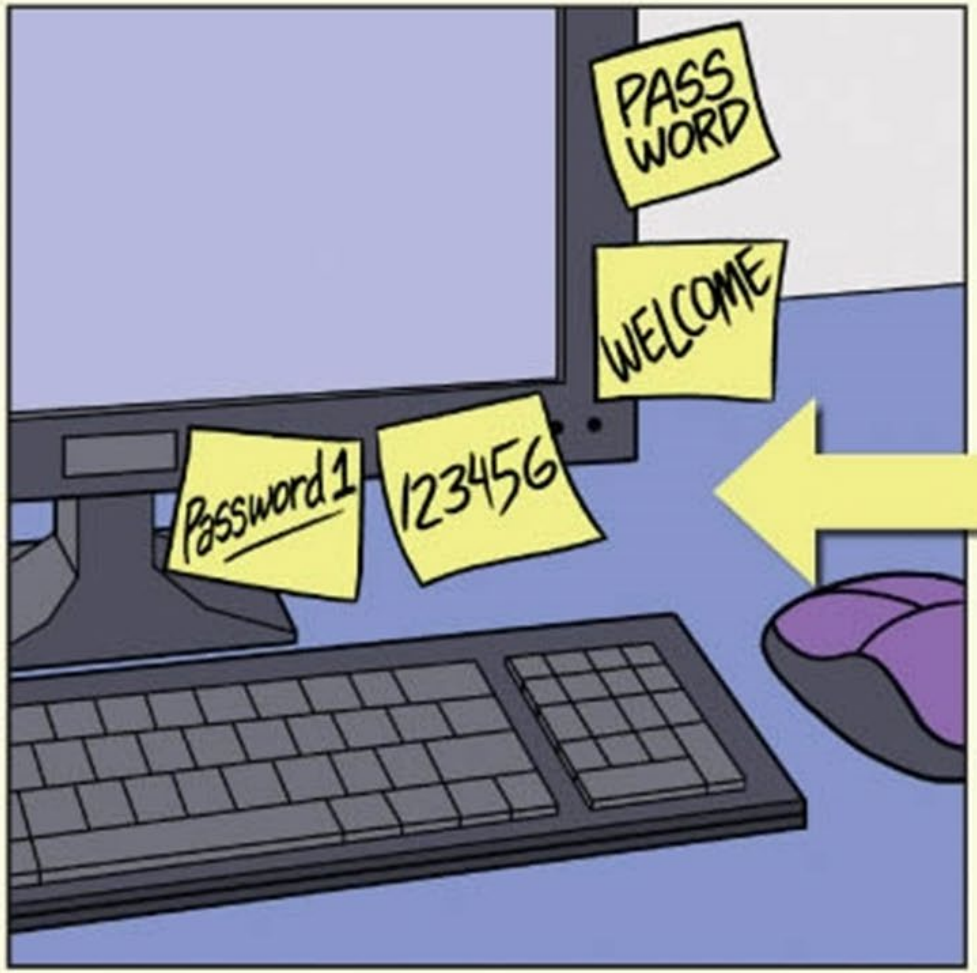
$3.5 Million

Average cost of a data breach (15% YoY increase)

7 Security Issues that just should not happen

CQURE

Here comes the 1st issue…



#1: PATHETIC PASSWORDS

15%

IN APPROXIMATELY 15% OF PHYSICAL SECURITY TESTS PERFORMED AT CLIENT SITES WRITTEN PASSWORDS WERE FOUND ON AND AROUND USER WORKSTATIONS

THE MOST COMMON CORPORATE PASSWORD IS Password1 BECAUSE IT JUST BARELY MEETS THE MINIMUM COMPLEXITY REQUIREMENTS OF ACTIVE DIRECTORY FOR LENGTH, CAPITALIZATION AND NUMERICAL FIGURES

#2: PEEPING ROM

WORKERS SURVEYED THAT SAY THEY HAVE BEEN ABLE TO SNEAK A PEEK AT A CO-WORKER'S OR STRANGER'S WORK STATION IN THE WORKPLACE OR A PUBLIC PLACE

71%

ONE IN THREE WORKERS LEAVE THEIR COMPUTERS LOGGED ON TO NETWORK RESOURCES AND UNLOCKED WHEN THEY ARE AWAY FROM THEIR DESK

26.4% *OF MALWARE* IS KEY LOGGER OR APPLICATION-SPECIFIC — WHICH OFTEN REQUIRES DETAILED KNOWLEDGE OF OR PHYSICAL ACCESS TO A TARGETED SYSTEM

Bootkey:

Class names for keys from HKLM\SYSTEM\CCS\Control\Lsa

SAM/NTDS.dit
(MD4 Hashes)
C:\windows\system32\config
C:\windows\system32\NTDS

LSA Secrets
(Service Accounts)
HKLM\SECURITY\Policy\Secrets

MSDCC2
(Cached Logon Data)
HKLM\SECURITY\Cache

$MACHINE.ACC
(SYSTEM's Clear Text Password)

DPAPI_SYSTEM (Master Keys)
HKLM\SECURITY\Policy\Secrets

More information: http://cqureacademy.com/blog

Classic Data Protection API

- Based on the following components:

Password, data blob, entropy

- Is not prone to password resets!

Protects from outsiders when being in offline access
Effectively protects users data

- Stores the password history

You need to be able to get access to some of your passwords from the past

Conclusion: OS greatly helps us to protect secrets

Classic DPAPI Flow: getting the system´s secrets (easy)

Cached Logons: It used to be like this...

Windows 2003 / XP

The encryption algorithm is RC4.
The hash is used to verify authentication is calculated as follows:

```
DCC1 = MD4(MD4(Unicode(password)) .
LowerUnicode(username))
is
DCC1 = MD4(hashNTLM . LowerUnicode(username))
```

Usage in the attack

Before the attacks facilitated by pass-the-hash, we can only rejoice the "salting" by the username.

There are a number pre-computed tables for users as Administrator facilitating attacks on these hashes.

Cached Logons

Windows Vista / 2008 +

The encryption algorithm is AES128.

The hash is used to verify authentication is calculated as follows:

MSDCC2 = PBKDF2(HMAC-SHA1, Iterations, DCC1, LowerUnicode(username))

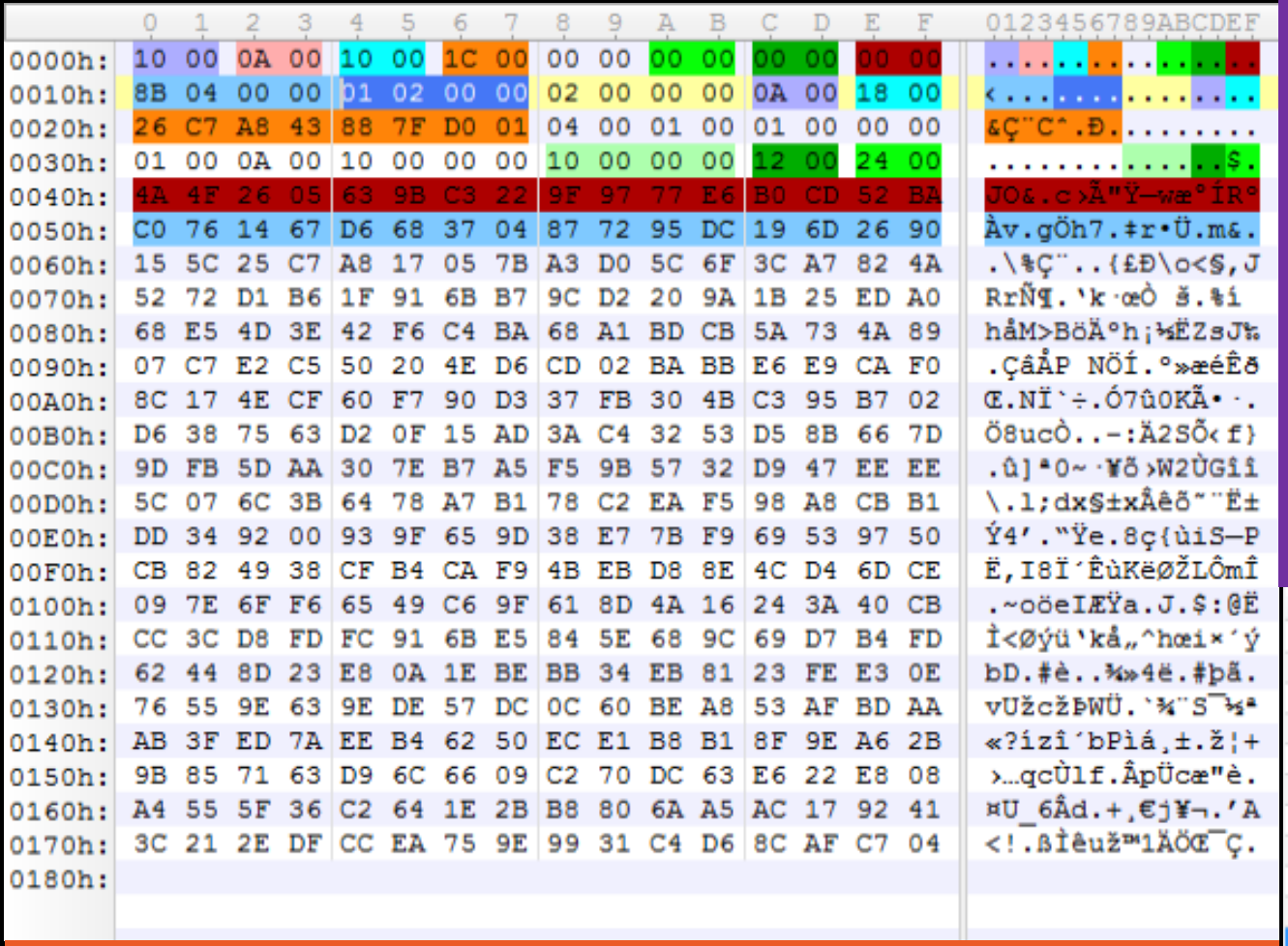
with DCC 1 calculated in the same way as for 2003 / XP.

Usage in the attack

There is actually not much of a difference with XP / 2003!
No additional salting.

PBKDF2 introduced a new variable: the number of iterations SHA1 with the same salt as before (username).

Sysmon stores a hash base



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	0123456789ABCDEF
0000h:	10	00	0A	00	10	00	1C	00	00	00	00	00	00	00	00	00	.....
0010h:	8B	04	00	00	01	02	00	00	02	00	00	00	0A	00	18	00	‹.....
0020h:	26	C7	A8	43	88	7F	D0	01	04	00	01	00	01	00	00	00	&Ç¨Cˆ.Ð.....
0030h:	01	00	0A	00	10	00	00	00	10	00	00	00	12	00	24	00	.....$.
0040h:	4A	4F	26	05	63	9B	C3	22	9F	97	77	E6	B0	CD	52	BA	JO&.c›Ã"Ÿ—wæ°ÍR°
0050h:	C0	76	14	67	D6	68	37	04	87	72	95	DC	19	6D	26	90	Àv.gÖh7.‡r•Ü.m&.
0060h:	15	5C	25	C7	A8	17	05	7B	A3	D0	5C	6F	3C	A7	82	4A	.\%Ç¨..{£Ð\o<§,J
0070h:	52	72	D1	B6	1F	91	6B	B7	9C	D2	20	9A	1B	25	ED	A0	RrÑ¶.'k·œÒ š.%í
0080h:	68	E5	4D	3E	42	F6	C4	BA	68	A1	BD	CB	5A	73	4A	89	håM>BöÄºh¡½ËZsJ‰
0090h:	07	C7	E2	C5	50	20	4E	D6	CD	02	BA	BB	E6	E9	CA	F0	.ÇâÅP NÖÍ.º»æéÊð
00A0h:	8C	17	4E	CF	60	F7	90	D3	37	FB	30	4B	C3	95	B7	02	Œ.NÏ`÷.Ó7û0KÃ•·.
00B0h:	D6	38	75	63	D2	0F	15	AD	3A	C4	32	53	D5	8B	66	7D	Ö8ucÒ..-:Ä2SÕ‹f}
00C0h:	9D	FB	5D	AA	30	7E	B7	A5	F5	9B	57	32	D9	47	EE	EE	.û]ª0~·¥õ›W2ÙGîî
00D0h:	5C	07	6C	3B	64	78	A7	B1	78	C2	EA	F5	98	A8	CB	B1	\.l;dx§±xÂêõ˜¨Ë±
00E0h:	DD	34	92	00	93	9F	65	9D	38	E7	7B	F9	69	53	97	50	Ý4'.“Ÿe.8ç{ùiS—P
00F0h:	CB	82	49	38	CF	B4	CA	F9	4B	EB	D8	8E	4C	D4	6D	CE	Ë‚I8Ï´ÊùKëØŽLÔmÎ
0100h:	09	7E	6F	F6	65	49	C6	9F	61	8D	4A	16	24	3A	40	CB	.~oöeIÆŸa.J.$:@Ë
0110h:	CC	3C	D8	FD	FC	91	6B	E5	84	5E	68	9C	69	D7	B4	FD	Ì<Øýü'kå„^hœi×´ý
0120h:	62	44	8D	23	E8	0A	1E	BE	BB	34	EB	81	23	FE	E3	0E	bD.#è..¾»4ë.#þã.
0130h:	76	55	9E	63	9E	DE	57	DC	0C	60	BE	A8	53	AF	BD	AA	vUžcžÞWÜ.`¾¨S¯½ª
0140h:	AB	3F	ED	7A	EE	B4	62	50	EC	E1	B8	B1	8F	9E	A6	2B	«?ízî´bPìá¸±.ž¦+
0150h:	9B	85	71	63	D9	6C	66	09	C2	70	DC	63	E6	22	E8	08	›…qcÙlf.ÂpÜcæ"è.
0160h:	A4	55	5F	36	C2	64	1E	2B	B8	80	6A	A5	AC	17	92	41	¤U_6Âd.+¸€j¥¬.'A
0170h:	3C	21	2E	DF	CC	EA	75	9E	99	31	C4	D6	8C	AF	C7	04	<!.ßÌêuž™1ÄÖŒ¯Ç.
0180h:																	

Encrypted Cached Credentials: Legend

Name	Value	Start	Size	Color	Comment
struct Header h		0h	96	Fg: Bg:	
ushort uname_len	16	0h	2	Fg: Bg:	
ushort domain_len	10	2h	2	Fg: Bg:	
ushort mail_nick_len	16	4h	2	Fg: Bg:	
ushort cn_len	28	6h	2	Fg: Bg:	
ushort u1	0	8h	2	Fg: Bg:	
ushort logon_script_len	0	Ah	2	Fg: Bg:	
ushort profile_path_len	0	Ch	2	Fg: Bg:	
ushort home_dir_len	0	Eh	2	Fg: Bg:	
uint user_sid	1163	10h	4	Fg: Bg:	
uint primary_group_id	513	14h	4	Fg: Bg:	
uint u2	2	18h	4	Fg: Bg:	
ushort group_sids_len	10	1Ch	2	Fg: Bg:	
ushort domain_netbios_name...	24	1Eh	2	Fg: Bg:	
FILETIME last_local_logon	04/25/2015 18:47:22	20h	8	Fg: Bg:	
ushort u3	4	28h	2	Fg: Bg:	
ushort u4	1	2Ah	2	Fg: Bg:	
uint u5	1	2Ch	4	Fg: Bg:	
ushort u6	1	30h	2	Fg: Bg:	
ushort u7	10	32h	2	Fg: Bg:	
uint u8	16	34h	4	Fg: Bg:	
uint u9	16	38h	4	Fg: Bg:	
ushort domain_name_len	18	3Ch	2	Fg: Bg:	
ushort email_len	36	3Eh	2	Fg: Bg:	
byte iv[16]	JO&|c›Ã"Ÿ—wæ°ÍR°	40h	16	Fg: Bg:	

Encrypted Cached Credentials

DK = PBKDF2(PRF, Password, Salt, c, dkLen)

Microsoft's implementation: MSDCC2= PBKDF2(HMAC-SHA1, DCC1, username, 10240, 16)

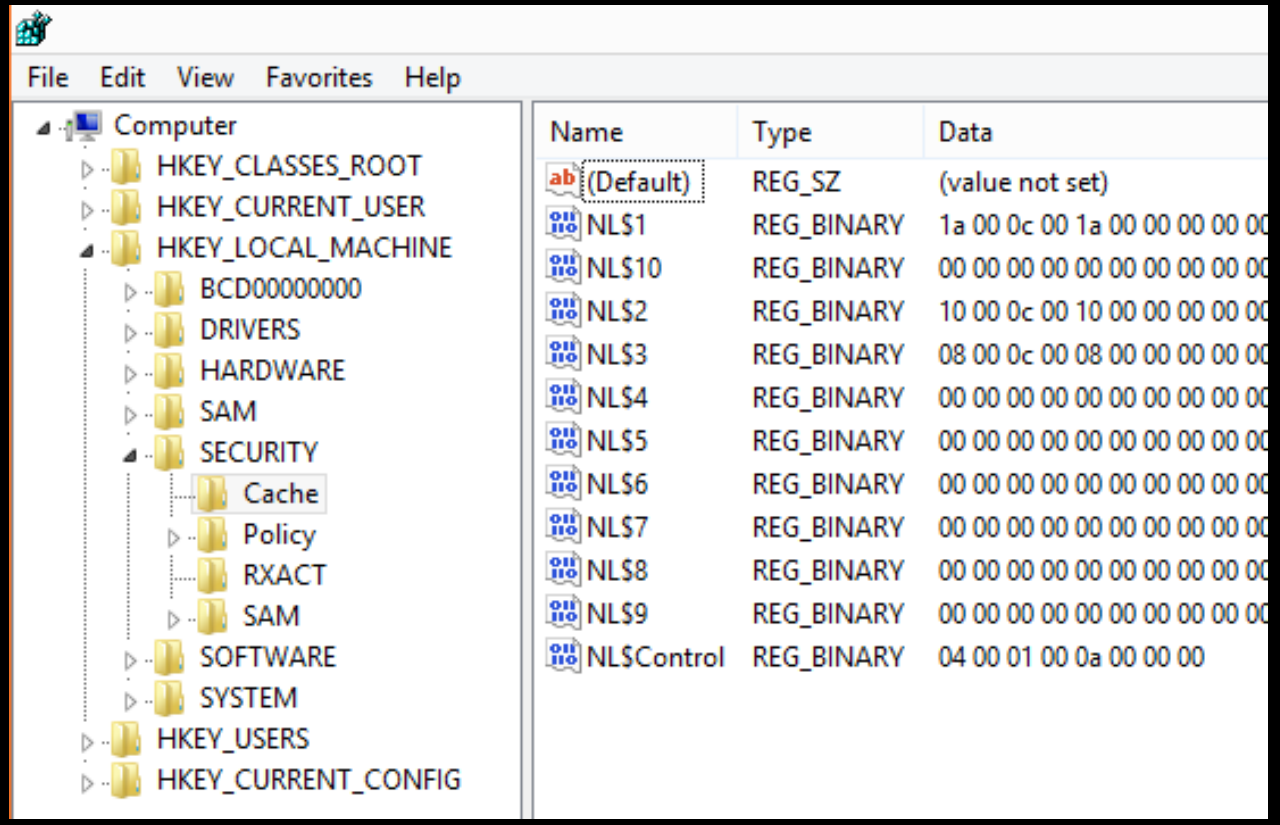
Cached Logons: Iterations

The number of iterations in PBKDF2, it is configurable through the registry:

HKEY_LOCAL_MACHINE\SECURITY\Cache DWORD (32) NL$IterationCount

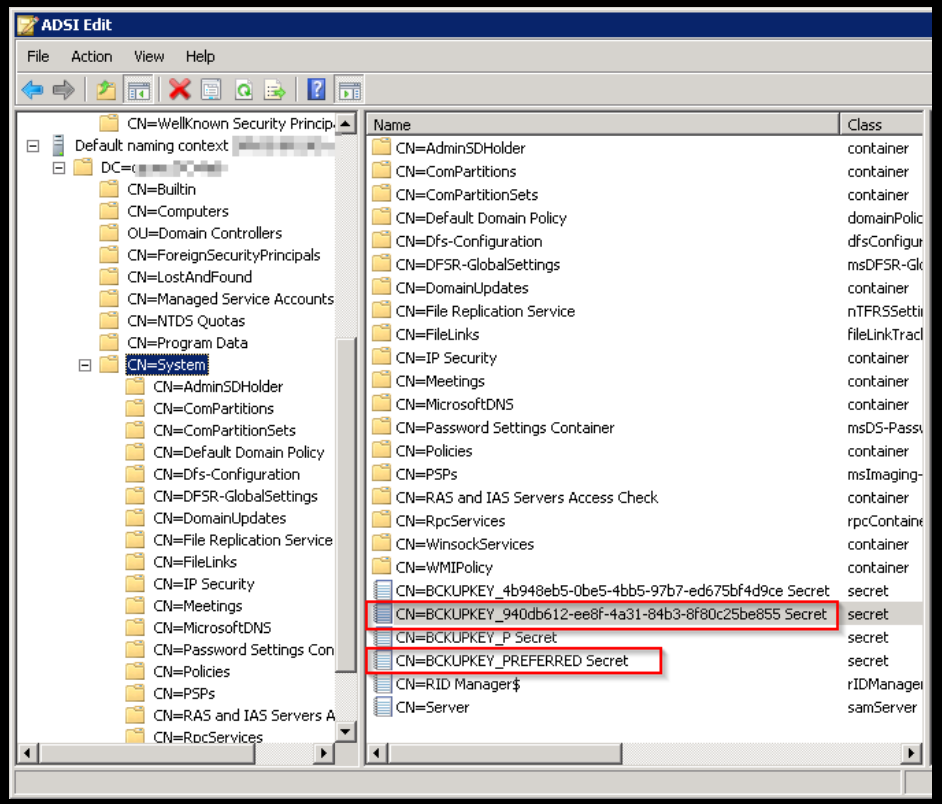
If the number is less than 10240, it is a multiplier by 1024 (20 therefore gives 20480 iterations)

If the number is greater than 10240, it is the number of iterations (rounded to 1024)



Classic DPAPI Flow: getting the user´s secrets

Retrieving Golden Key from LSA – CQURE's way



AD secret? HOW?!

? ? ? ? ? ? ? ?

LSASS.EXE MEMORY

LSASRV.DLL

G$BCKUPKEY_PREFERRED

G$BCKUPKEY_940db612-ee8f-4a31-84b3-8f80c25be855

LsaRetrievePrivateData()

RSA private/public key pair

CQLsassSecretsDumper

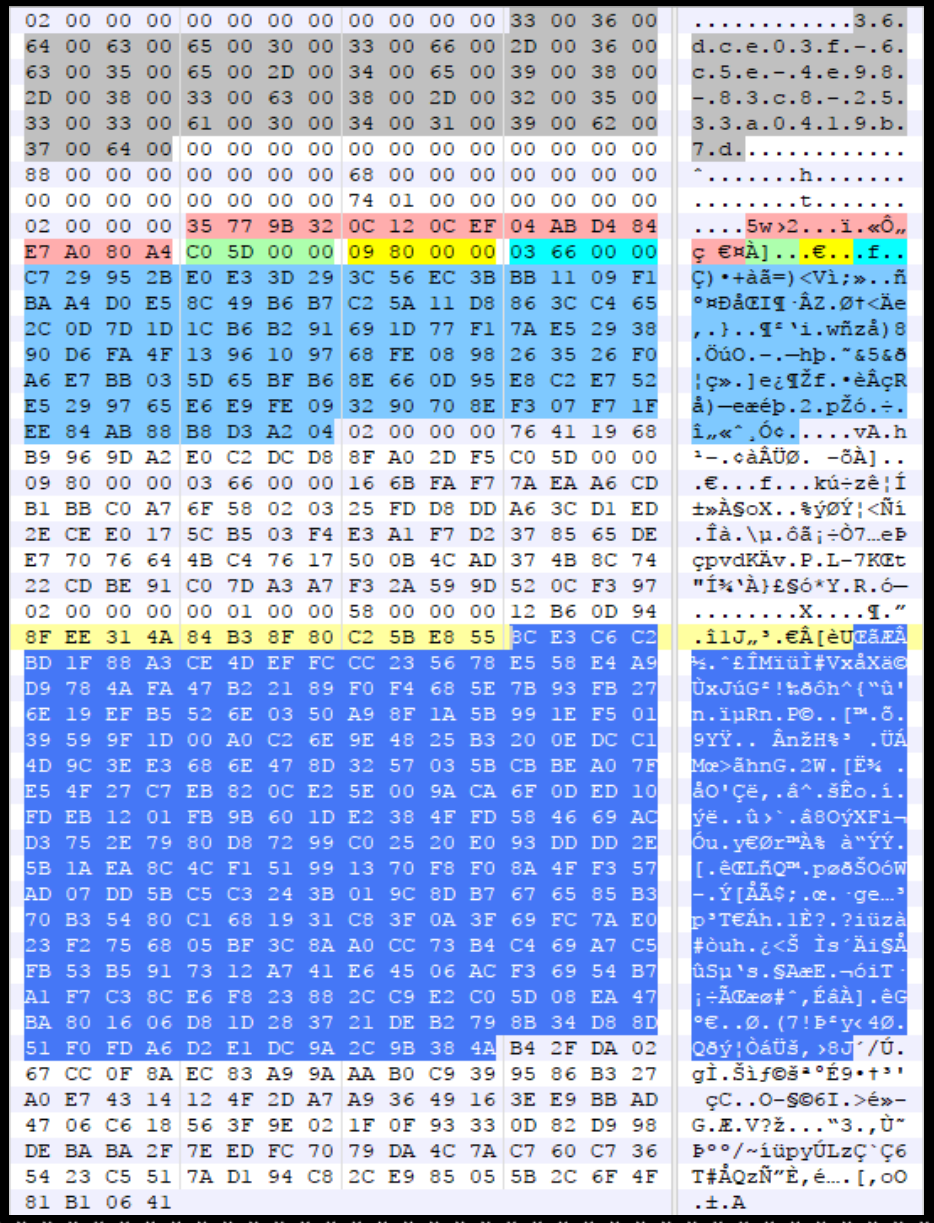
GoldenKey.pfx

CQURE

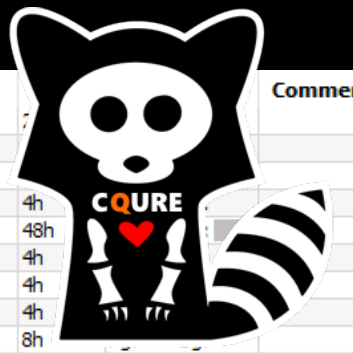
DPAPI-AD: How did we do it?

DomainKey contains some
GUID and
256-byte len secret – RSA??

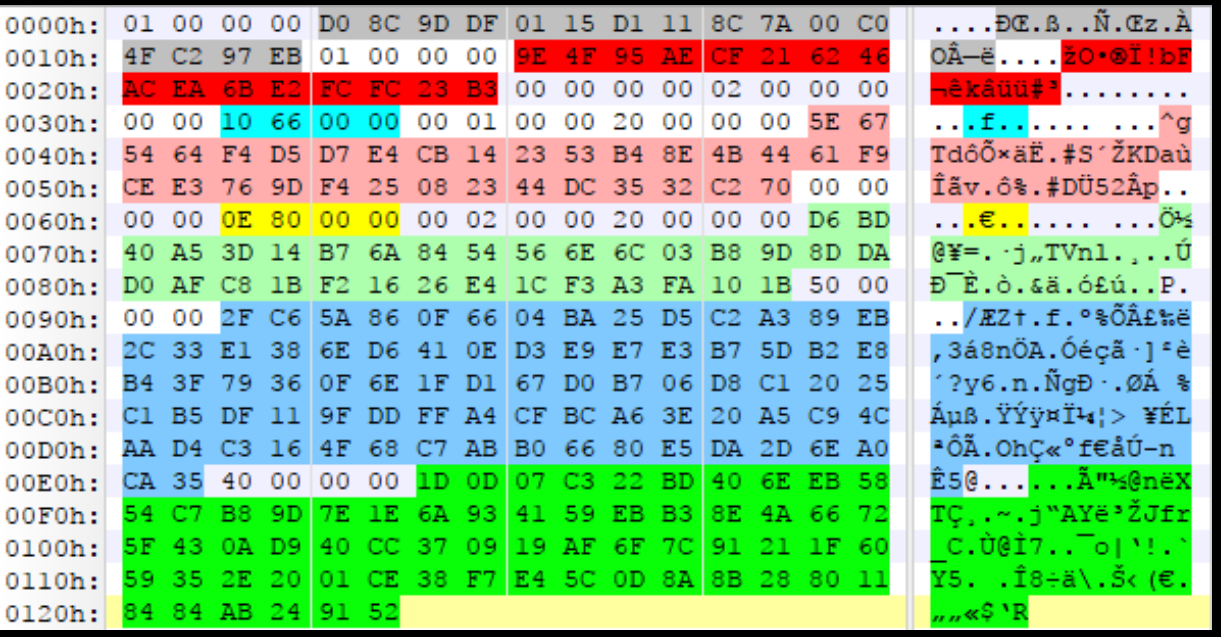
Dude, look in the AD...



Name	Value	Start		Comment
struct MasterKeyFile mkf		0h		
uint version	2	0h		
uint unknown1	0	4h		
uint unknown2	0	8h	4h	
wchar_t guid[36]	36dce03f-6c5e-4e98-83c8-2533a0419b7d	Ch	48h	
uint unknown3	0	54h	4h	
uint unknown4	0	58h	4h	
uint policy	0	5Ch	4h	
quad masterkeyLen	136	60h	8h	
quad backupkeyLen	104	68h	8h	Fg: Bg:
quad credhistLen	0	70h	8h	Fg: Bg:
quad domainkeyLen	372	78h	8h	Fg: Bg:
struct MasterKey masterkey		80h	88h	Fg: Bg:
uint version	2	80h	4h	Fg: Bg:
byte iv[16]	5w›2□□□i□«Ô„ç €¤	84h	10h	Fg: Bg:
uint rounds	24000	94h	4h	Fg: Bg:
uint hashAlgo	32777	98h	4h	Fg: Bg:
uint cipherAlgo	26115	9Ch	4h	Fg: Bg:
byte cipherText[104]	Ç)•+àã=)<Vì;»□ ñº¤ÐåŒI¶·ÂZ □Ø†<Ä...	A0h	68h	Fg: Bg:
struct MasterKey backupkey		108h	68h	Fg: Bg:
struct DomainKey domainkey		170h	174h	Fg: Bg:
uint version	2	170h	4h	Fg: Bg:
uint secretLen	256	174h	4h	Fg: Bg:
uint accessCheckLen	88	178h	4h	Fg: Bg:
struct GUID guidKey	940db612-ee8f-4a31-84b3-8f80c25be855	17Ch	10h	Fg: Bg:
byte encryptedSecret[256]	ŒãÆÅ½□ˆ£ÍMïüÍ#VxåXä©ÙxJúG²!‰ðô...	18Ch	100h	Fg: Bg:
byte accessCheck[88]	´/Ú□gÌ□Šìƒ©šª°É9•†³' çC□□O-§©6I□...	28Ch	58h	Fg: Bg:



DPAPI in pictures Example: KeePass ProtectedUserKey.bin



0000h:	01	00	00	00	D0	8C	9D	DF	01	15	D1	11	8C	7A	00	C0	....ÐŒ.ß..Ñ.Œz.À
0010h:	4F	C2	97	EB	01	00	00	00	9E	4F	95	AE	CF	21	62	46	OÂ—ë....žO•®Ï!bF
0020h:	AC	EA	6B	E2	FC	FC	23	B3	00	00	00	00	02	00	00	00	¬êkâüü#³........
0030h:	00	00	10	66	00	00	00	01	00	00	20	00	00	00	5E	67	...f.... ....^g
0040h:	54	64	F4	D5	D7	E4	CB	14	23	53	B4	8E	4B	44	61	F9	TdôÕ×äË.#S´ŽKDaù
0050h:	CE	E3	76	9D	F4	25	08	23	44	DC	35	32	C2	70	00	00	Îãv.ô%.#DÜ52Âp..
0060h:	00	00	0E	80	00	00	00	02	00	00	20	00	00	00	D6	BD	...€.... ....Ö½
0070h:	40	A5	3D	14	B7	6A	84	54	56	6E	6C	03	B8	9D	8D	DA	@¥=.·j„TVnl.¸..Ú
0080h:	D0	AF	C8	1B	F2	16	26	E4	1C	F3	A3	FA	10	1B	50	00	Ð¯È.ò.&ä.ó£ú..P.
0090h:	00	00	2F	C6	5A	86	0F	66	04	BA	25	D5	C2	A3	89	EB	../ÆZ†.f.°%ÕÂ£‰ë
00A0h:	2C	33	E1	38	6E	D6	41	0E	D3	E9	E7	E3	B7	5D	B2	E8	,3á8nÖA.Óéçã·]²è
00B0h:	B4	3F	79	36	0F	6E	1F	D1	67	D0	B7	06	D8	C1	20	25	´?y6.n.ÑgÐ·.ØÁ %
00C0h:	C1	B5	DF	11	9F	DD	FF	A4	CF	BC	A6	3E	20	A5	C9	4C	Áµß.ŸÝÿ¤Ï¼¦> ¥ÉL
00D0h:	AA	D4	C3	16	4F	68	C7	AB	B0	66	80	E5	DA	2D	6E	A0	ªÔÃ.OhÇ«°f€åÚ-n
00E0h:	CA	35	40	00	00	00	1D	0D	07	C3	22	BD	40	6E	EB	58	Ê5@.... ...Ã"½@nëX
00F0h:	54	C7	B8	9D	7E	1E	6A	93	41	59	EB	B3	8E	4A	66	72	TÇ¸.~.j“AYë³ŽJfr
0100h:	5F	43	0A	D9	40	CC	37	09	19	AF	6F	7C	91	21	1F	60	_C.Ù@Ì7.. ¯o|'!.`
0110h:	59	35	2E	20	01	CE	38	F7	E4	5C	0D	8A	8B	28	80	11	Y5. .Î8÷ä\.Š‹(€.
0120h:	84	84	AB	24	91	52											„„«$'R

Name	Value	Start	Size	Color	Comment
struct DPAPIBlob blob		0h	126h	Fg: Bg:	
uint version	1	0h	4h	Fg: Bg:	
struct GUID provider	df9d8cd0-1501-11d1-8c7a-00c04fc297eb	4h	10h	Fg: Bg:	
uint mkversion	1	14h	4h	Fg: Bg:	
struct GUID mkguid	ae954f9e-21cf-4662-acea-6be2fcfc23b3	18h	10h	Fg: Bg:	
uint flags	0	28h	4h	Fg: Bg:	
uint descriptionLen	2	2Ch	4h	Fg: Bg:	
wstring description[1]		30h	2h	Fg: Bg:	
uint cipherAlgo	26128	32h	4h	Fg: Bg:	
uint keyLen	256	36h	4h	Fg: Bg:	
uint saltLen	32	3Ah	4h	Fg: Bg:	
byte salt[32]	^gTdôÕ×äË□#S´ŽKDaùÎãv□ô%□#DÜ5...	3Eh	20h	Fg: Bg:	
uint strongLen	0	5Eh	4h	Fg: Bg:	
uint hashAlgo	32782	62h	4h	Fg: Bg:	
uint hashLen	512	66h	4h	Fg: Bg:	
uint hmacLen	32	6Ah	4h	Fg: Bg:	
byte hmac[32]	Ö½@¥=□·j„TVnl□¸□□ÚÐ¯È□ò□&ä□ó...	6Eh	20h	Fg: Bg:	
uint cipherTextLen	80	8Eh	4h	Fg: Bg:	
byte cipherText[80]	/ÆZ†□f□°%ÕÂ£‰ë,3á8nÖA□Óéçã·]²è...	92h	50h	Fg: Bg:	
uint signLen	64	E2h	4h	Fg: Bg:	
byte sign[64]	□ □Ã"½@nëXTÇ¸□~□j"AYë³ŽJfr_C Ù...	E6h	40h	Fg: Bg:	

The master password for KeePass files encrypted & stored as cipherText (80 bytes)

DPAPI blob: Legend

Solution: Privileged Access Management

Administrative / power user access

A privileged user is someone who has administrative access to critical systems

Privileged users have sometimes more access than we think (see: SeBackupRead privilege)

Privileged users have possibility to read SYSTEM and SECURITY hives from the registry

Domain Admins should log on only to the Domain Controllers

Access Monitoring / Effective Access

We need to know about who and where has access to

Access should be role driven

#3: USB STICK UP

OF USERS WHO FIND RANDOM USB STICKS IN A PARKING LOT WILL PLUG THEM INTO THEIR COMPUTERS

ADD THE COMPANY LOGO, AND THAT NUMBER INCREASES TO

OF USERS REPORT HAVING EXPERIENCED A VIRUS INFECTION THROUGH A USB DEVICE

Solution: Whitelisting

Code execution prevention

It is an absolute necessity taking into consideration the current security trends

PowerShell is a new hacking tool

Scripting languages are the biggest threat

Ransomware can be in a form of PowerShell script

Just Enough Administration: PowerShell should be blocked for users and limited for helpdesk to use the necessary commands

It is necessary to know what executes on your servers

Sysmon is perfect for this

AppLocker / DeviceGuard in the audit mode

Scenario

You receive the email about the new voice mail:

You received a voice mail : VOICE548-457-6638.wav (27 KB)
Caller-Id: 548-457-6638
Message-Id: S5VAAC
Email-Id: paula.j@gmail.com

Download and extract the attachment to listen the message.
We have uploaded fax report on dropbox, please use the following link to download your file:

https://www.dropbox.com/meta_dl/eyJzdWJfcGF0aCI6ICIiLCAidGVzdF9saW5rIjogZmFsc2UsICJzZXJ2ZXIiOiAiZGwuZHJvcGJveHVzZXJjb250ZW50LmNvbSIsICJpdGVtX2lkIjogbnVsbCwgImlzX2RpciI6IGZhbHNlLCAidGtleSI6ICJueGxzcWh0MDF5ZnloOHMifQ/AAPQJWOgwKVSIAJCmizztc3dqjAIfdlgyD87Cw0mgJOIxw?dl=1
Sent by Microsoft Exchange Server

What do you do?

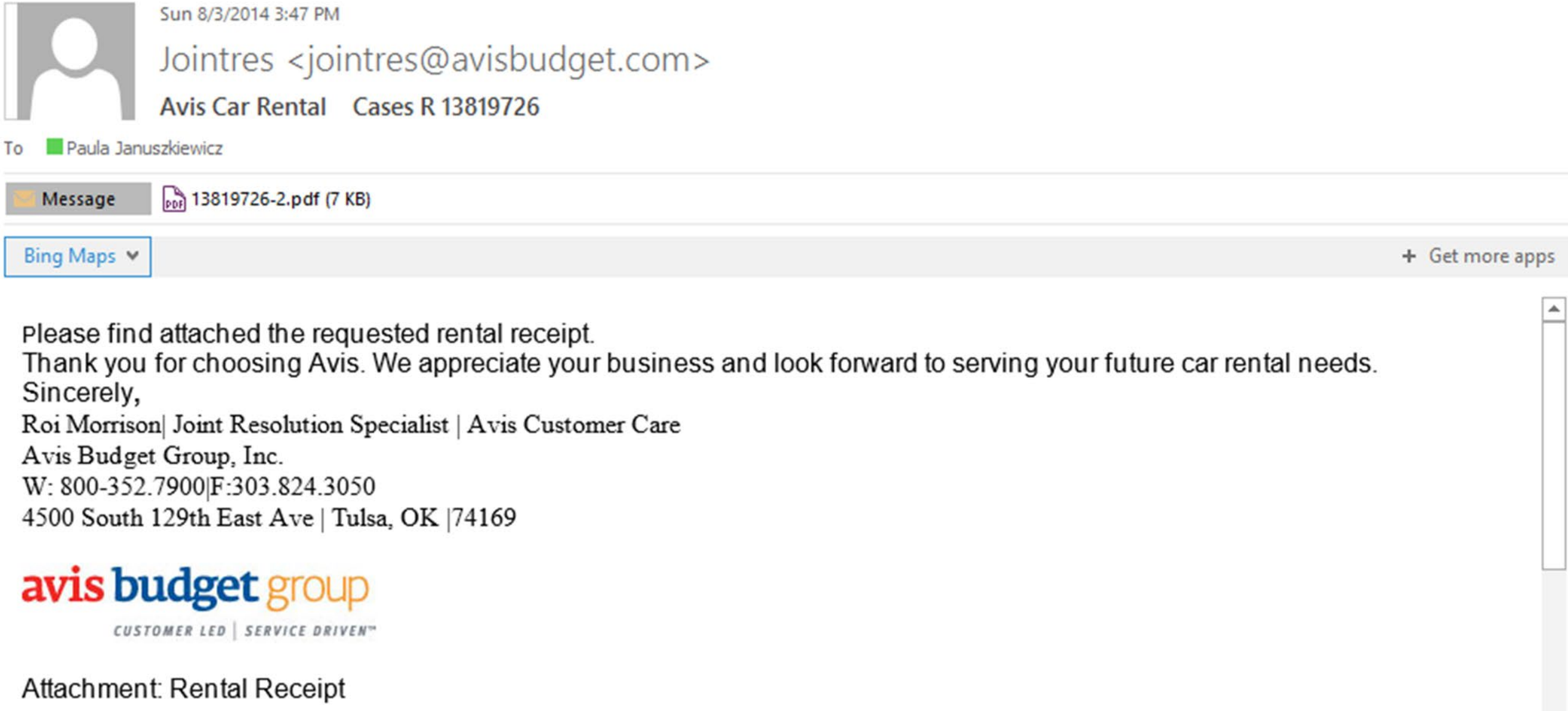
#4: PHISH BITING

69% OF IT SECURITY PROS SAY THEY COME ACROSS PHISHING MESSAGES THAT GET PAST SPAM FILTERS

27% OF IT ORGANIZATIONS HAVE TOP EXECUTIVES OR PRIVILEGED USERS WHO HAVE FALLEN FOR MALICIOUS EMAIL ATTACKS

USERS TRAINED IN AVOIDING PHISHING AND SCAM EMAILS FELL FOR THESE MALICIOUS EMAILS *42% LESS* THAN THOSE WITHOUT TRAINING

Question: Is this a phishing email?



Sun 8/3/2014 3:47 PM

Jointres <jointres@avisbudget.com>

Avis Car Rental Cases R 13819726

To Paula Januszkiewicz

Message 13819726-2.pdf (7 KB)

Bing Maps + Get more apps

Please find attached the requested rental receipt.
Thank you for choosing Avis. We appreciate your business and look forward to serving your future car rental needs.
Sincerely,
Roi Morrison| Joint Resolution Specialist | Avis Customer Care
Avis Budget Group, Inc.
W: 800-352.7900|F:303.824.3050
4500 South 129th East Ave | Tulsa, OK |74169

avis budget group
CUSTOMER LED | SERVICE DRIVEN™

Attachment: Rental Receipt

Attacks happen FAST and are HARD to stop

If an attacker sends an email to 100 people in your company...

...23 people will open it...

...11 people will open the attachment...

...and six will do it in the first hour.

Source: VerizoData Breach Investigations Report

#5: RECKLESS ABANDON

70%

OF USERS DO NOT PASSWORD PROTECT THEIR SMARTPHONES

89%

OF PEOPLE WHO FIND LOST CELL PHONES RUMMAGE THROUGH THE DIGITAL CONTENTS TO LOOK AT SENSITIVE INFORMATION

Classic Data Protection API

- Based on the following components:

Password, data blob, entropy

- Is not prone to password resets!

Protects from outsiders when being in offline access
Effectively protects users data

- Stores the password history

You need to be able to get access to some of your passwords from the past

Conclusion: OS greatly helps us to protect secrets

Solution: Incident Response Plan

Action list

In case of emergency situation: allows to act reasonably and according to the plan

Increases chances that evidence is gathered properly

Allows to define responsibilities for recovery

Discussions provide management with understanding of security

Recovery plan

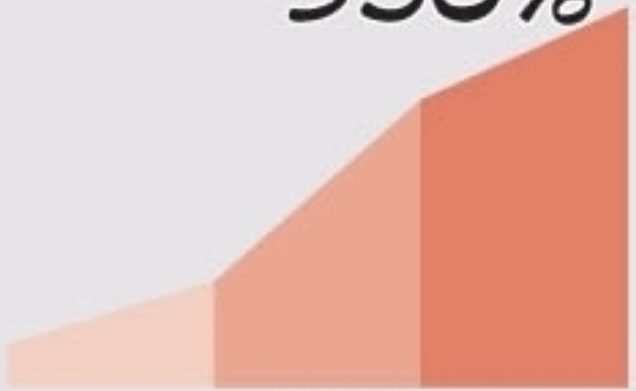
Centralization of the event logs

BYOD management strategy

'Connect and go' approach for better efficiency

#6: HOOKING UP WITH ANOTHER MAN'S WI-FI

BY 2015, THE NUMBER OF WIFI HOTSPOT DEPLOYMENTS WILL INCREASE BY **350%**



ONLY 18 PERCENT OF USERS USE A VPN TOOL WHEN ACCESSING PUBLIC WI-FI

FBI

THE FBI RECENTLY RELEASED AN ALERT TO TRAVELERS WARNING AGAINST AN UPTICK IN MALWARE PASSED OFF AS SOFTWARE UPDATES ON HOTEL INTERNET CONNECTIONS

Lack of SMB Signing (or alternative)

Key learning points:

- ✓ Set SPNs for services to avoid NTLM:

SetSPN –L <your service account for AGPM/SQL/Exch/Custom>

SetSPN –A Servicename/FQDN of hostname/FQDN of domain domain\serviceaccount

- ✓ Reconsider using Kerberos authentication all over

https://technet.microsoft.com/en-us/library/jj865668.aspx

- ✓ Require SPN target name validation

Microsoft network server: Server SPN target name validation level

- ✓ Reconsider turning on SMB Signing
- ✓ Reconsider port filtering
- ✓ Reconsider code execution prevention but do not forget that this attack leverages administrative accounts

SMB2/3 client and SMB2/3 server signing settings

Setting	Group Policy Setting	Registry Key
Required *	Digitally sign communications (always) – Enabled	RequireSecuritySignature = 1
Not Required **	Digitally sign communications (always) – Disabled	RequireSecuritySignature = 0

* The default setting for signing on a Domain Controller (defined via Group Policy) is “Required”.
** The default setting for signing on SMB2 Servers and SMB Clients is “Not Required”.

Effective behavior for SMB2/3:

	Server – Required	Server – Not Required
Client – Required	Signed	Signed
Client – Not Required	Signed*	Not Signed**

* Default for Domain Controller SMB traffic.
** Default for all other SMB traffic.

Allowing unusual code execution

Key learning points:

Common file formats containing malware are:

- ✓ .exe (Executables, GUI, CUI, and all variants like SCR, CPL etc)
- ✓ .dll (Dynamic Link Libraries)
- ✓ .vbs (Script files like JS, JSE, VBS, VBE, PS1, PS2, CHM, BAT, COM, CMD etc)
- ✓ .docm, .xlsm etc. (Office Macro files)
- ✓ *.other (LNK, PDF,* PIF, *etc.)*

If SafeDllSearchMode is enabled, the search order is as follows:

1. The directory from which the application loaded
2. The system directory
3. The 16-bit system directory
4. The Windows directory
5. The current directory
6. The directories that are listed in the PATH environment variable

Old protocols or their default settings

Key learning points:

- ✓ SNMPv3 addresses: user-based system for access control, a means to properly authenticate users, and a method for encrypting SNMP traffic between agent and host
- ✓ SQL issues – TDS provides by default lack of encryption
- ✓ ODBC Driver – check if it has a secure networking layer built into it

NTLMv1 / NTLMv2

- ✓ Security Options in GPO allow to monitor where NTLM is used
- ✓ General direction is to get rid of NTLM

SSL / TLS

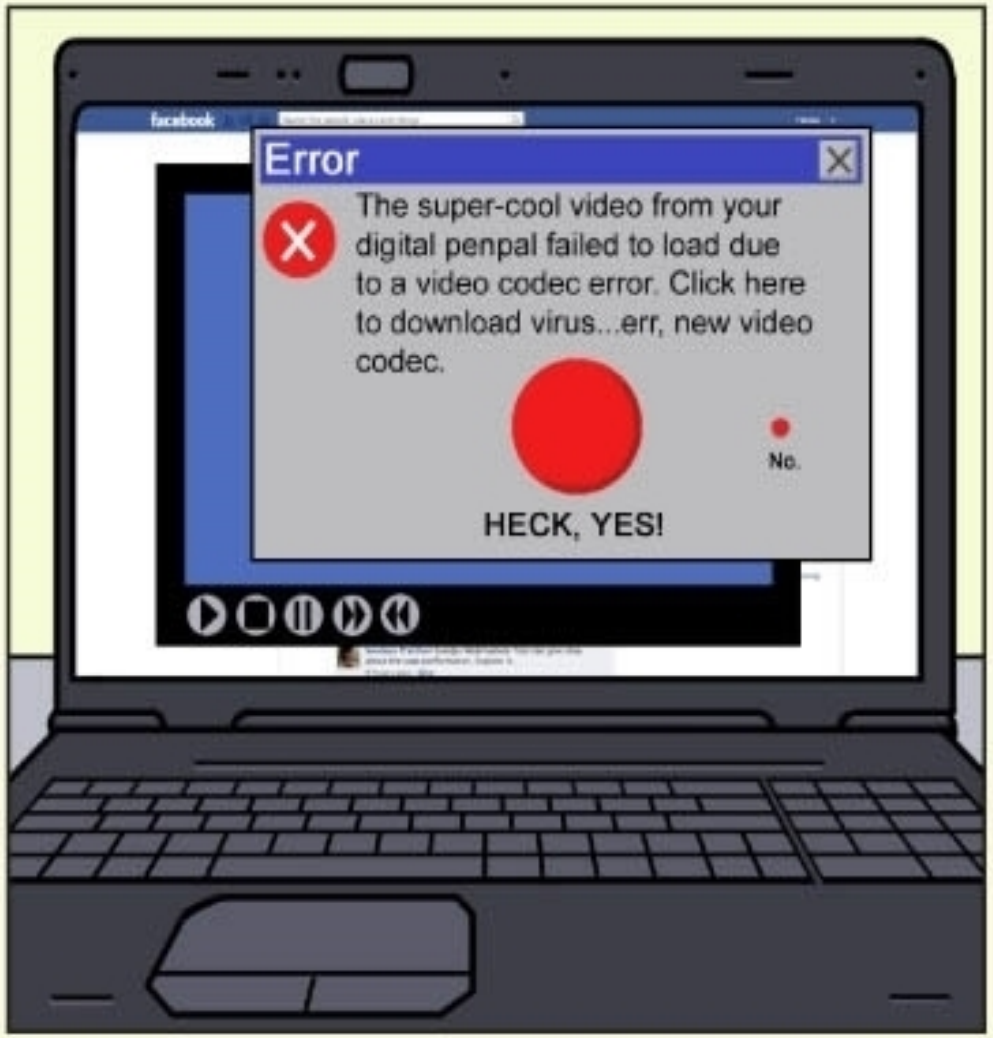
- ✓ TLS v1.3 is still an Internet Draft
- ✓ SSL 2.0 and 3.0 have been deprecated by the IETF (in 2011 and 2015)
- ✓ Disable SSL 2.0 and 3.0, leaving only TLS protocols enabled

Solution: Machine Learning for Threat Protection

- Antivirus solution is not enough
  - Signature and behavioral recognition is not enough too
  - In most cases it is possible to run an unknown code
  - … if not then it is possible to run PowerShell
  - Windows Defender ATP – have a look!

- Modern solutions
  - Are capable of machine learning but it takes time
  - Are quire easy to implement bur require a lot of understanding of what do they actually do

For example: What if we use a custom reflective PE Loader to create and run custom code?



#7: A LITTLE TOO SOCIAL

67% OF YOUNG WORKERS THINK CORPORATE SOCIAL MEDIA POLICIES ARE OUTDATED

70% REGULARLY IGNORE IT POLICIES

52% OF ENTERPRISES HAVE SEEN AN INCREASE OF MALWARE INFECTIONS DUE TO EMPLOYEES' USE OF SOCIAL MEDIA

Solution: Talk *Security* to Employees

Sad facts

Most of the companies we deal with did not have security policies in place that included security awareness education programs.

Management understands risk. IT also understands it. This can be nicely combined together when we use appropriate language.

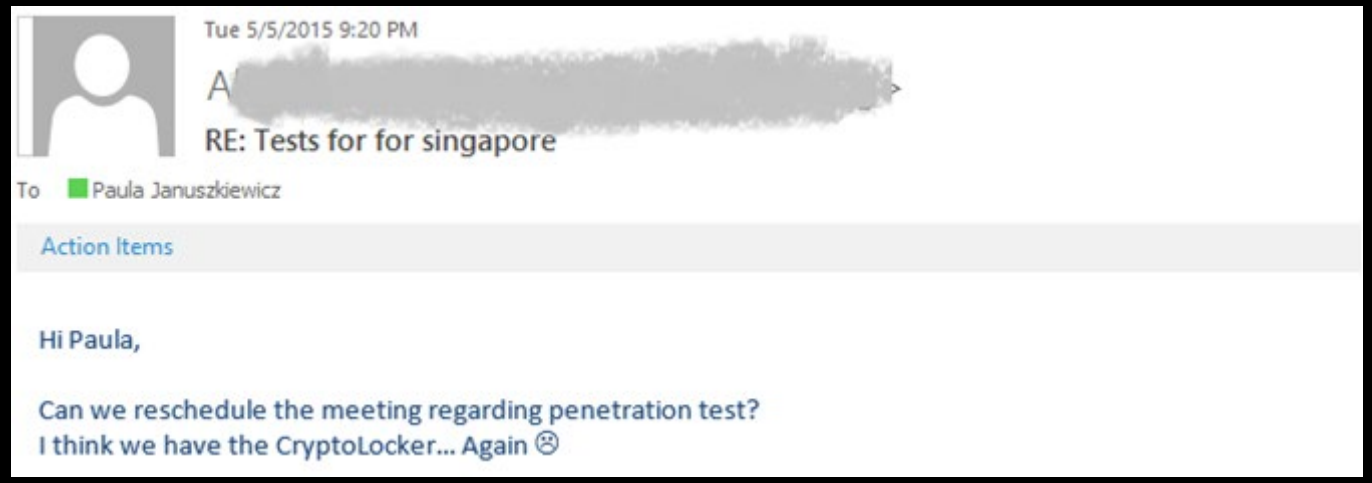


Photo: the New York Times Magazine

Agenda

Security Awareness Idea

Summary

1

2

3

Things to avoid in 2021

Why human factor is so important?

Reason 1: Security is both a Reality and Feeling

For Security Practicioners

Security is a reality based on the mathematical probability of risks

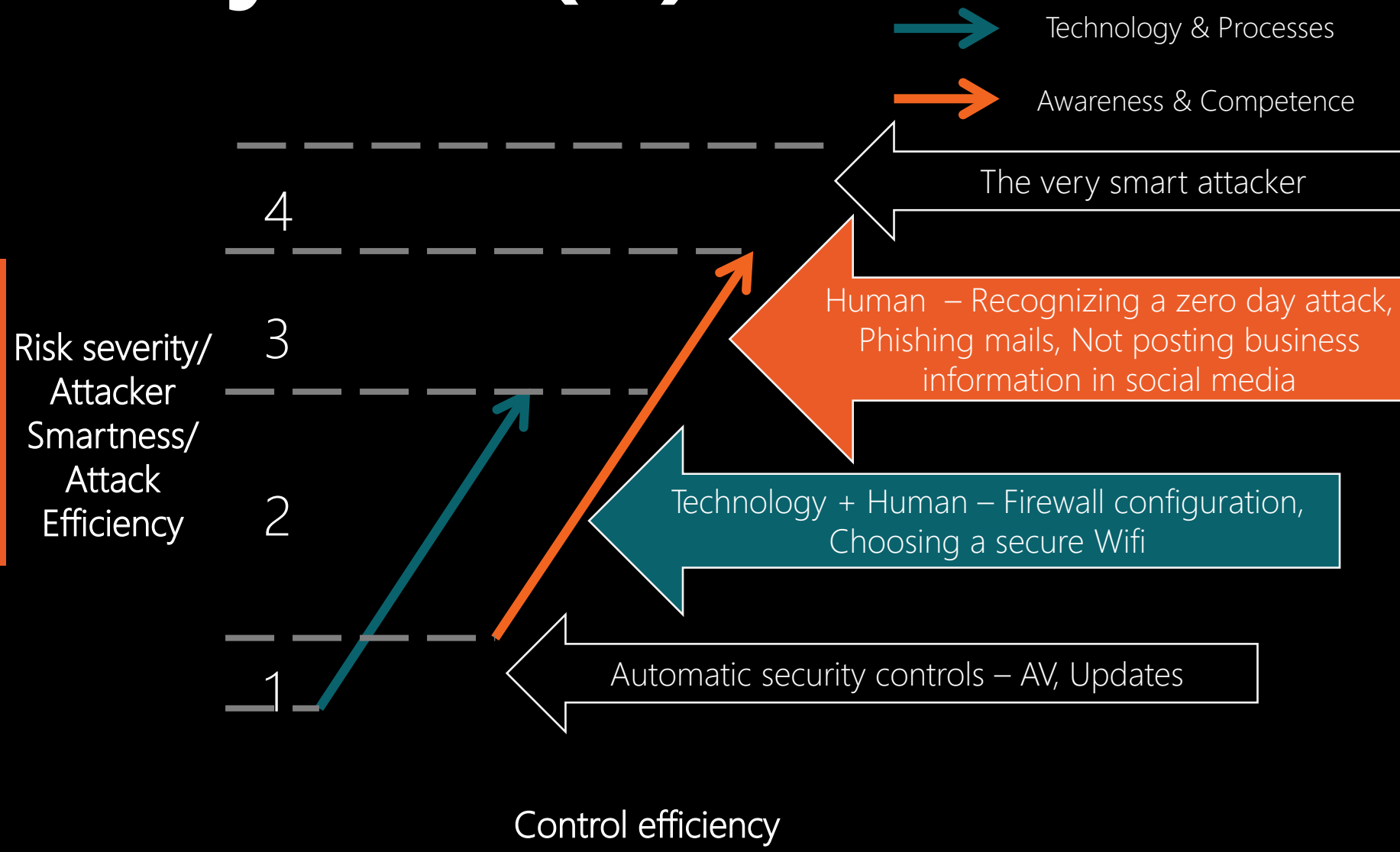
For End User

Security is a feeling

Success lies in influencing the “feeling” of security

Reason 2: Not every attack(er) is that smart

People exaggerate risks that are spectacular or uncommon

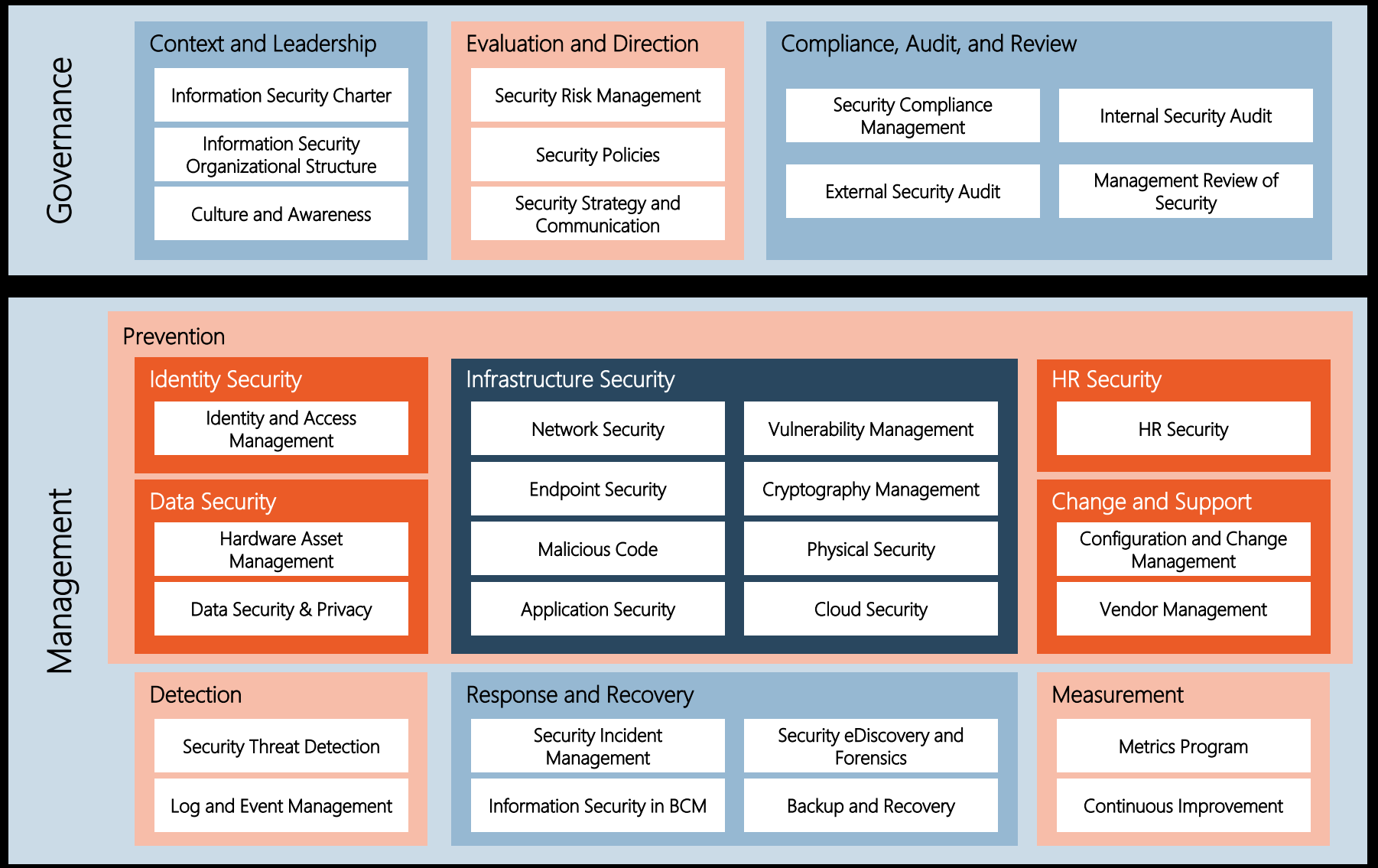


Reason 3: Technology…yes, but humans… of course!

Aircrafts have become more advanced, but does it mean that pilot training requirements have reduced?

Medical technology has become more advanced, but will you choose a hospital for it's machines or the doctors?

A best-of-breed security framework



The 11 key cyber security questions

1. Do we treat cyber security as a business or IT responsibility?
2. Do our security goals align with business priorities?
3. Have we identified and protected our most valuable processes and information?
4. Does our business culture support a secure cyber environment?
5. Do we have the basics right? (For example, access rights, software patching, vulnerability management and data leakage prevention.)
6. Do we focus on security compliance or security capability?
7. Are we certain our third-party partners are securing our most valuable information?
8. Do we regularly evaluate the effectiveness of our security?
9. Are we vigilant and do we monitor our systems and can we prevent breaches?
10. Do we have an organized plan for responding to a security breach?
11. Are we adequately resourced and insured?

Summary: Best Practices

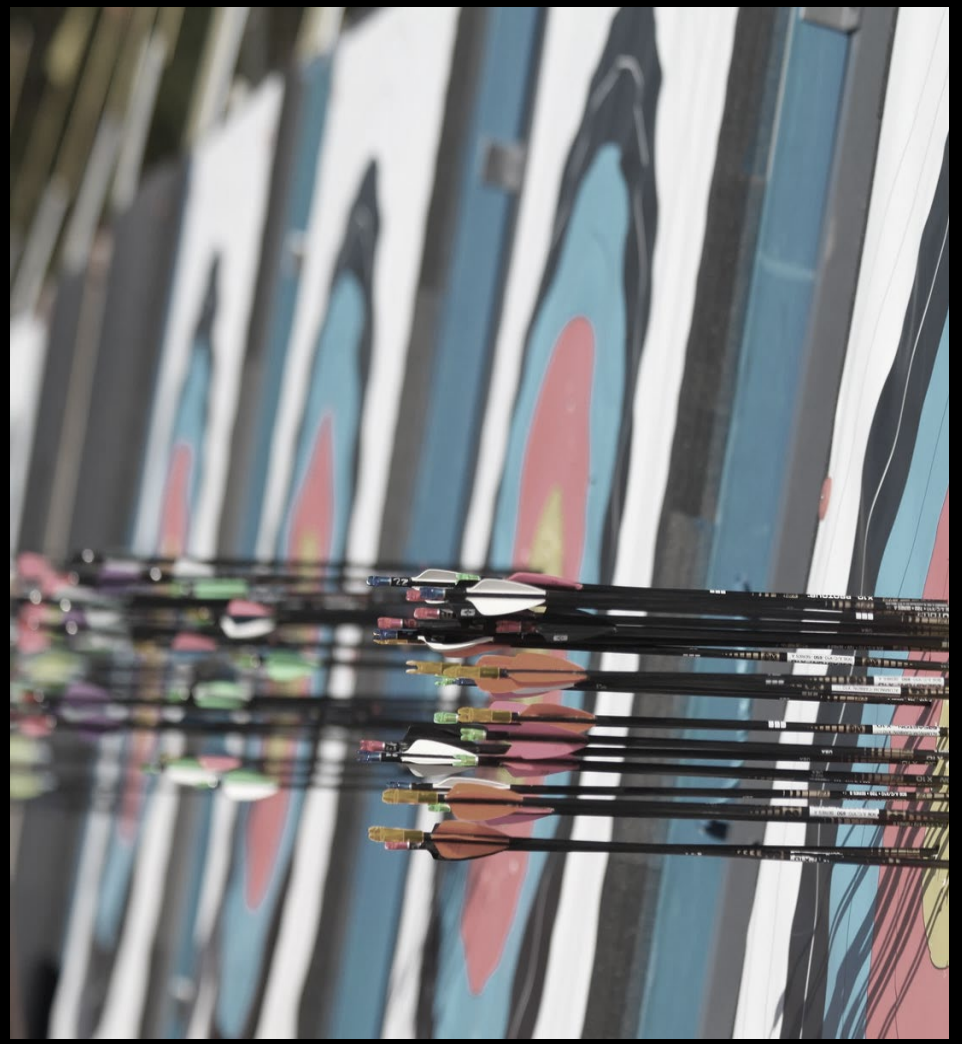
Understanding is the key to security

Continuous vulnerability discovery
Context-Aware Analysis
Prioritization
Remediation and Tracking
Configuration reviews

Put on the Hacker's Shoes

Prevention is the key to success

How can we know what to prevent if we do not know what is the threat?



Additional Resources

Websites

Ars Technica
The Register
The Hacker News
Dark Reading
Krebs on Security
Computer World
Threat Post
Beta News
Tech News World
Tech Crunch
ZDNetSecurity Affairs
Computer Weekly
Network World
SC Magazine
Wired
Schneier on Security

Q&A

Visit our BLOG and discover more about cybersecurity solutions & tools:

https://cqureacademy.com/blog

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Defense Against the Dark Arts:

Securing hybrid work against known vulnerabilities and attacks in 2021

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Thank You