



Faculty of Science



IT-security:

- User Authentication
- Access control
- Identity and Access Management
- Passwords
- Biometrics
- Social engineering

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DIKU 15. september 2023



OS Security and Access Control



IAM - ACL

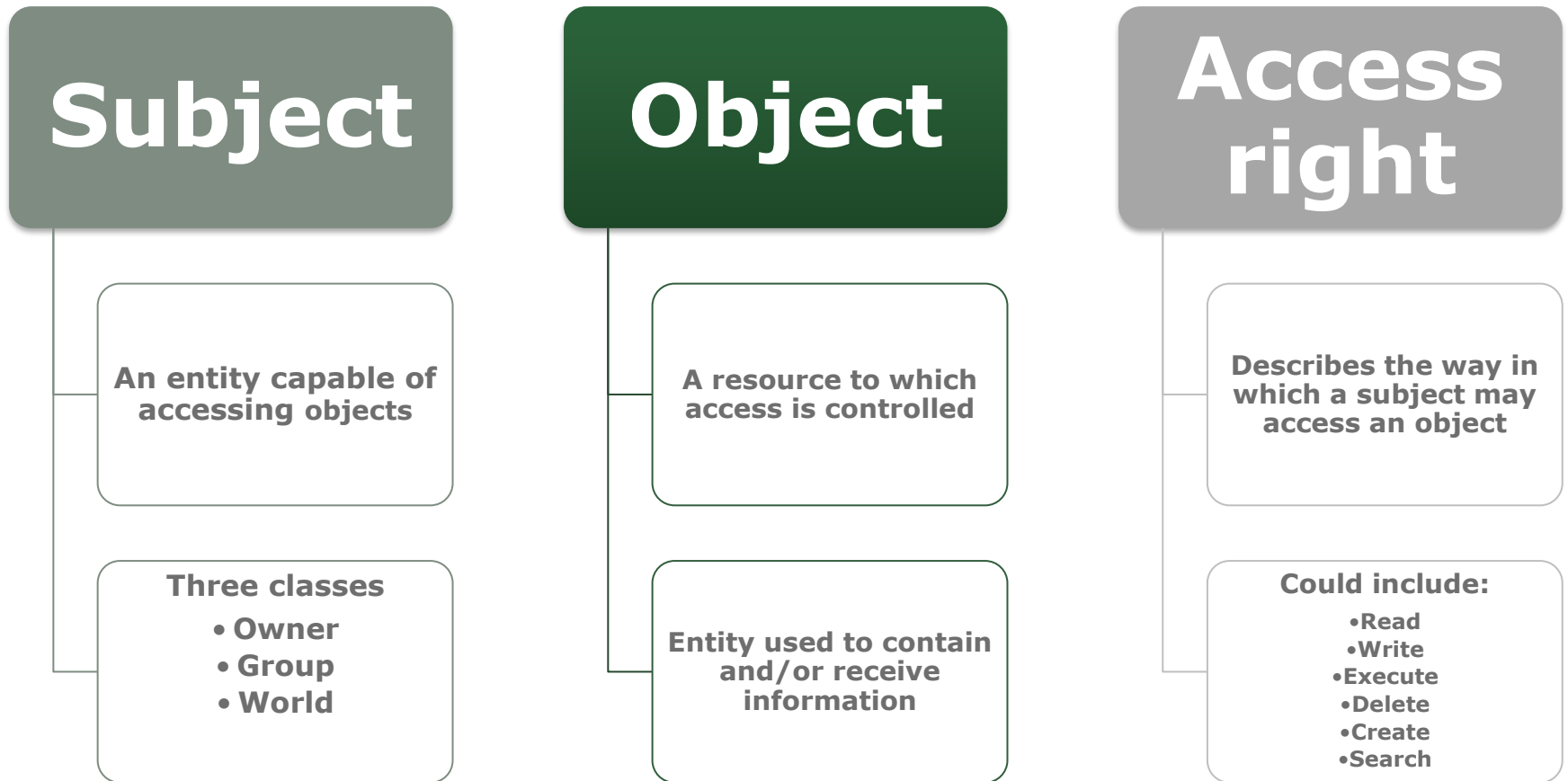
An access control list (ACL) is a list of permissions attached to an object.

An ACL specifies which users or system processes are granted access to objects, as well as what operations are allowed on given objects

Alice: read,write; Bob: read



Subjects, Objects, and Access Rights



Access Control Policies

Discretionary access control (DAC)

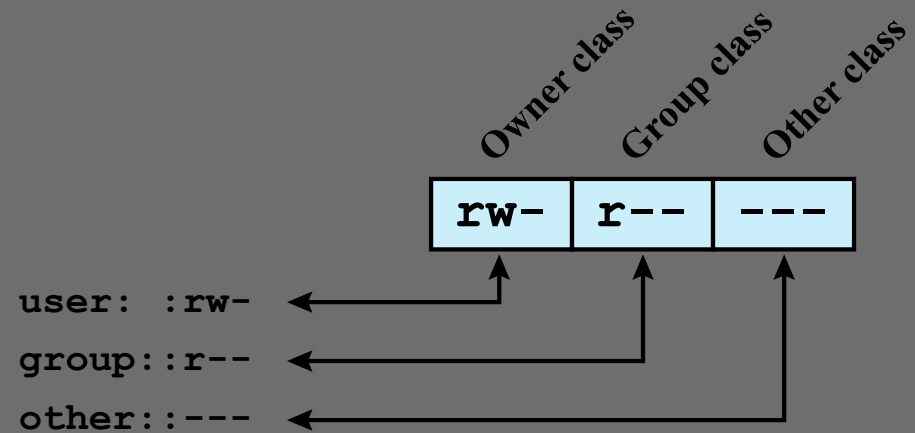
- Controls access based on the identity of the requestor and on access rules (authorizations) stating what requestors are (or are not) allowed to do

Mandatory access control (MAC)

- Controls access based on comparing security labels with security clearances

UNIX - File Access Control

- Unique user identification number (user ID)
- Member of a primary group identified by a group ID
- Belongs to a specific group
- 12 protection bits
 - Specify read, write, and execute permission for the owner of the file, members of the group and all other users
- The owner ID, group ID, and protection bits are part of the file's inode

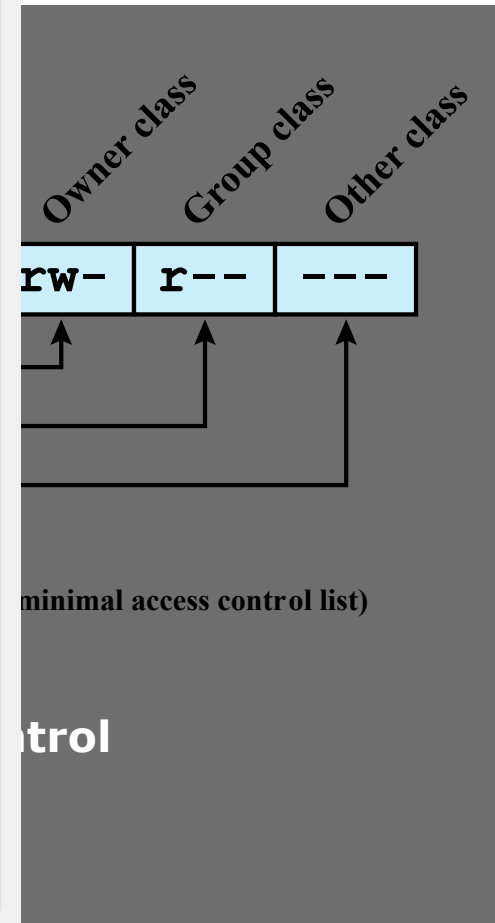
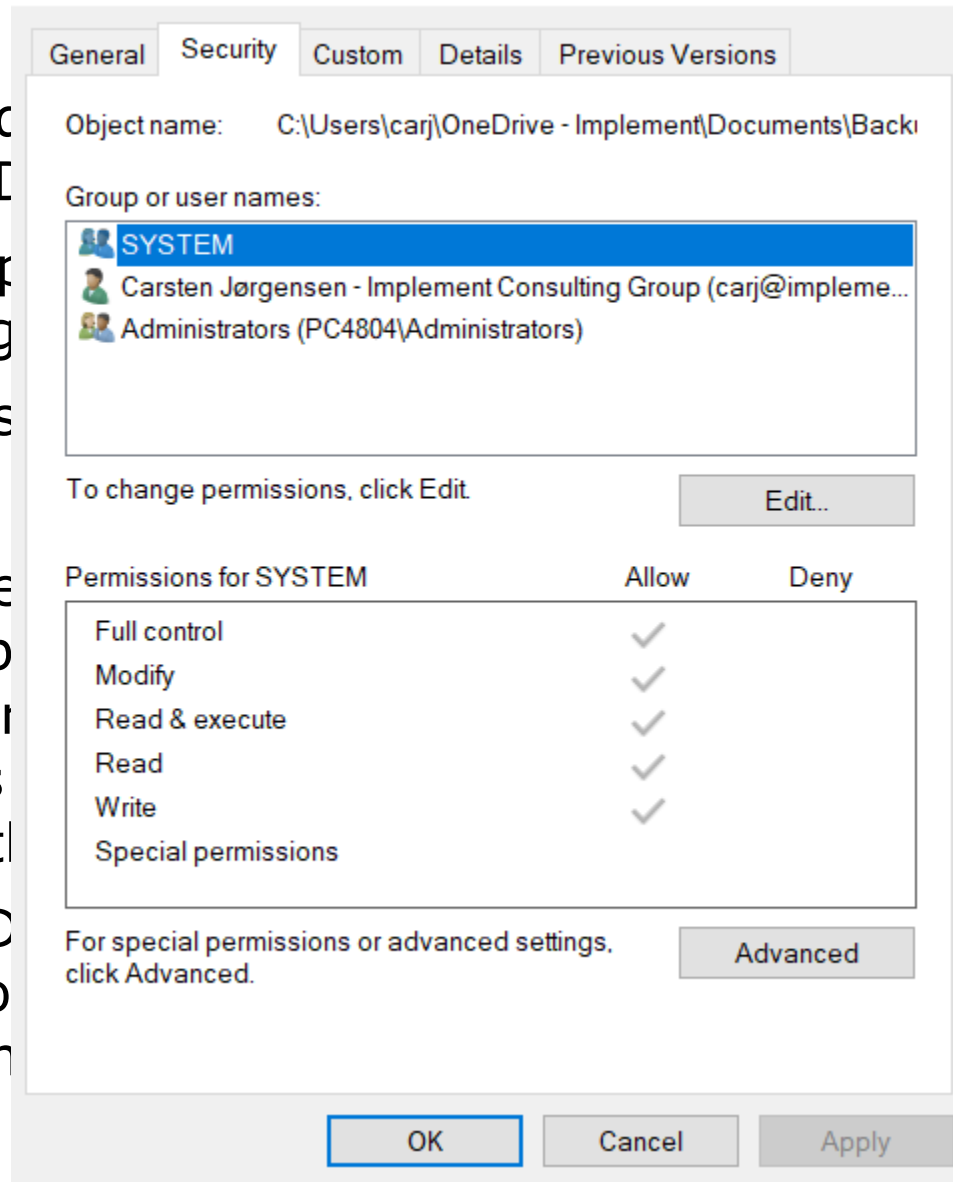


(a) Traditional UNIX approach (minimal access control list)

UNIX File Access Control

UNIX - File Access

- Unique user identifier (user ID)
- Member of a group (identified by a group ID)
- Belongs to a security class
- 12 protection bits
 - Specify read, write, execute permissions for the owner, group members, and all others
- The owner ID, group ID, and protection bits of the file's inode



Traditional UNIX - File Access Control

- "Set user ID"(SetUID)
- "Set group ID"(SetGID)
 - System temporarily uses rights of the file owner/group in addition to the real user's rights when making access control decisions
 - Enables privileged programs to access files/resources not generally accessible
- Sticky bit
 - When applied to a directory it specifies that only the owner of any file in the directory can rename, move, or delete that file
- Superuser
 - Is exempt from usual access control restrictions
 - Has system-wide access

Problemer med konceptet...



IAM

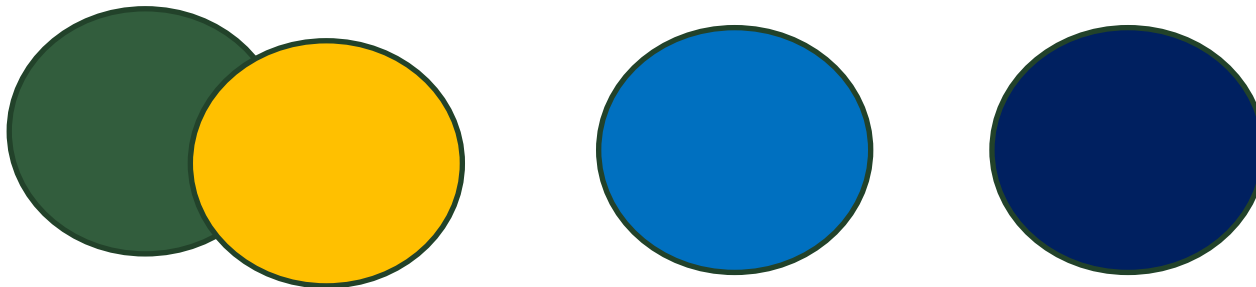
Role Based Access Control (RBAC)

Peter is a current employee, Peter is Administrator

Mia is an employee, Mia has access to SAP

Susan is no longer employee, Susan has Guest-access

Jens has resigned, he was Administrator, does he still have access?



Access Control Policies

Role-based access control (RBAC)

- Controls access based on the roles that users have within the system and on rules stating what accesses are allowed to users in given roles

Attribute-based access control (ABAC)

- Controls access based on attributes of the user, the resource to be accessed, and current environmental conditions

Access Control Policies

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IAM – and PAM

An administrative process coupled with a technological solution which validates the identity of individuals and allows owners of data, applications, and systems to either maintain centrally or distribute responsibility for granting access to their respective resources to anyone participating within the IAM framework.

IAM refers to the processes, technologies and policies for managing digital identities and controlling how identities can be used to access resources



Begrænsning af brugernes adgangsrettigheder

Daglig brug: kun nødvendige adgangsrettigheder
(gælder også administratorer)

Privilegeret adgang skal kontrolleres og begrænses
(udvidet eller administrator-adgang)

Proces for tildeling af administratoradgang
(i tidsbegrænses periode?)

Logning af tildelte (administrator-) rettigheder



IAM – Identity Life Cycle Management

Identity, Authentication and Authorization

Principle of Least Access

Groups and Roles

Administration

Auditing, Logging and Reporting

Segregation of Duties/Funktionsadskillelse



IAM

Identity: Who are you (person or a computer):
UserIDs, certificates, cards...

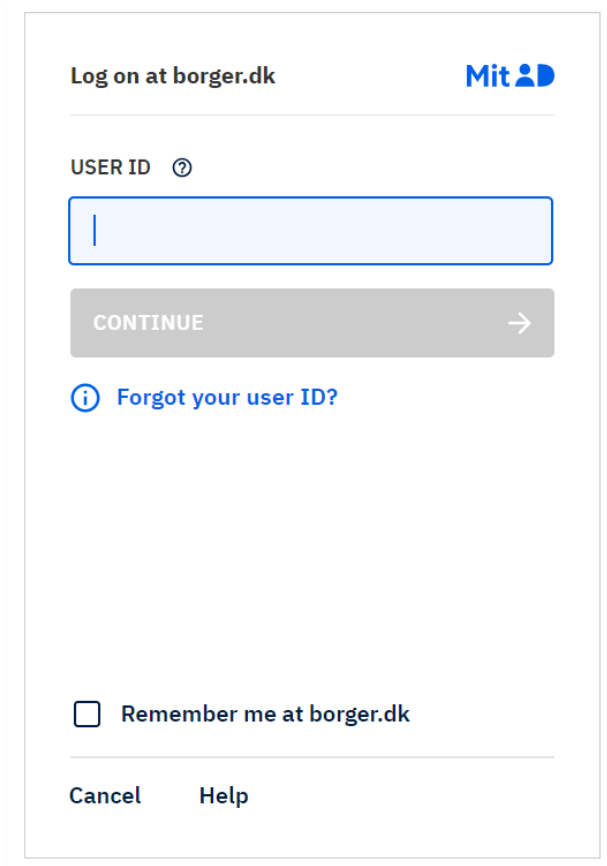
Authentication: Prove your identity:
challenge-response: Passwords, Private keys, PINs...
Your possession of the secret proves you are who
you claim to be

Authorization: the system controls which resources
you're allowed to access. Typically through the use
of a token or ticket mechanism.

Allows you to access only that which the
administrators have determined is necessary, thus
enforcing the *principle of least privilege*



Identity, authentication, authorization – MitID ?



The image shows a login window titled "Log on at borger.dk" with the MitID logo in the top right corner. Below the title is a horizontal line. The main section is labeled "USER ID" with a help icon. There is a text input field for the user ID. Below the input field is a grey "CONTINUE" button with a right-pointing arrow. Underneath the button is a link that says "Forgot your user ID?" with an information icon. At the bottom of the form is a checkbox labeled "Remember me at borger.dk". Below the checkbox are two links: "Cancel" and "Help".

Log on at borger.dk **MitID**

USER ID ⓘ

CONTINUE →

ⓘ [Forgot your user ID?](#)

☐ Remember me at borger.dk

[Cancel](#) [Help](#)

Service Providers provides access to services based on their own risk assessment



IAM - Case

Du arbejder på et internt projekt til udvikling af nyt økonomisystem til din virksomhed.

Projektlederne fortæller, at for at overholde tidsplanen skal der ikke bruges bruger-id'er. Systemet skal i stedet have et stærkt hardcodet password (17 tegn incl. specialtegn)
Alle der skal have adgang til økonomisystemet vil få oplyst koden hvis de har brug for adgangen.

Hvad siger du til projektlederen?



IAM - Case

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IAM – Case

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Groups and Roles

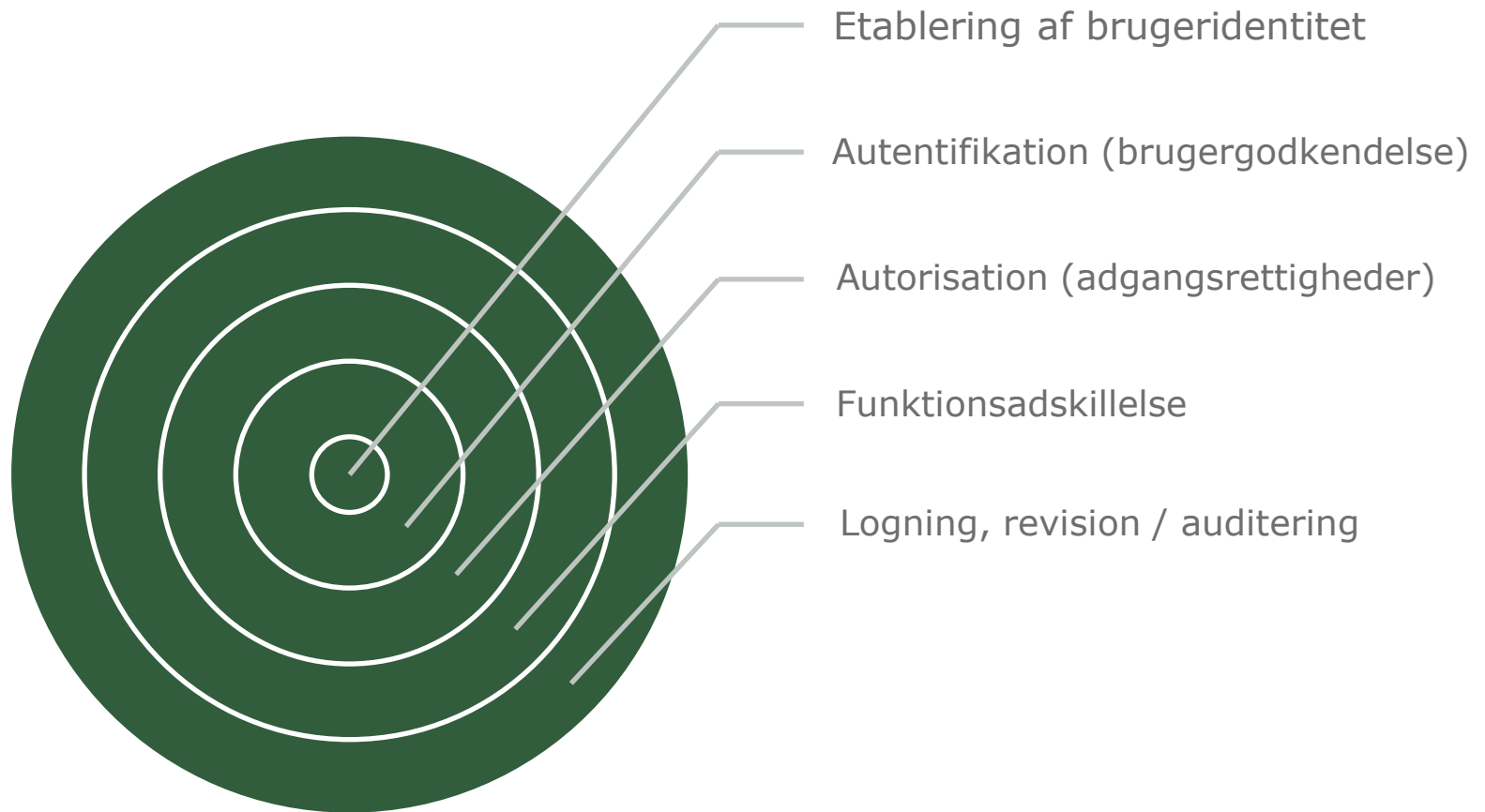
Administration

Auditing, Logging and Reporting

Segregation of Duties/Funktionsadskillelse



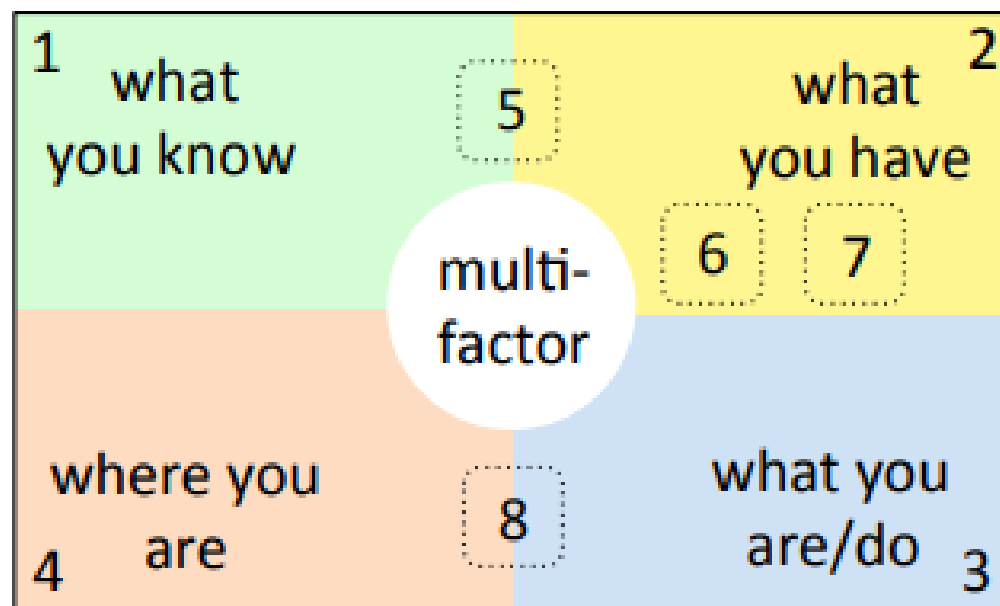
Identity and Access Management (IAM)



Tre faktorer+ til autentificering

Noget man **ved**, noget man **har** og
noget man **ér**

User authentication categories
based on
type of verification evidence



Noget man **gør**, **hvor** man er

Hvad er et godt password?



Om brugen af kodeord

Kodeord har været anvendt i tusinder af år



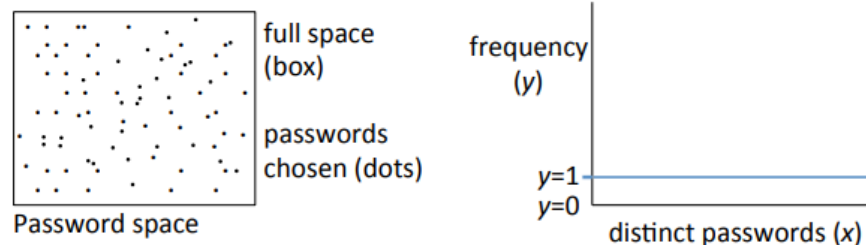
Hvad er et godt password?

Brugernes passwords er
altid dårlige

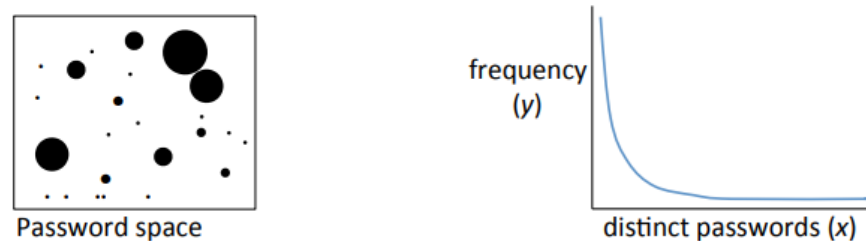
Opfylder kun lige
akkurat de tekniske
krav der stilles

Dvs. password regler
styrker passwords, men
kun op til den tekniske
grænse løsningen
tvinger brugerne til

(a) What we want: randomly distributed passwords



(b) What we get: predictable clustering, highly skewed distribution



Hvad er et godt password?

Med mindre vi bliver tvunget - eller undervist – i andet, så vælger vi alle password efter dette mønster:



Hvad er et godt password?

1. Ingen koder

Hvis man giver en bruger frit valg vil alle brugere selvfølgelig, alt andet lige, vælge at ikke bruge passwords, fordi det er det mest brugervenlige (dvs. letteste)

2. Almindelige ord

Hvis systemet tvinger til at bruge et kodeord, er første problem hvordan man selv husker sin kode.

Så man vælger i første omgang sin kode ud fra, om man tror man kan huske den, ikke fordi man tænker på "sikkerhed"

– brugerens risikovurdering



Mental models – “noget man tit tænker på”



You Retweeted



Gene Spafford @TheRealSpaf · 22 Sep 2014

“@shariv67: Had I known I was going to need this many passwords, I would have had a lot more pets.”



19



17



You Retweeted



George Takei @GeorgeTakei · 23 Jul 2014

Every time I change my password, I have to get a new pet.



615



1K



Hvad er et godt password?

Systemer:

problemet er, at vi bruger de same systemer:

- Hvis krav om både STORE og små bogstaver bruger man kun ét stort bogstav – og det står altid først:
Passwordet bliver "Password", ikke "pAssword"
- Hvis krav om numre står de altid til sidst: "Password12"
- Specialtegn er sidste del, og kun hvis de er krævet
Så det "super-stærke" password er "Password12!"
- Vi laver mønstre på telefoner: "1234", "1122", "1111" eller
årstal/datoer, som "1945"
(så en PIN bør være mindst 8 tegn)

To passwords

Password123dec

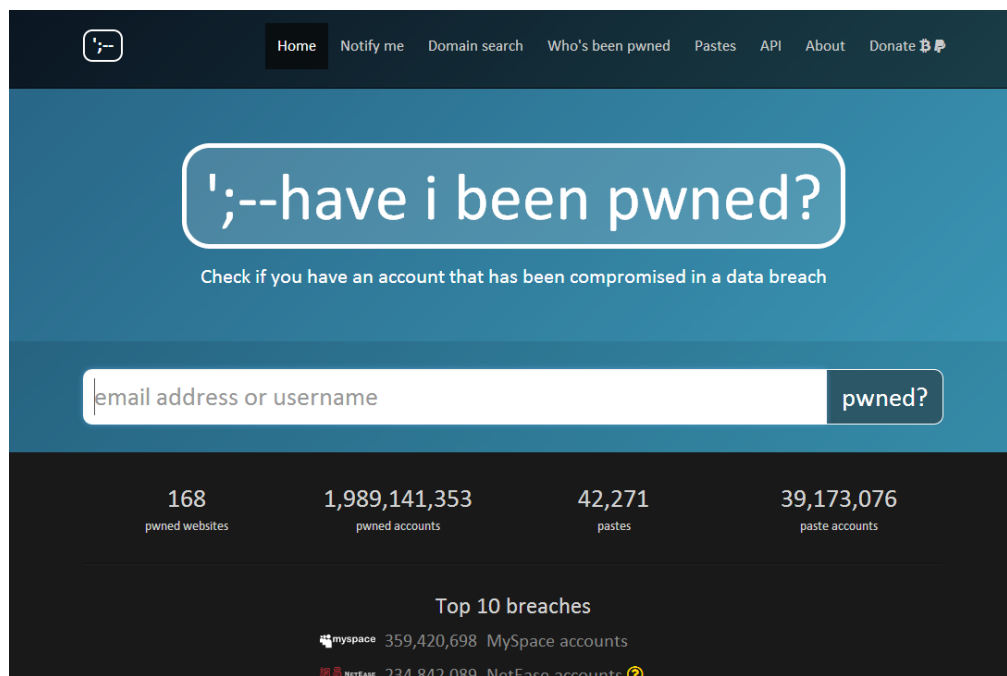
hY6%%#2873GH/GtAQ?08-dPe2>S

- Hvis man kender det første PW kan alle fremtidige PW gættes
- Brugeren kan huske de første PW - nr.2 bliver skrevet ned, særligt når der er krav om PW-skift
- Hvilket password er bedst nu?
- Hvilket password er bedst næste måned?



Password reuse

Model2: samme password på mange sites
Er det et problem?



The screenshot shows the homepage of the 'have i been pwned' website. The header is dark blue with a navigation bar containing links: Home, Notify me, Domain search, Who's been pwned, Pastes, API, About, and Donate. The main content area has a large blue box with the text '';--have i been pwned?' and a subtext 'Check if you have an account that has been compromised in a data breach'. Below this is a search bar with the placeholder 'email address or username' and a 'pwned?' button. The footer is dark blue and displays statistics: 168 pwned websites, 1,989,141,353 pwned accounts, 42,271 pastes, and 39,173,076 paste accounts. It also lists 'Top 10 breaches' with 'myspace' and 'NetEase' as examples.

Category	Count
pwned websites	168
pwned accounts	1,989,141,353
pastes	42,271
paste accounts	39,173,076

Top 10 breaches

- myspace 359,420,698 MySpace accounts
- NetEase 234,842,089 NetEase accounts

Password reuse:
<https://haveibeenpwned.com>



Hvad er et godt password?

"The password must be impossible to remember
and nowhere written down"

Peter Gutmann



Må man skrive sine passwords ned?

https://www.youtube.com/watch?v=Srh_TV_J144



Hvor langt skal et password være?
Hvad med special tegn?

<http://howsecureismypassword.net>



HOW PASSWORD
LENGTH WINS
THE INTERNET

Passwords 102



Hvad er et godt password?

Password huskere/password managers

Overvej password managers som 1password

Kan beskytte koderne og kan give adgang til de gemte koder med et "super-password"

Autogenerere stærke koder:

Undgår genbrug af passwords på forskellige sider

Password længden kan øges



Password managers

Undgår password genbrug
Stærke lange passwords over det hele

Problemer?

“Password manager salt”



Sikkerhed er ikke sort-hvidt

they need no longer be remembered. In practice, master passwords may be weaker than hoped, and the individual site passwords managed remain not only static (thus replayable) but often remain user-chosen (thus guessable) for reasons explained below. Overall, password managers thus deliver fewer security advantages than expected, while introducing new risks (below); their main advantage is improved usability.

Computer Security and the Internet: Tools and Jewels from Malware to Bitcoin, Second Edition by Paul C. van Oorschot p.77

Forelæsning 22.sep: Risikovurderinger



Angreb imod brugerens passwords

1. Hvad er dit password? (spørge)
2. Gætte / default passwords
3. Dictionary Attack
4. Brute Force (f.eks. imod LanMan hash)
5. Rainbow Tables



Password cracking

Hashcat: <https://hashcat.net>



hashcat
advanced
password
recovery

hashcat

Forum

Wiki

Tools

Events

Converter

Contact

```
HWMon.Dev.#2.....: Temp: 55c Fan: 30% Core:1010Mhz Mem:1250Mhz Lanes:16
HWMon.Dev.#3.....: N/A
Started: Wed Nov 30 10:48:18 2016
Stopped: Wed Nov 30 10:48:43 2016
```

Algorithms

- MD4
- MD5
- Half MD5 (left, mid, right)
- SHA1
- SHA-256
- SHA-384
- SHA-512
- SHA-3 (Keccak)
- SipHash
- RipeMD160
- Whirlpool
- DES (PT = \$salt, key = \$pass)
- 3DES (PT = \$salt, key = \$pass)
- GOST R 34.11-94
- GOST R 34.11-2012 (Streebog) 256-bit
- GOST R 34.11-2012 (Streebog) 512-bit
- Double MD5
- Double SHA1
- md5(\$pass.\$salt)
- md5(\$salt.\$pass)
- md5(unicode(\$pass).\$salt)
- md5(\$salt.unicode(\$pass))
- md5(sha1(\$pass))
- md5(\$salt.md5(\$pass))
- md5(\$salt.\$pass.\$salt)
- md5(strtoupper(md5(\$pass)))
- sha1(\$pass.\$salt)
- sha1(\$salt.\$pass)
- sha1(unicode(\$pass).\$salt)
- sha1(\$salt.unicode(\$pass))
- sha1(md5(\$pass))
- sha1(\$salt.\$pass.\$salt)
- sha1(CX)



Default passwords

**Eksempel på dårlige passwords:
Amerikanske Dankort maskiner**



Amerikanske ATM/Dankortmaskiner hacket med default password

ATM hacket, tror indeholder 5\$ sedler i stedet for \$20 => udbetaler 3x for meget

Pre Paid Card

9 dage før kunder rapporterede



Amerikanske ATM/Dankortmaskiner hacket med default password

http://www.youtube.com/watch?v=cmW_4R81jVU

CNN Report: Robber Tricks ATM machine



CNN Report: Robber Tricks ATM machine



Amerikanske ATM/Dankortmaskiner hacket med default password

Minibank 1510 - Mozilla Firefox

File Rediger Vis Gå til Bogmærker Funktioner Hjælp

http://www.phoenixcardnet.com/1510.htm

Computer Forensics.DK

Home Up

Merchants
Distributors
Employees
Products
Services
[ATM balancing](#)
Disputes



VISA
MasterCard
STAR
Citizens Bank
Not your typical bank?

PHOENIX CARDNET

Tel: (888) 972-4286

44

- 5.7" LCD with 320 x 240 resolution
- 8 menu screens
- 7 screen advertising capability (Mono or Color)
- Encrypted Pin Pad (EPP)
- Triple DES compliant
- Removable money box



- Dip-type card reader
- Lock options:
 - Manual dial lock
 - Electronic lock



Encrypted Pin Pad (EPP)
Triple DES compliant



Amerikanske ATM/Dankortmaskiner hacket med default password

Welcome to Tranax Technologies, Inc. - Mozilla Firefox

Filer Rediger Vis Gå til Bogmærker Funktioner Hjælp

http://www.tranax.com/

Computer Forensics.DK


home Products Industry Channel Partners Service & Support Corporate info

login contact

TRANAX TECHNOLOGIES RECOGNIZED WITH PRESTIGIOUS GROWTH STRATEGY LEADERSHIP AWARD

2006 FROST & SULLIVAN Growth Strategy Leadership Award

More Info




Card Dispensing Self-Service Terminal


Instant Issue Cards a Reality


- ◆ Instant Issue Stored-Value Cards
- ◆ Automate Stored-Value Card Dispensing
- ◆ Increase Revenues


details >>

news:

 **Partnership Delivers Self-Service & Financial Services to Presto Convenience Stores**
TIO & Tranax Partner to Deliver Self-Service Bill Payment and Financial Services to Presto Convenience Stores.

 **Strong Demand in Credit Union Market for Tranax 'Essential Banking' ATMs**
Tranax announced strong demand for its Mini-Bank family of "Essential Banking" ATMs for credit unions and smaller banks.

 **Tranax wants to be first to ride wave of change**
For Dr. Hansup Kwon, change is a good thing. It had better be, for the mild-mannered leader of Tranax Technologies Inc. is banking his company's future on it.

 **Tranax Technologies recognized by Frost & Sullivan**
Tranax, chosen for exceptional growth in the highly competitive North American ATM Marketplace, was

Færdig

Adblock



Amerikanske ATM/Dankortmaskiner hacket med default password

Knowledgebase:

“The ATM is programmed with the passwords that the distributor requests when the order is placed to program a new ATM. *When special passwords are not requested they are left at the factory default (see your mini-bank operators manual)* Every new ATM that is shipped from Tranax has a copy of the print setup included in the “open me first” box or envelope. The master password is hand written at the top of the print setup for the convenience of the installer.”



Amerikanske ATM/Dankortmaskiner hacket med default password

mb1500 "Operator Manual" - Google Search - Mozilla Firefox

File Rediger Vis Gå til Bogmærker Funktioner Hjælp

http://www.google.dk/search?hl=en&q=mb1500+%22Operator+Manual%22&btnG=Search

Computer Forensics.DK

Google Web Images Groups News more »

mb1500 "Operator Manual" Search Advanced Search Preferences

Web Results 1 - 1 of 1 for mb1500 "Operator Manual". (0.19 seconds)

Tip: Try removing quotes from your search to get more results.

[PDF] [MB1500 Cover TOC.doc](#)
File Format: PDF/Adobe Acrobat - [View as HTML](#)
Operator Manual. Doc. No. 101205. 2.3. Step 6. Open the top of the ATM. ... **Operator Manual.** Doc. No. 101205. 3.5. How to enter data with the keypad ...
[www.wegrowbusiness.ca/manuals/Tranax_MB_Operator_Manual.pdf?GCE=489d2476c9728ab16cbde0a2acc438a5](#) - Supplemental Result - [Similar pages](#)

Sponsored Links

[Operators Manuals](#)
Looking for operators manuals? Save! [EveryRule.com](#)

Tranax manual inurl:pdf



Amerikanske ATM/Dankortmaskiner hacket med default password

Thranax:

Master = 555555

Service = 222222

Operator = 111111

Triton:

12345

Lipman:

Merchant = 222222

Technician = 111111

GTI:

1234



Amerikanske ATM/Dankortmaskiner hacket med default password

The screenshot shows a Mozilla Firefox browser window displaying the Lipman TransAction Solutions website. The address bar shows the URL <http://www.lipmanusa.com/site/sites/USA/lipman.asp?pi=902>. The website header includes the Lipman logo, navigation links (HOME, USA, Members Login, SEARCH), and a menu bar with links to Company, Products, Solutions, Support, News, and Investor Relations. The main content area is titled 'MANUALS' and lists several manuals for download:

- Nurit Cash Register Manuals
 - [2050 Complete Manual](#)
 - [2050 Quick Reference Guides](#)
 - [NURIT 2059i Manual](#)
 - [NURIT Store Manager Manual](#)
- NURIT 20XX Manuals
 - [2085-2090 App. 4.82 Menu Guide](#)
 - [2085-2090 App. 4.7x Function Guide](#)
 - [20XX App. 4.82 Manual](#)
 - [App. 4.8X Driver License Verification Guide](#)
 - [App. 4.7X Store & Forward Guide](#)
- NURIT 3000-3020 Manuals
 - [30XX App. 4.82 Menu Guide](#)
 - [30XX App. 4.82 Function Guide](#)
 - [30XX App. 4.82 Manual](#)
 - [App. 4.8X Driver License Verification Guide](#)
 - [App. 4.7X Store & Forward Guide](#)
 - [3020 Battery Saver Guide](#)
 - [3020 ImagePak Installation Guide](#)
- NURIT 8000 Manuals

The browser window also shows a status bar at the bottom with 'Færdig' and 'Adblock' buttons.



Amerikanske ATM/Dankortmaskiner hacket med default password

Adobe Reader - [1099.pdf]

File Rediger Vis Dokument Værktøjer Vindue Hjælp

Gem en kopi Søg Vælg 118% Søg på nettet Har du behov for at oprette PDF-dokumenter?

Søg efter: Forrige Næste

Accessing the Service Menu

Important!

One of two passwords can be entered. For merchant access please enter the merchant password. For Technician access (including *Money Service*) please enter the Technician password.

The default system passwords are:
 Merchant = 2222222
 Technician = 1111111

Function Description

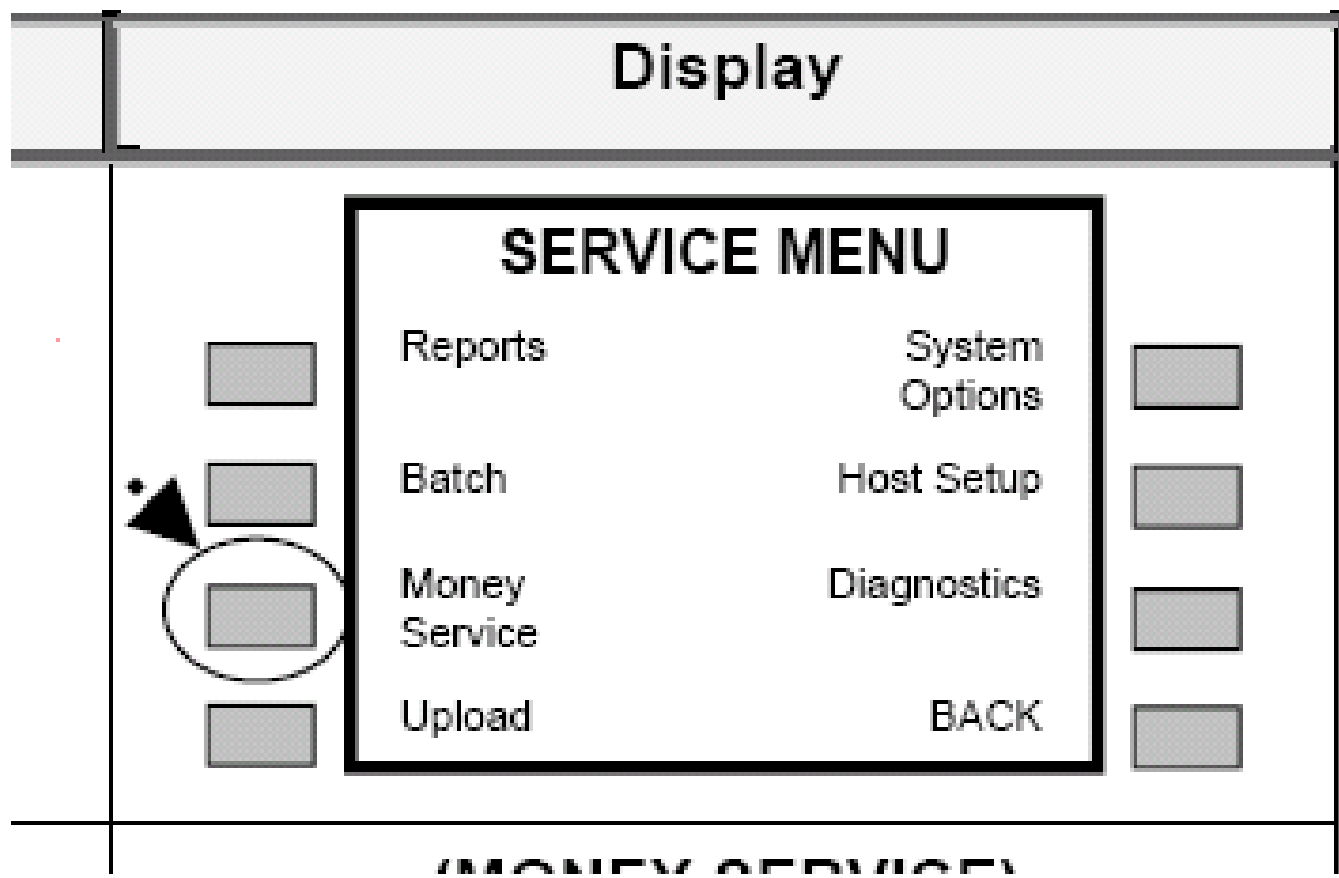
The following Step/Action table will assist you in accessing the Service Menu of the ATM from the idle prompt.

Step	Action	Display
1.	From the Idle Prompt press the following buttons in the following order: [CANCEL], [CLEAR], [ENTER], [1], [2], [3]	ENTER PASSWORD [_ _ _ _ _]
2.	Input the default Password <u>Note:</u> For Merchant Access input the merchant default password. For technician access (Including <i>Money Service</i>) input the technician default password.	ENTER PASSWORD [* * * * *]

10 af 73



Amerikanske ATM/Dankortmaskiner hacket med default password



Amerikanske ATM/Dankortmaskiner hacket med default password

TP-820327-001B * Operating Guide for the Diebold 1075ix Exterior Walk-up Cash Dispenser - Mozilla Firefox

Filer Rediger Vis Gå til Bogmærker Funktioner Hjælp

http://www.diebold.com/ficcdsvdoc/techpubs/ixCustomer/TP-820327-001/TP-820327-001_fram.htm Gå til

Computer Forensics.DK

DIEBOLD
We won't rest.

Operating Guide for the Diebold 1075ix Exterior Walk-up Cash Dispenser

- + 1 Introduction
- + 2 Cash Dispenser Devices
- + 3 Beginning and Ending a Maintenance Session
- + 4 Fluorescent Lamp Replacement Procedures
- 5 Cash Dispenser Device Maintenance
- + Appendix A Entering and Changing the Safe Lock Combination
- Appendix B Related Customer Documents
- + Figures

Here you are terminal manager language you will enter a password to perform the required perform the following steps.

- If continuous availability mode is set up to require a password, the Password Entry screen appears (Figure 3-22). Enter your 6-digit password, using the numeric keys on the keypad.

NOTE

If you are logging on for the first time, the default password is 0-0-0-0-0-0.

As you enter your password, each entry appears as an x. Use the backspace key to correct a mistake. After you enter the sixth digit, your password is verified and the Continuous Availability Mode screen appears (Figure 3-21).

Figure 3-22 Password Entry Screen

Password Entry

Enter Password using keypad
Press Cancel (Esc) to abort logon
Use backspace to correct errors

_

Time Remaining (seconds)
11

M27209A

Logging on to Maintenance Mode

- Go to the Terminal Control Software (TCS) screen (Section 3.7.1).

Find: pas Find Næste Find forrige Fremhævet alt Forskel på store og små bogstaver



Pause



Om brugen af kodeord

Kodeord har været anvendt i tusinder af år



Password baggrund

Passwords er den nye firewall

Password hash,
hash og salt,
scrypt/bcrypt



Baggrund

Password hash
hash og salt,
bcrypt/bcrypt

Password Reminder

There was a recent password request from our website.

Here is your login information for your account.
Login Email: **bigbob@mailinator.com**
Login Password: **123456**


Check the "manage account" page to change your password.


[login instantly](#)


[or click here to change your password](#)

No account yet? [Sign up](#)

! We have reinforced your password security. If you can't log in, we invite you to enter your password in lowercase only. If you still can't log in, [choose a new password](#).



 Nickname

 Password

☒ **Keep my session active**

Leave this box unchecked on a public or shared computer.

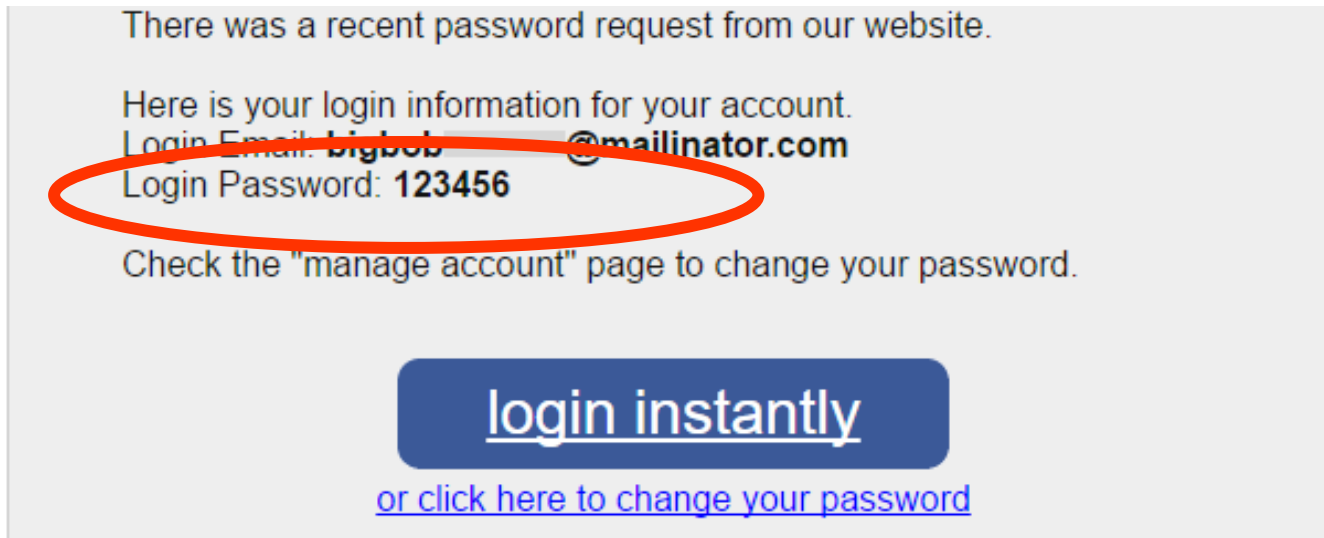
[Login](#)

[Forgot your password?](#)

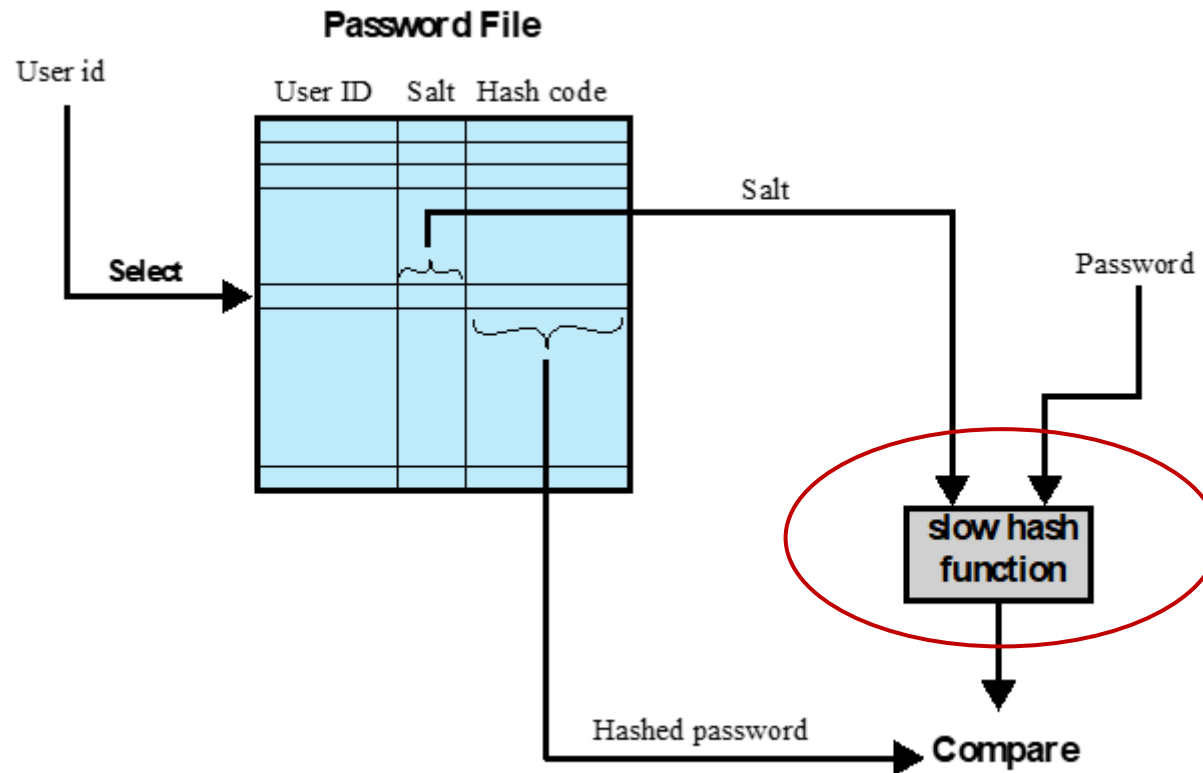
Baggrund

Password hash, hash og salt, scrypt/bcrypt

Don't store the password, store a hash of the password



Salt



(b) Verifying a password

Password hash?

Direkte off-line adgang til password hash
eller

Online - forbinde til serveren hver gang?

- Begrænsninger på antallet af forsøg?
- Time-delay mellem sign-in attempts, brug penalty period (f.eks. 1 time) hvis forkert password er indtastet for mange gange
- f.eks. 10 gange



Password hash?

The password "**alpine fun**" can be brute-forced in only 2 months if the server can be attacked 100 times per second. But, with a penalty period and 5 second delay, the same password can suddenly sustain an attack for 1,889 years.

No of attacks	Password	Time	Security level
100 times per sec	alpine fun	2 months	Low risk
1 time every 5 sec	alpine fun	63 years	Secure
1 time every 5 sec with a 1 hour penalty period after 10 attempts	alpine fun	1,889 years	Secure forever

Se f.eks. "The Usability of Passwords"

<http://www.baekdal.com/tips/password-security-usability> og

"The Usability of Passwords FAQ":

<http://www.baekdal.com/tips/the-usability-of-passwords-faq>



Apple

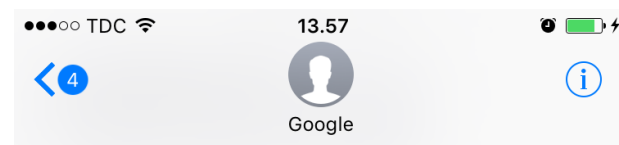
Apple default: 80ms per password attempt delay
Enforced by tamper resistant hardware

Indbyggede lille forsinkelse per password-forsøg
medfører eksponentiel vækst ift. at bryde passwordet:

# characters	[0-9]	[0-9a-z]	[0-9a-zA-Z]
1	0.8 seconds	2.9 seconds	5 seconds
2	8 seconds	1.7 minutes	5.1 minutes
3	1.3 minutes	1 hour	5.3 hours
4	13 minutes	1.6 days	2 weeks
5	2.2 hours	8 weeks	2.3 years
6	22 hours	5.5 years	140 years
7	1.3 weeks	200 years	9 thousand years
8	13 weeks	7 thousand years	550 thousand years
9	2.5 years	260 thousand years	34 million years
10	25 years	9 million years	2 billion years



Two Factor Authentication (2FA)



Mon, 8 Feb, 12.00

G-743835 er din bekræftelseskode til Google.

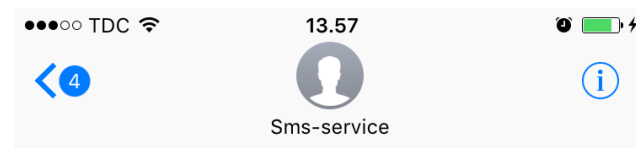
Tue, 9 Feb, 08.47

G-493534 er din bekræftelseskode til Google.

Wed, 10 Feb, 08.22

G-840743 er din bekræftelseskode til Google.

Mon, 20 Jun, 12.15



Text Message
Sat, 26 Nov, 07.36

Din personlige engangskode er: 1527

Bemærk! Engangskoden udløber om 12 timer.

To-faktor autentificering (2FA) – nogle termer



Push notification
Verify identity by approving a push notification, for instance in an app



Phone callback
Require you to pick-up a phone call and for instance press a specific key, or any key, before you are provided access



Challenge-response
Requires you to enter data back to the system to verify a transaction is correct



Token
A hardware device, after pushing a button to generate a code, the code is then typed into the password prompt



SMS passcode
A code is sent to your phone via SMS and must be typed into the two-factor prompt

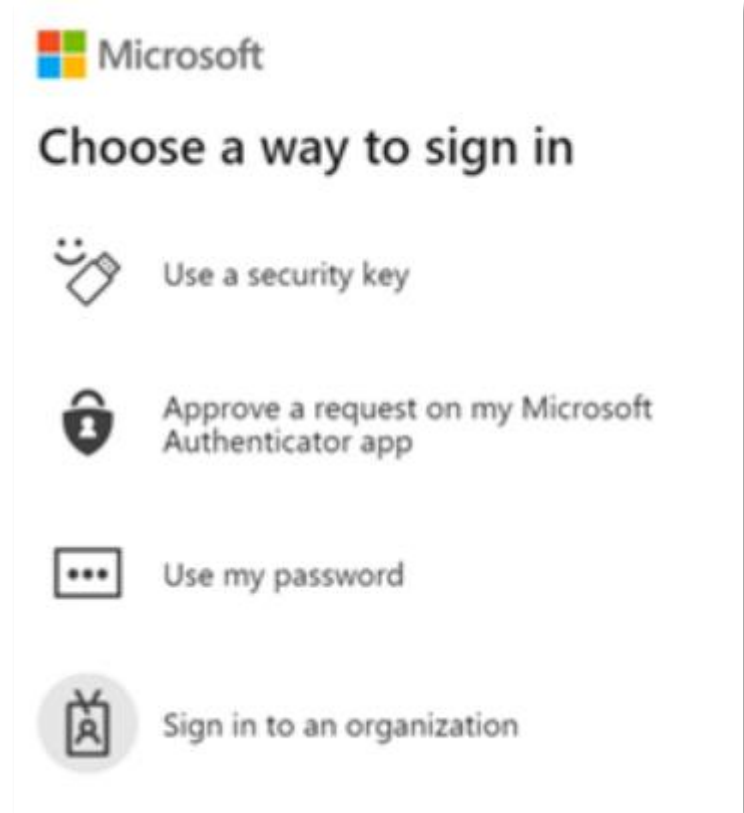


One-Time Password/One-Time Pad (OTP)
Can only be used one time

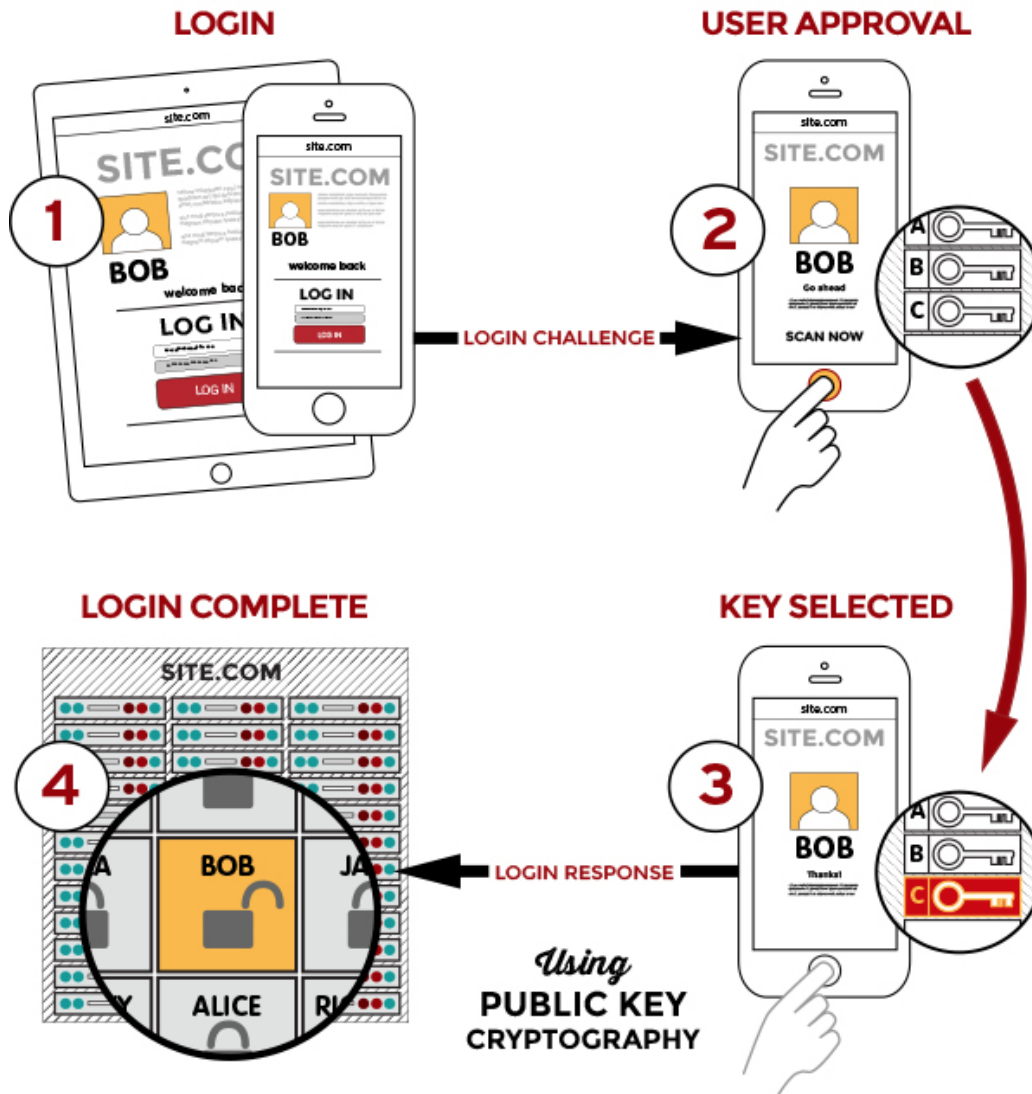
Passwordless / FIDO2

Passwordless authentication is a form of multi-factor authentication (MFA)

Replaces passwords with two or more verification factors secured and encrypted on a user's device, such as a fingerprint, facial recognition, a device pin, or a cryptographic key



Passwordless / FIDO2



Hvad er et godt password?

Hvor tit skal password skiftes?

Ikke kritisk (afhængig af hvor man har indtastet passwords)

Krav om skift f.eks. hver 90 dage kan være et problem fordi mennesker så typisk vælger svage passwords.

=> "Password06" eller "PasswordJuni"



Hvad er et godt password?

Overvej det hvis det er muligt at bruge
2-faktor autentifikation på en site

Næsten altid en forbedring af sikkerheden

Support er dyrt

Pas på "secret questions"

Backup systemet for glemte passwords må
ikke være svagere end dit password.



Meget lavere sikkerhed

Pick a secure password:

"0k5ijU)=2w8VAiqxozKyB"

**Now, in case you forget it, what's
your favorite color?**

"Blue"



Kort sagt

2FA er næsten altid bedst
(brug det hvis i overhovedet kan)

Brug en **password manager**

Lange passwords er bedre end komplekse passwords
(passphrases over 14 tegn)

Brug forskellige passwords på forskellige sites
(password manager)

Back dine passwords op

Lange passwords er bedre end hyppige skift - med
mindre der har været risiko for aflytning



Biometrics



Biometri

Noget man ved
Noget man har
Noget man er
Hvor man er

Biometri bør altid kombineres med
BrugerID/password

Biometri samles typisk i en hash



Hvad er et godt password?

Biometri?



Biometri

Er biometri identity eller authentication ?

Public or private?

Man efterlader biometri-data overalt

AI/Deep-fakes (stemme, ansigt osv)

Biometri som autentifikation – uden andre faktorer –
er potentielt et problem
(risiko vurdering!)



Biometri

To biometriske målinger er aldrig helt ens, derfor er der altid element af usikkerhed:

False Acceptance Rate:

Rate at which someone other than the actual person is falsely recognized.

False Rejection Rate:

Rate at which the actual person is not recognized accurately.



Biometri

Modality	Type	Notes
fingerprints	P	common on laptops and smartphones
facial recognition	P	used by some smartphones
iris recognition	P	the part of the eye that a contact lens covers
hand geometry	P	hand length and size, also shape of fingers and palm
retinal scan	P	based on patterns of retinal blood vessels
voice authentication	M	physical-behavioral mix
gait	B	characteristics related to walking
typing rhythm	B	keystroke patterns and timing
mouse patterns	B	also scrolling, swipe patterns on touchscreen devices

Table 3.2: Biometric modalities: examples. P (physical), B (behavioral), M (mixed). Fingerprint (four digits) and iris biometrics are used at U.S.-Canadian airport borders.



Biometri

TABLE 37.1 Overview of Selected Biometric Technologies

Biometric	Uniqueness	Universality	Permanence	Measurability	Acceptability
DNA	High	High	High	Low	Low
Face geometry	Low	High	Medium	High	High
Fingerprint	High	Medium	High	Medium	Medium
Hand geometry	Medium	Medium	Medium	High	Medium
Iris	High	High	High	Medium	Low
Retina	High	High	Medium	Low	Low
Signature dynamics	Low	Medium	Low	High	High
Voice	Low	Medium	Low	Medium	High


Hvor let er det at stjæle credentials ?
Hvad skal løsningen beskytte?



Biometri

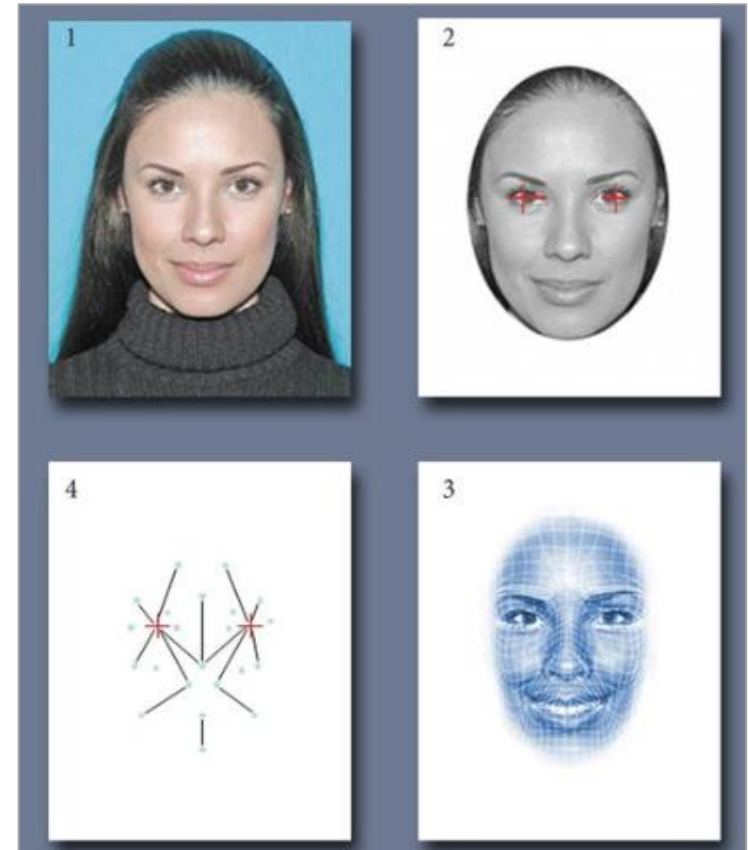
Biometri er let at bruge, let tilgængelig
- men har lavere sikkerhed alene

guten Tag, mein Name ist
Dr. von der Leyen



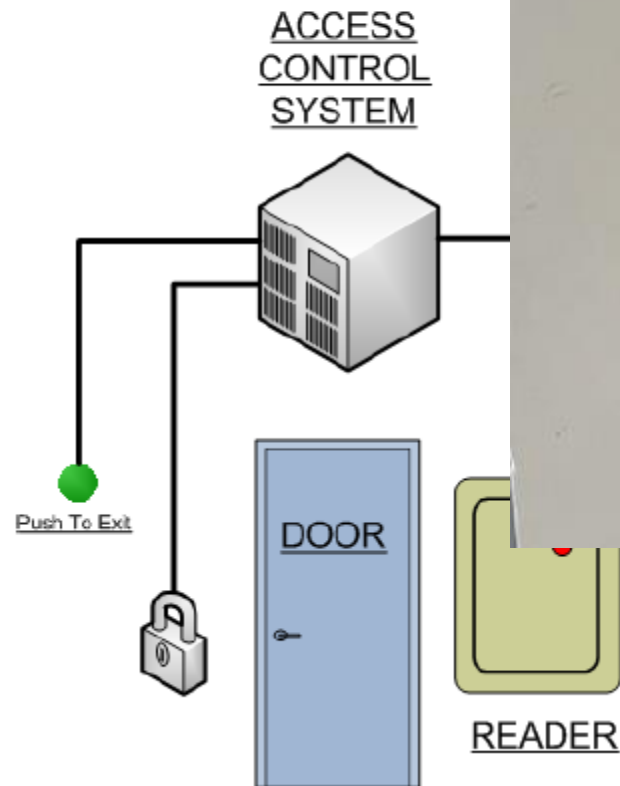
31C3

Mr Krissler provided details of his technique at a convention in Hamburg

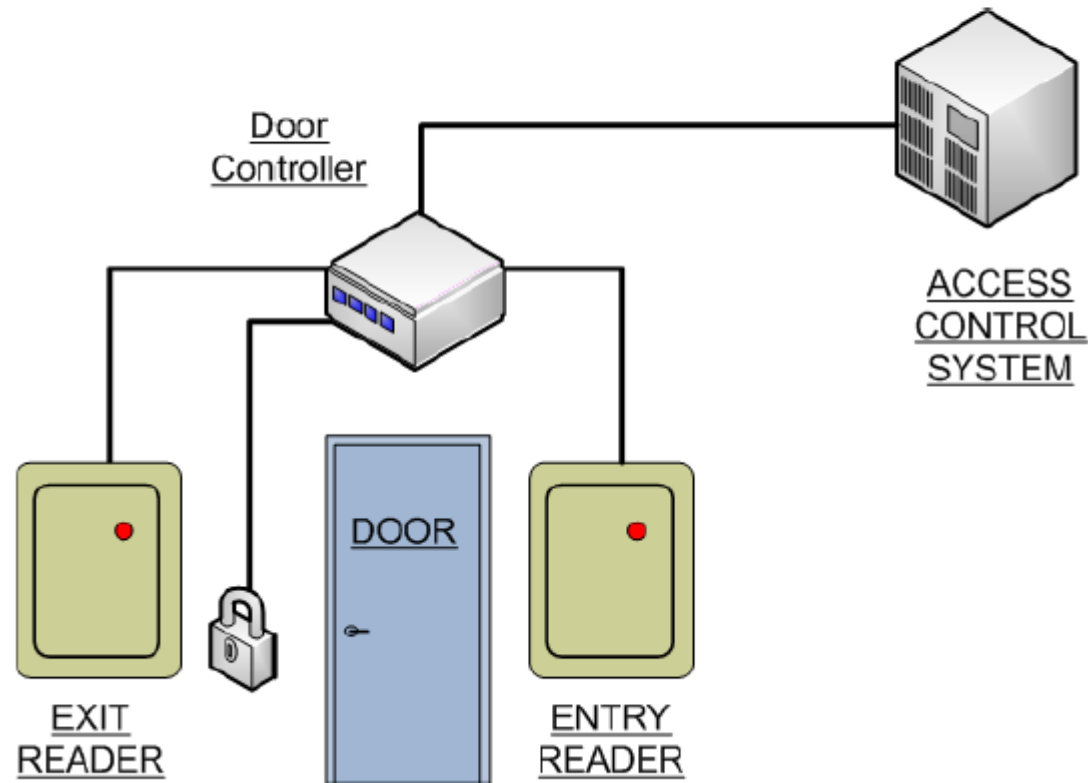


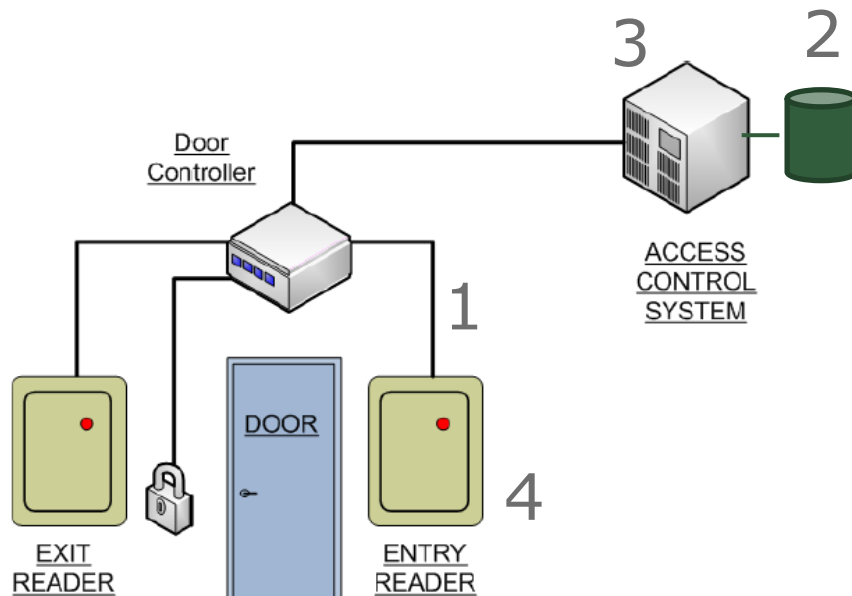
Basic system

Placering af "request to exit" knapper er vigtig, kan de aktiveres ude fra?



Anti-Passback system

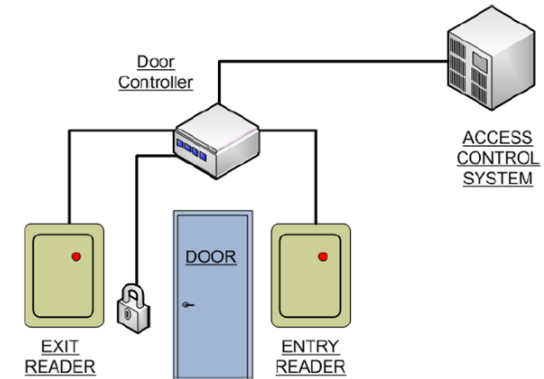




1. Angreb imod data og kommunikation
2. Angreb imod templates
3. Angreb imod software
4. Angreb med sensoren

Anti-Passback system

Biometri



Der findes også default access nøgler til smart cards.

F.eks. - kan en MD5 hash af UID og master nøglen give adgang til smartcardet/administrator kortet

Credential revocation



Fingeraftryk / hånd revokering

Beskyttelse af biometri-data

Defeating Facial Recognition Systems doesn't have to be Hi-Tech



facebook.com/OneTruth4Life



"Cheating": Social engineering



Security is difficult (but fun)

Intelligent adversaries



Kompromittering via Social Engineering

- At narre mennesker til at gøre ting de ellers ikke ville gøre eller udlevere fortrolige oplysninger.
- Kan fører til hacking og identitetstyveri.
- F.eks. ved at optræde som insider med afsæt i viden om virksomheden.

Hvordan kan en angriber få viden om en virksomhed?



Fremgangsmåden

Informationsindsamling

Opbygning af tillid

Scenariet

Pres for en løsning - "hvad kan vi gøre?"



Bagrundsviden



0. Informationsindsamling

Internet, sociale netværk, dumpster diving, besøg, opsøge medarbejdere, webmail, linkedin, jobannoncer osv, osv.

Hej, hvad er dit password?

1. Opbygning af tillid

Det er sjældent nok at sige
"Hej, hvad er dit password?" eller
"Hallo – det er din chef, giv mig Admin
passwordet eller du er fyret"

En række venlige, trivielle spørgsmål først
(opbygger tillid)



Hej, hvad er dit password?

2. Baggrundsscenariet (pretexting)

Ramme for angreb, kan være en hel identitet (baseret på indledende research)



Hej, hvad er dit password?

3. Pres

"Hvordan løser vi det her?"

Kropssprog, stemmeføring,
høflig/vred/travl/autoritær osv



Han er "en af vores"

Samme sprog og jargon
Det rigtige tøj

Overbevise folk om man "hører til"



Påklædning er vigtig

Dress as a DJ:

<https://www.youtube.com/watch?v=uoIL2x6sIC8>

Hvad ville have virket i bussen?



Man er usynlig i en neon-vest

<https://www.youtube.com/watch?v=tFur1-i6BpA>



"Pre-loading"

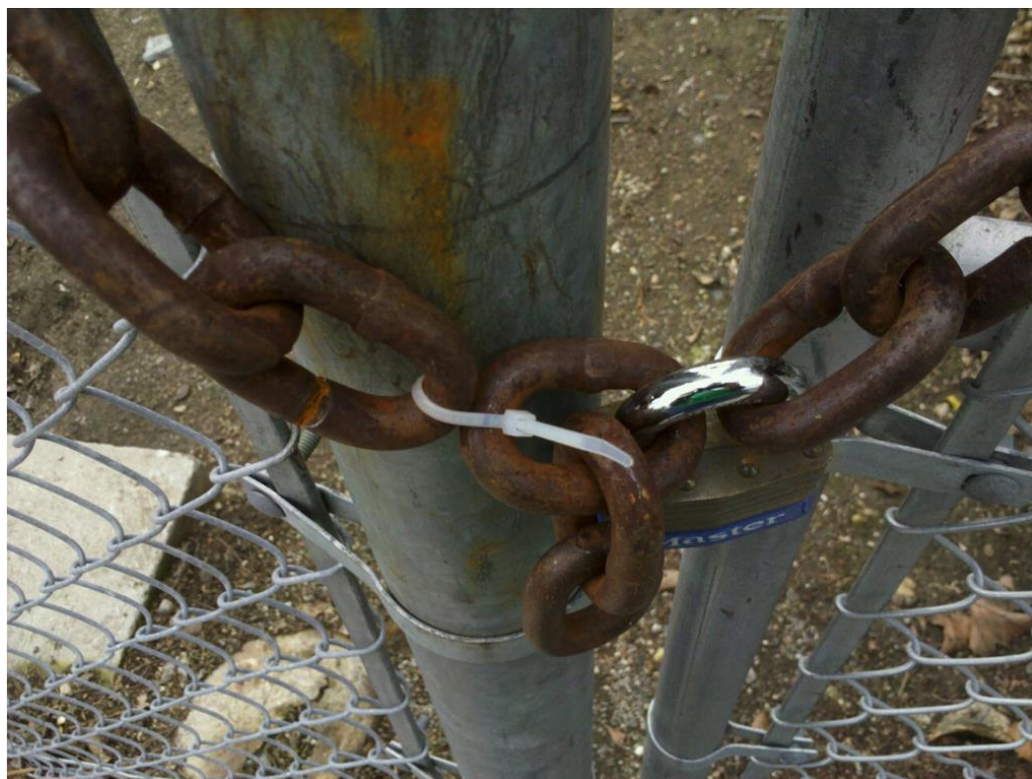
Mange, mange teknikker

Påvirke inden faktiske møde/hændelse
Verifikation af identitet



Det svageste led i sikkerhedskæden

Telefon, personlig fremmøde,
USB, CD, websider, pdf-filer, hacke
e-mail, vinde gaver, voice beskeder



Phishing

A phishing attack usually comes in the form of a message meant to convince you to:

- **click on a link**
- **open a document**
- **install software on your device**
- **enter your username and password into a website that's made to look legitimate.**

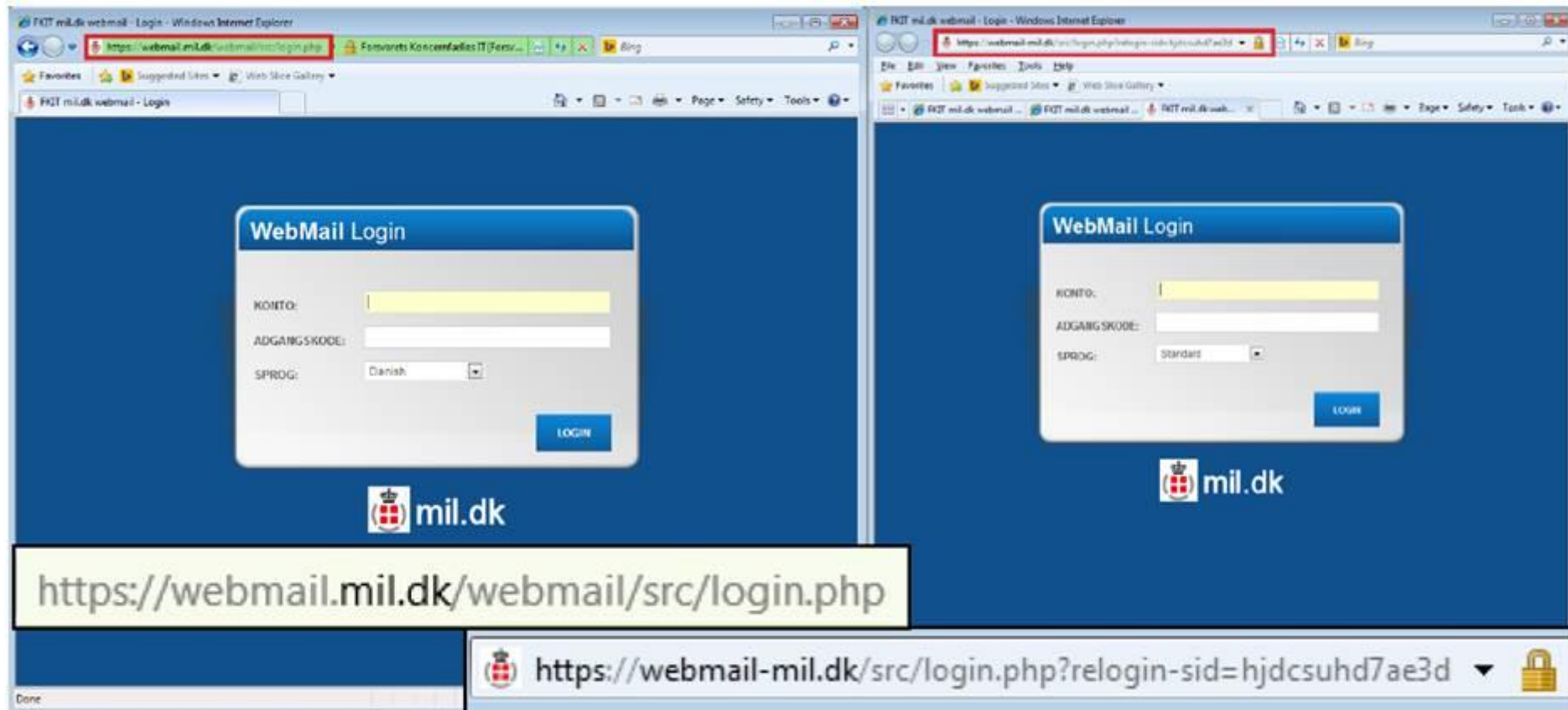


Don't click it



Totally not a
virus. Trust
me...im a
dolphin

Can I click it?



Billede 1: Den falske e-mail-login-side sidestillet med den legitime side. De to URL'er er fremhævet nedenunder.

Can I click it?



Someone has your password

Hi William

Someone just used your password to try to sign in to your Google Account

@gmail.com.

Details:

Tuesday, 22 March, 14:9:25 UTC

IP Address: 134.249.139.239

Location: Ukraine

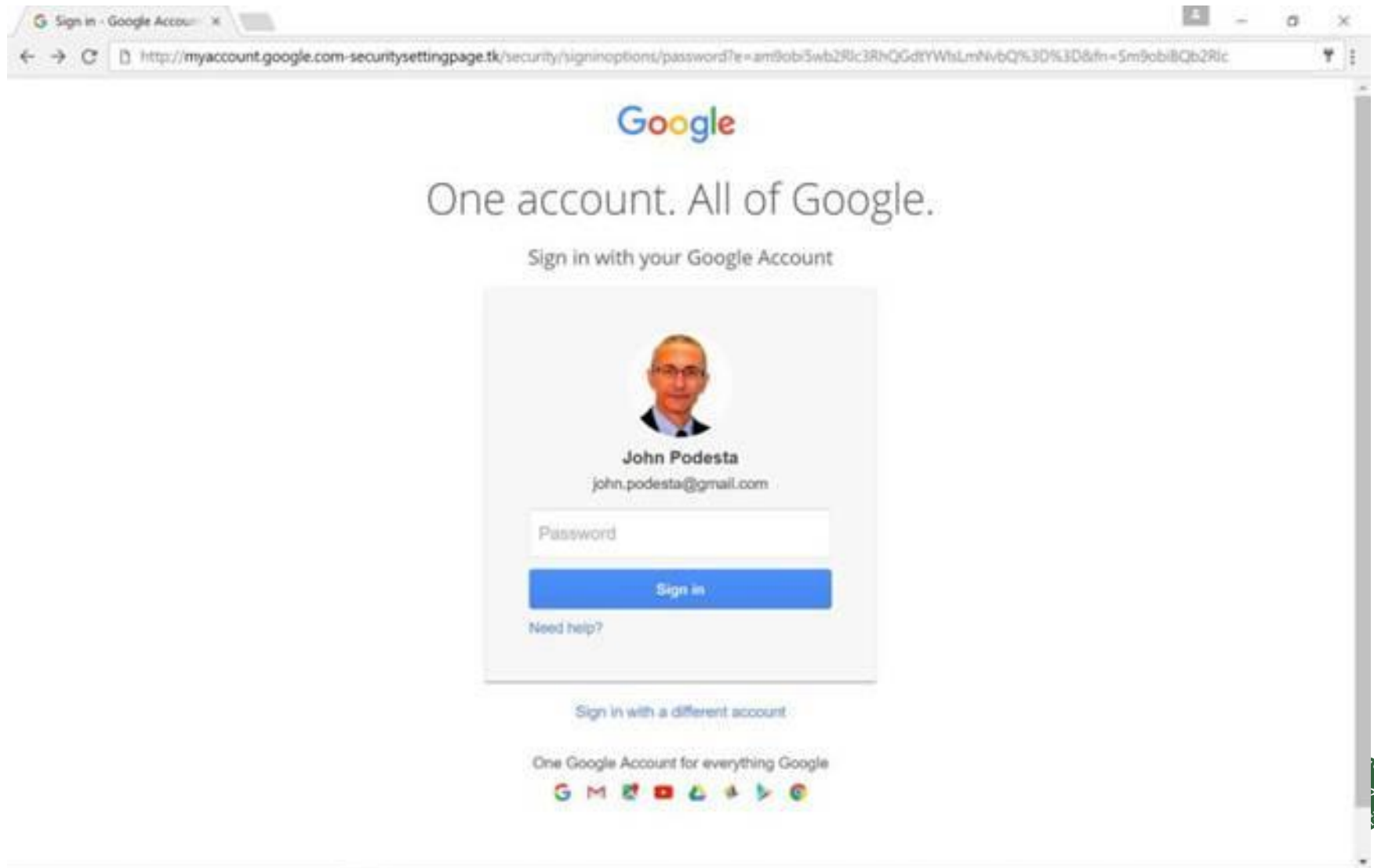
Google stopped this sign-in attempt. You should change your password immediately.

[CHANGE PASSWORD](#)

Best,
The Gmail Team



Can I click it?



Can I click it?

Be suspicious of all **links** that ask you to log in, regardless of the sender.

And be very careful of all **attached files** – regardless of the sender



By the way - do not "*enable content*" on documents with macros (.docm)

Don't click it – and don't pick it up either!

**Ah – og hvis du finder en USB-nøgle
på jorden: lad være med at teste den !**



Hvad gør man imod Social Engineering?

Pain Center



Forstå truslerne

Jo højere sikkerhed, jo mere sandsynlig er social engineering

Træning og understøttende procedurer

- hvad er advarselssignalerne
- procedure gør det svært for angriber

Ikke kun telefonen - også mail, chat, hjemmesider og fysisk fremmøde m.m.

"Hvordan kan vi forbedre vores procedurer?"



Ikke det samme for alle

Rette niveau af paranoia !

Hvis man føler sig *usikker* – ”der er et eller andet, der ikke føles rigtigt”



Forstå truslerne

O. Informationsindsamling

Makuler dokumenter

Forsigtig i offentlige rum

Information over telefonen, mail o.lign.,
særligt ved uventede henvendelser

1. Opbygge tillid

Meget snakkende

Hvorfor taler han om det?

Spørg ind ved fejl, hvis fejl fortsætter ->
afslut



Forstå truslerne

2. Scenariet

Hvis usikker: gencheck, gencheck, gencheck
Tag dig tid og følg proceduren

3. Pres

Teknikker der benyttes (awareness)

Giv ikke efter

Henvis til politikker og procedurer

Tilkald en leder hvis usikker (overfør risiko),
tag ikke beslutningen selv



Mulige tiltag

- **Awareness**
- **Opdateret software**
- **Brug 2FA (og/eller password manager)**
- **Bekræft med afsender (vha andre kanaler)**
- **Åben attachments på en sikker måde**
- **Backup**

A sense of urgency is always the first big clue

Giver pretext'en egentlig mening – ville et firma virkelig ringe til dig, eller bede dig om at ringe til dem?

Ville dét firma virkelig bede om den information?



Spørgsmål

