Autenticazione utente

Corso di Sicurezza
a.a. 2019-20

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Maggio 2020

Sommario

- Introduzione
- Password
- One-time password
- Challenge-Response
- Two-factor Authentication

Sistemi di autenticazione: principi

Per utilizzare un servizio, un utente deve autenticarsi

Pericoli

Sistemi di autenticazione: principi

Qualcosa che l'utente **POSSIEDE**

- cose fisiche o elettroniche, …

Qualcosa che l'utente **CONOSCE**

- password, PIN,…

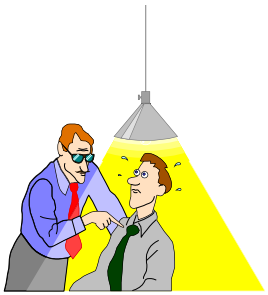
Qualcosa che l'utente **E´**

- **biometria**, cioè misura di proprietà biologiche

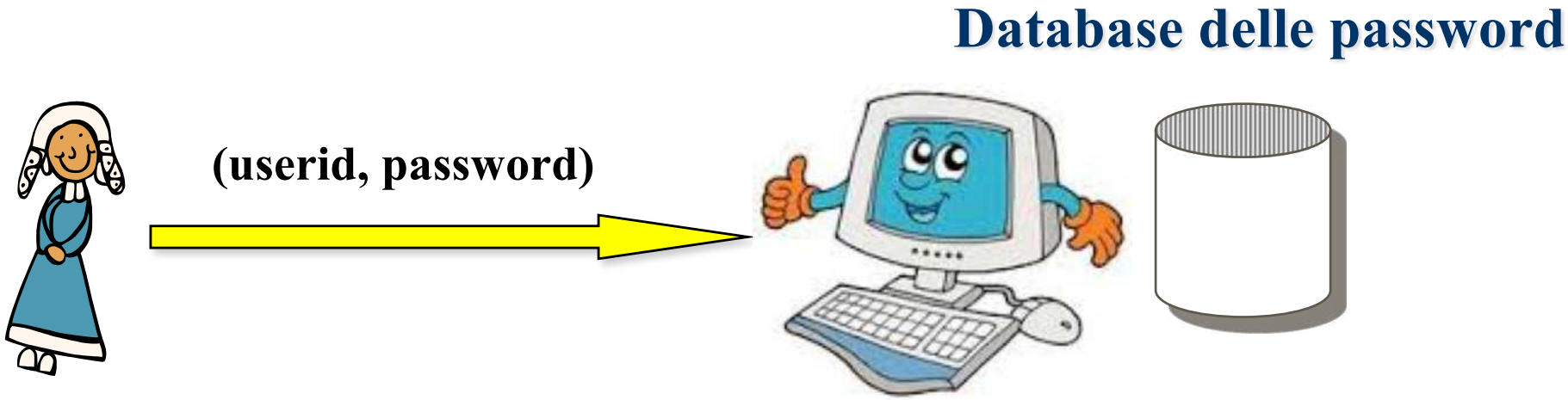
Caratteristiche

- Sicurezza
- Tempo dell'autenticazione (password, analisi DNA,…)
- Costo
- Complessità dell'update (riconoscimento vocale,…)
- Affidabilità e Mantenibilità
- Fattori psicologici:

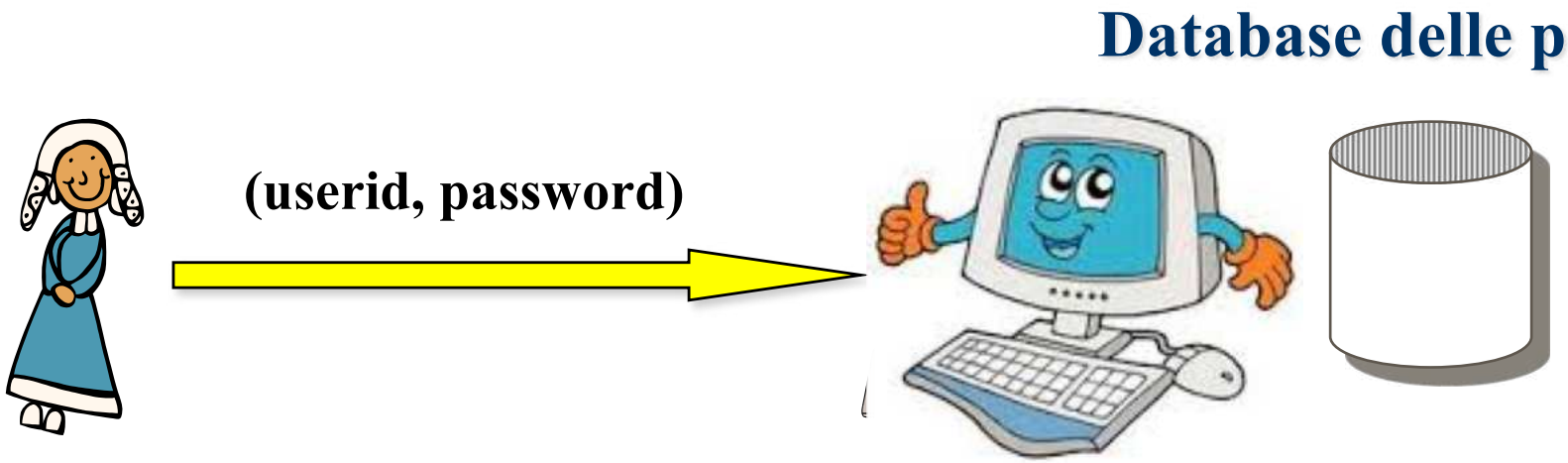
  accettabilità, facilità d´uso, …



Password



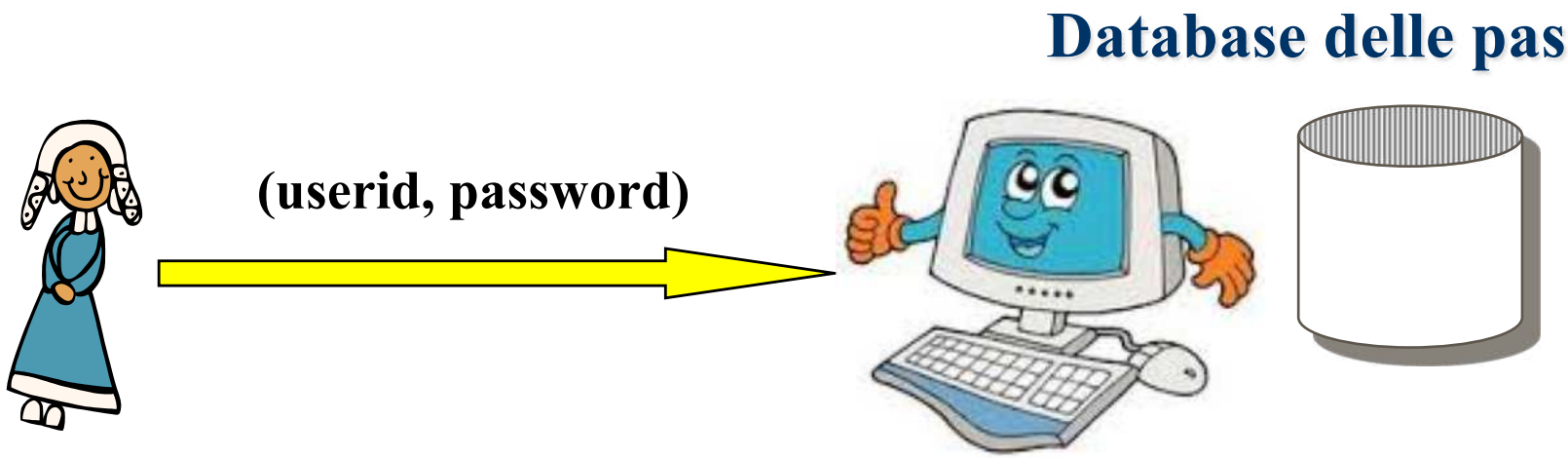
Password



Il sistema deve memorizzare una rappresentazione della password

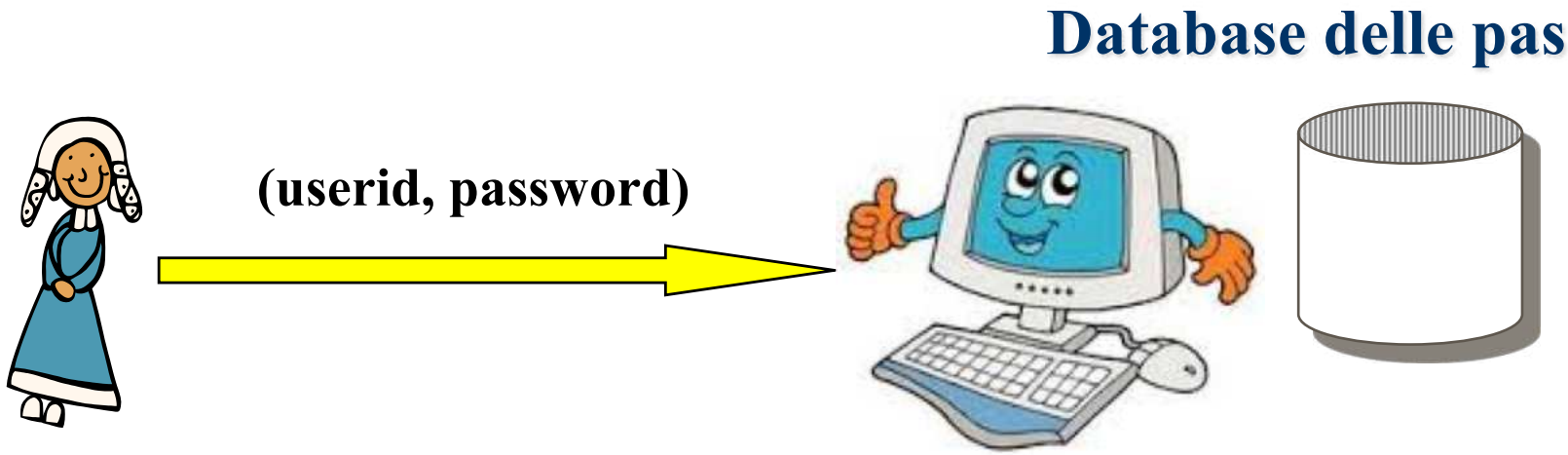
Come?

Password



Memorizzate in chiaro in un file protetto

Password



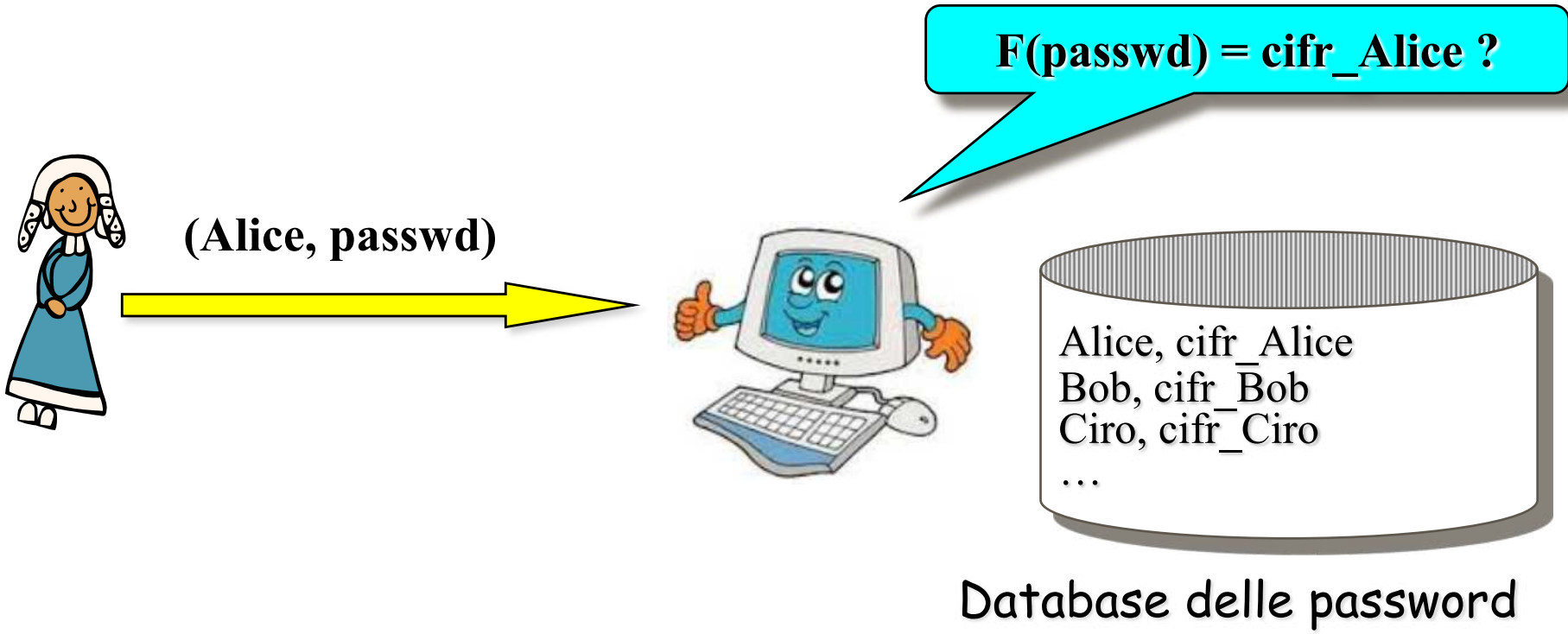
Memorizzate in chiaro in un file protetto

Problema:

nessuna protezione contro chi riesce a leggere il file

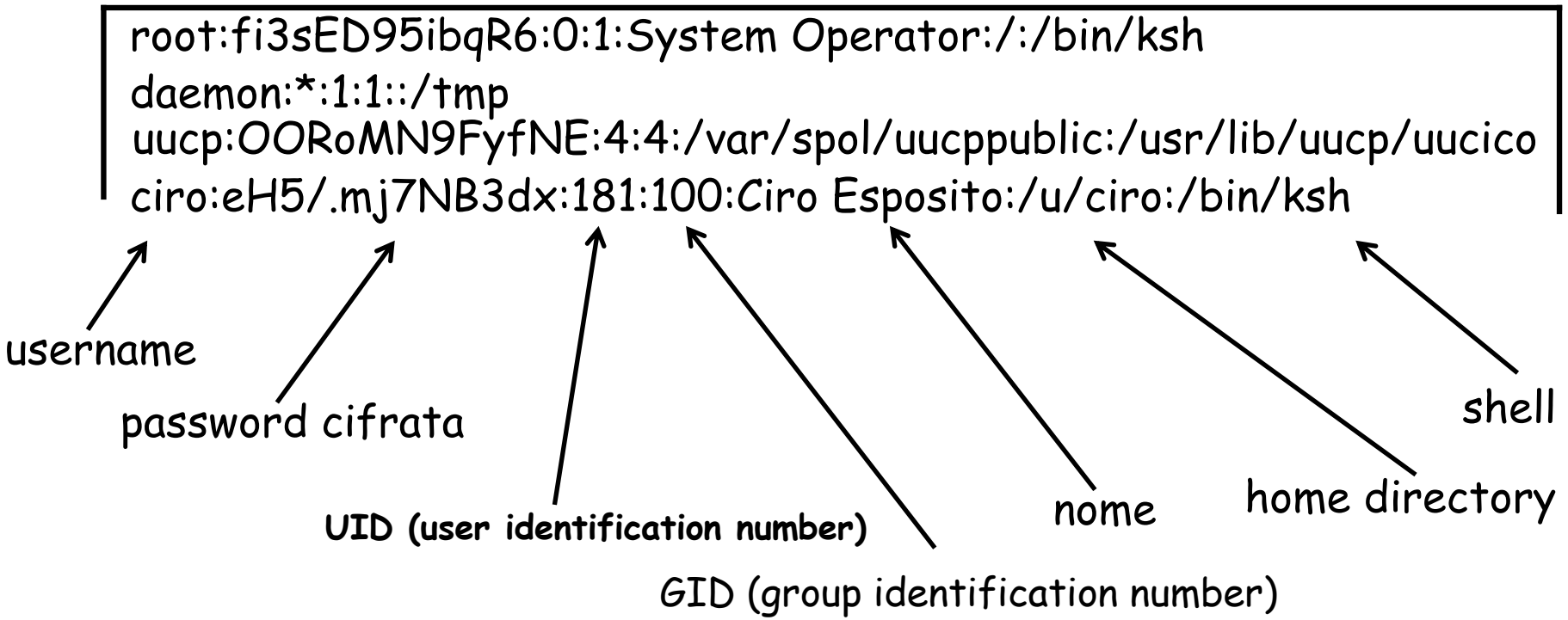
Password

Memorizzate in forma cifrata



Password sotto UNIX

File /etc/passwd



Password sotto UNIX

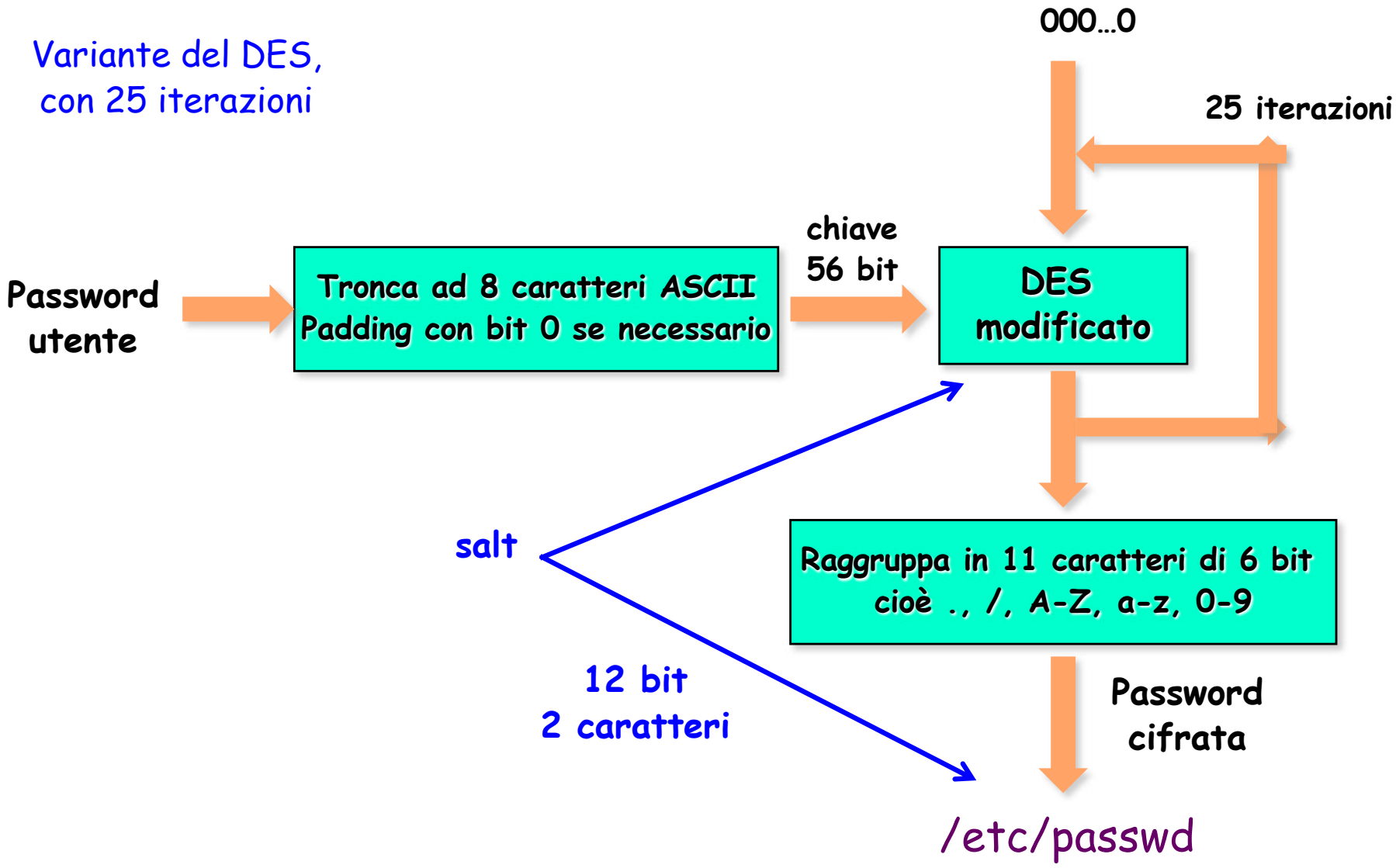
Funzione di cifratura = variante del DES

- Progettata da Robert Morris e Ken Thompson
- Evita la possibilità di usare chip DES disponibili commercialmente
- Evita che stesse password abbiano la stessa cifratura in diversi sistemi
- 25 iterazioni

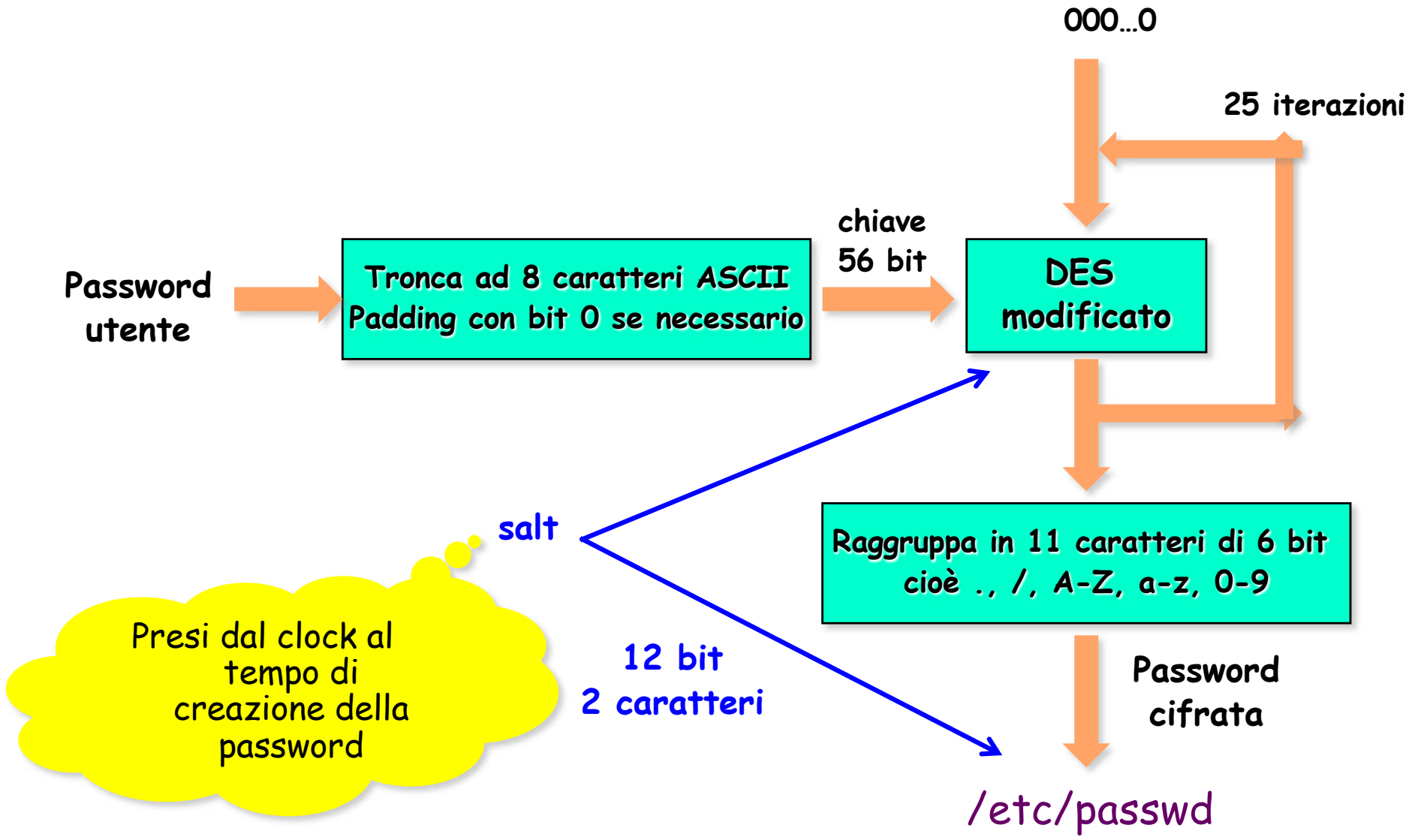
Maggiore difesa contro attacchi con dizionario

Funzione di cifratura crypt()

Variante del DES,
con 25 iterazioni



Funzione di cifratura crypt()



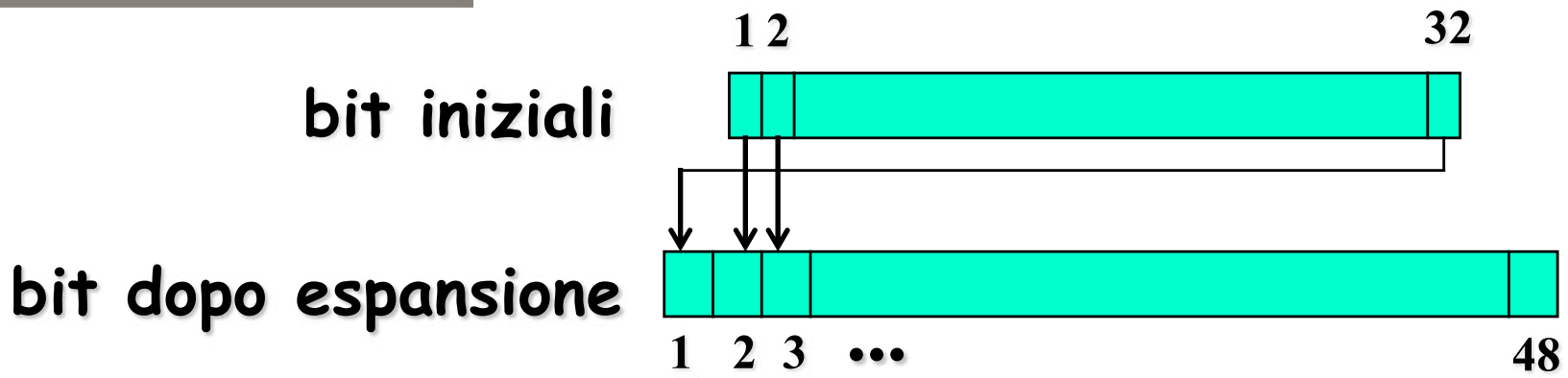
Password sotto UNIX

32	1	2	3	4	5
4	5	6	7	8	9
8	9	10	11	12	13
12	13	14	15	16	17
16	17	18	19	20	21
20	21	22	23	24	25
24	25	26	27	28	29
28	29	30	31	32	1

Espansione E
16 bit sono duplicati

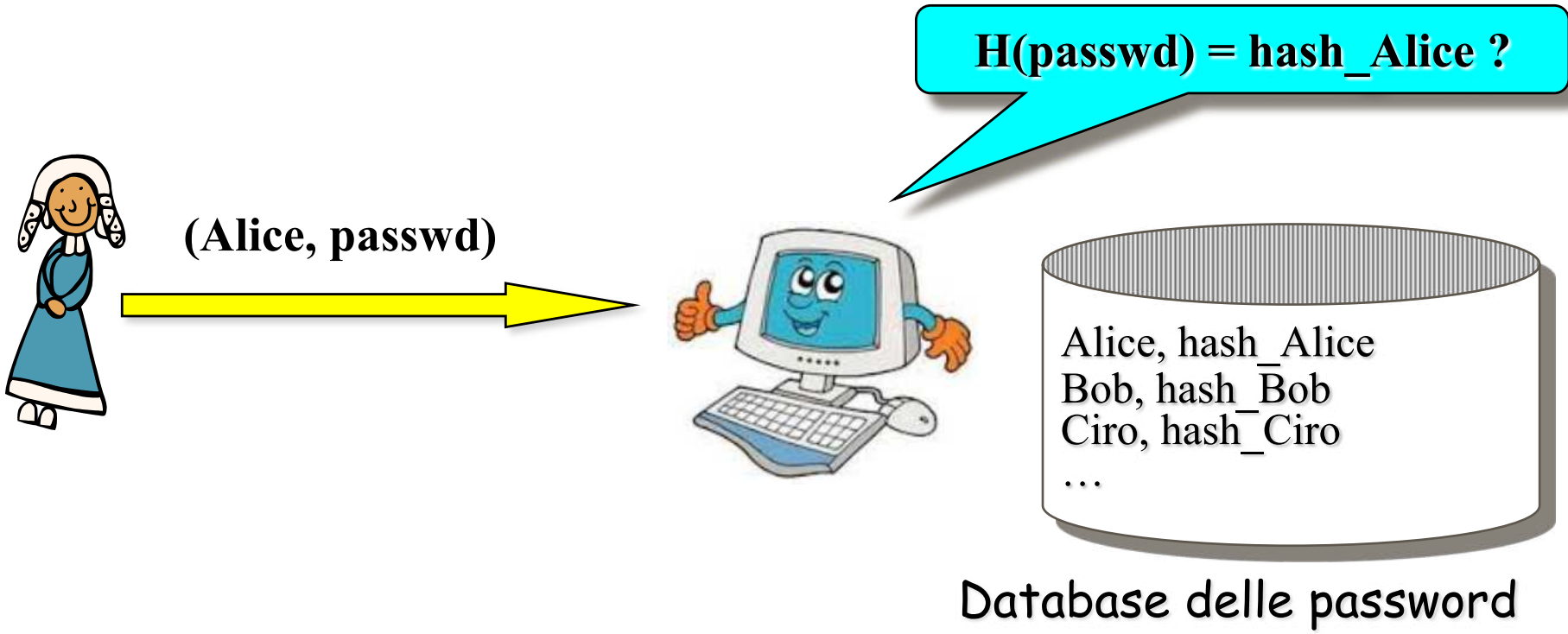
12 bit salt

- associati a 12 coppie (1,25), (2,26), (3,27),...
- Se bit salt =1 swap coppia corrispondente nei 48 bit output della tabella espansione E



Password

Memorizzato hash



Shadow Password

- Un cracker che ha in possesso il file delle password ha molte possibilità di intromettersi

- Difesa: utilizzare il sistema shadow:
  - si sostituisce una 'x' alla password cifrata nel file "passwd"
  - il file "shadow" contiene i cifrati ma è accessibile solo da root

Shadow password

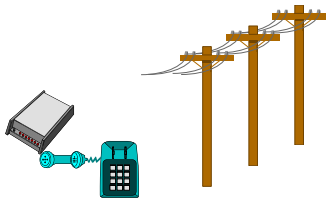
```
masucci:x:500:100:Masucci Barbara:/home/masucci:/bin/bash

masucci:FeEQShVEhOlq6:10889:0:10000:::
```

Password: attacchi

Spiare durante la digitazione

Intercettazioni



Tentare a caso o sistematicamente

- In genere bassa entropia, quindi *deboli* password
- Attacchi con dizionario

Spiare password

- Video e poi riconoscimento automatico
- Successo 90% per Pin 4-digit da 3 metri

  Anche se non visibili i punti di contatto
  - Google Glass, 83%
  - iPhone 5, 100%
  - $72 Logitech webcam, 92%
- Successo 78% per password 8-caratteri su tastiera QWERTY di iPad

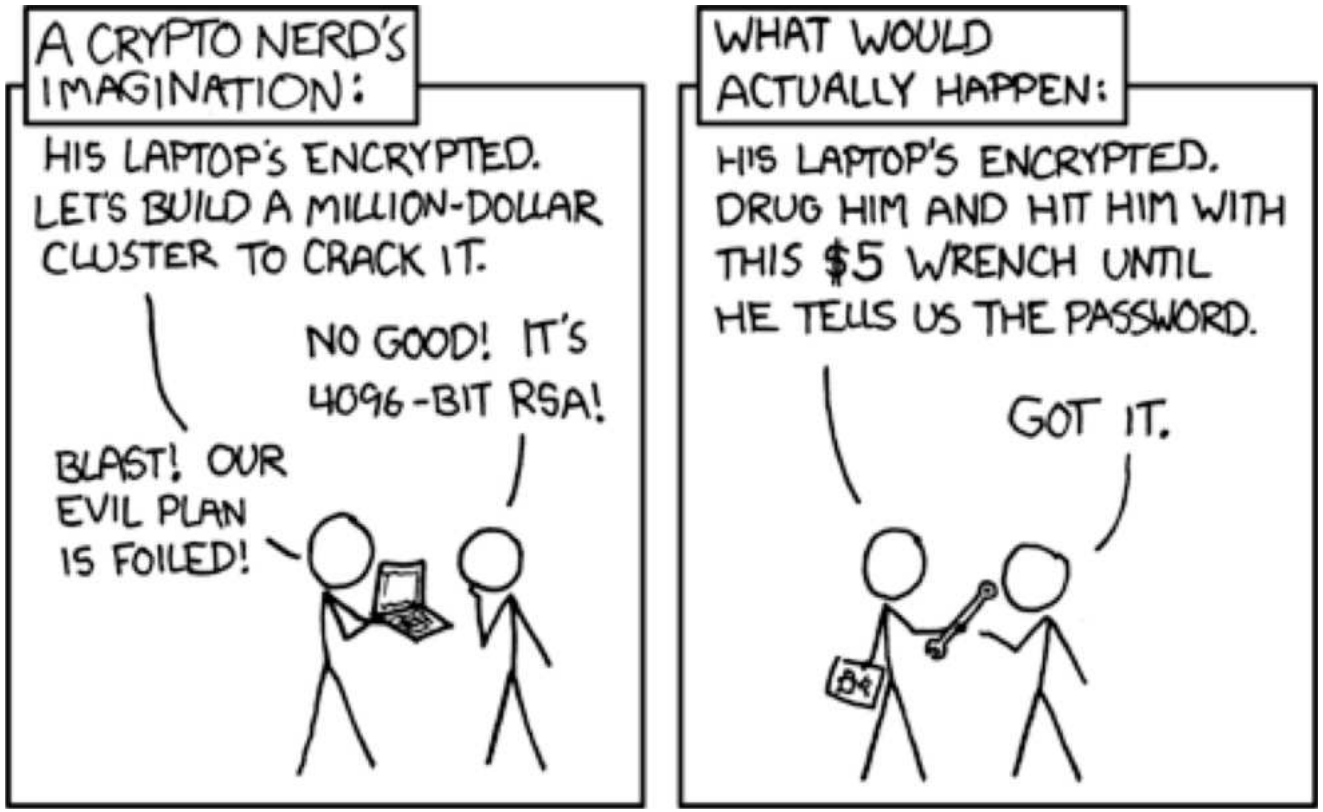
My Google glass see your password, Blackhat 2014

Spiare password

- $700 Panasonic camcorder
- Successo 100% per pin di iPad

My Google glass see your password, Blackhat 2014

Altri attacchi



http://xkcd.com/538/

Altri attacchi

ars technica

Drug dealer: Cops leaned me over 18th floor balcony to get my password

"This is *Training Day* for f—ing real."

by **Nate Anderson** - Apr 22, 2015 1:45pm CEST

Share Tweet 152

If you want access to encrypted data on a drug dealer's digital device, you might try to break the crypto —or you might just try to break the man.

According to testimony from a police corruption trial currently roiling the city of Philadelphia, officers from an undercover drug squad took the latter route back in November 2007. After arresting their suspect, Michael Cascioli, in the hallway outside his 18th floor apartment, the officers took Cascioli back inside. Although they lacked a search warrant, the cops searched Cascioli's rooms anyway. According to a federal indictment (PDF), the officers "repeatedly assaulted and threatened [Cascioli] during the search to obtain information about the location of money, drugs, and drug suppliers."

Enlarge / Officer Thomas Liciardello, accused of being the ringleader of a corrupt undercover unit.

Cascioli kept $800 of cash in his nightstand, which he told the cops about. The officers allegedly "took money from [Cascioli's] nightstand and used it to purchase pizza" for themselves.

Cascioli, who gave an interview last October to the Philadelphia *Daily News*, said the cops wanted much more cash. (The trial has largely focused on allegations that members of the squad shook down drug suspects for money and valuables.) "I'm going to f—ing break your face if you don't tell us where the f— money is," Cascioli recalled one officer

http://arstechnica.com/tech-policy/2015/04/drug-dealer-cops-leaned-me-over-18th-floor-balcony-to-get-my-password/

Ricerca esaustiva

Tempo richiesto per una ricerca esaustiva $T = c^n \cdot t \cdot y$

- **c** numero di possibili caratteri
- **n** lunghezza della password
- **t** numero di iterazione di hash/cifratura, **t** = 25
- **y** tempo richiesto per singola iterazione, **y** = 1/125.000 sec

⇨ c ⇩ n	26 (minuscole)	36 (minuscole alfanumerici)	62 (min. e maius. alfanumerici)	95 (caratteri tastiera)
5	0,67 ore	3,4 ore	51 ore	430 ore
6	17 ore	120 ore	130 giorni	4,7 anni
7	19 giorni	180 giorni	22 anni	442 anni
8	1,3 anni	18 anni	1385 anni	42.073 anni
9	34 anni	644 anni	85.852 anni	3.997.015 anni
10	895 anni	23.187 anni	5.322.801 anni	3.879.716.476 anni

Attacco con dizionario

- Si basa sulla possibilità che un utente utilizzi come password una parola di senso compiuto
- Tenta di "indovinare" una password utilizzando un file di parole (il dizionario)
- Il successo dipende dalla bontà del dizionario

Trovata passwd di Ken Thompson

- File /etc/passwd trovato nel 2014 con le passwd di Dennis Ritchie, Ken Thompson, Brian Kernighan, Steve Bourne, Bill Joy
- Passwd di Thompson cifrata con crypt(3): ZghOT0eRm4U9s
- Trovata la passwd: p/q2-q4!
- Insieme a Joe Condon costrui *Belle*, chess computer world champion nel 1980

```
From: Nigel Williams <nw@retrocomputingtasmania.com>
Cc: TUHS main list <tuhs@minnie.tuhs.org>
Subject: Re: [TUHS] Recovered /etc/passwd files
Date: Wed, 9 Oct 2019 16:49:48 +1100
Message-ID: <CACCFpdx_6oeyNkgH_5jgfxbxWbZ6VtOXQNKOso
In-Reply-To: <8088e5bd-3530-d3e1-8066-db6ea9389dea@k

ken is done:

ZghOT0eRm4U9s:p/q2-q4!

took 4+ days on an AMD Radeon Vega64 running hashcat at about 930MH/s
during that time (those familiar know the hash-rate fluctuates and
slows down towards the end).
```

Password Crackers

- Usano anche dizionari ed un insieme di regole modificabili dall'utente
- Richiede l'accesso al file delle passwd
- Il successo dipende dalla bontà del dizionario

Password Crackers

- Usano anche dizionari ed un insieme di regole modificabili dall'utente
- Richiede l'accesso al file delle passwd
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Alcuni password crackers:

Crack	John the Ripper	THC Hydra
Brutus	Hashcat	Medusa
RainbowCrack	Hydra	OphCrack
Wfuzz	DaveGrohl	L0phtCrack
Cain and Abel	ElcomSoft	Aircrack-NG

Controllo della password

Per evitare cattive scelte come password

- Alcuni sys. admin. scelgono loro la password per gli utenti
- Uso di software per il controllo della scelta

  Freeware per UNIX: npasswd, passwd+, anlpasswd,...

  Esempio vincoli:
  - min lunghezza
  - min numero caratteri alfabetici
  - min numero caratteri non-alfabetici
  - max numero caratteri ripetuti
  - elenco parole proibite
- **Password Crackers** per testare il file /etc/passwd

Vulnerabiltà delle password

Morris e Thompson (*CACM*, 1979) esaminarono 3289 password trovandone 2831 (86%) vulnerabili tra cui:

- 15 erano un singolo carattere ASCII
- 72 erano una stringa di 2 caratteri ASCII
- 464 erano una stringa di 3 caratteri ASCII
- 477 erano una stringa di 4 caratteri alfanumerici
- 706 erano una stringa di 5 lettere tutte minuscole o tutte maiuscole
- 605 erano una stringa di 6 lettere tutte minuscole

Altre Vulnerabilità

Nomi comuni (Anna, Maradona,…)

Parole comuni (computer,…)

Specificità dell'utente (telefono, targa, date, indirizzi,…)

Permutazioni delle precedenti (a ritroso,…)

Il worm di Internet (novembre 1988) provava:

- nessuna password
- user name
- user name concatenato con se stesso
- cognome
- cognome a ritroso
- dizionario di 432 parole

Idee per scegliere una password

Usare minuscole e maiuscole

Usare numeri e lettere

Effettuare sostituzioni sistematiche, come o ⇨ 0 ℓ ⇨ 1

Includere caratteri non alfanumerici

Scegliere lettere da una frase lunga

Lunga (7/8 caratteri)

Facile da ricordare (nessuna necessità di scriverla su carta!)

Esempi: DA.nMdCdNV qE'uC24o ...

Survey di Klein [1989]

Survey su circa 15.000 account

4 DECstation 3100

- ognuna provava 750 password al secondo

Dizionario di 62.727 parole

2.7% (cioè 368) trovate nei primi 15 minuti

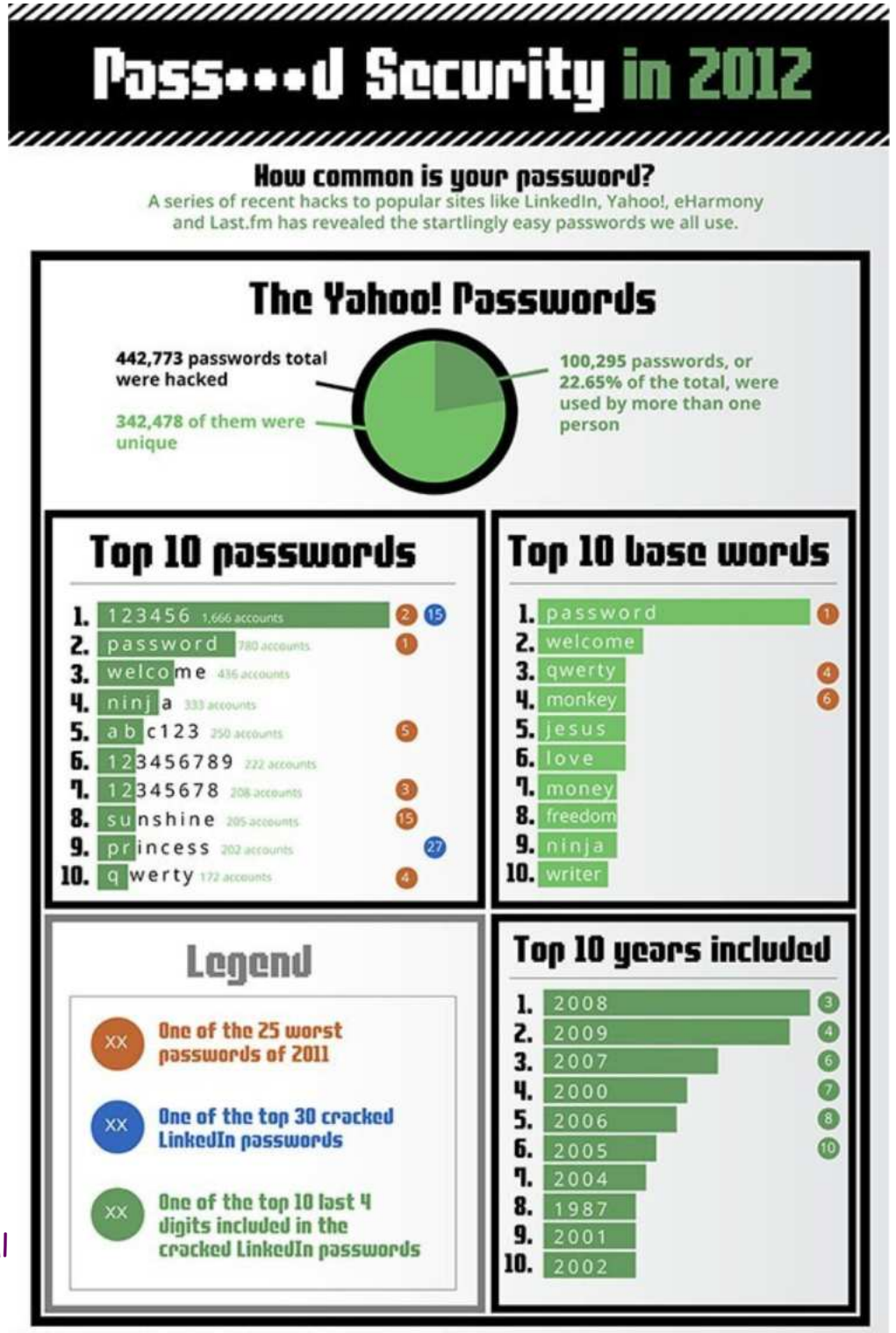
21% (circa 3000) trovate nella prima settimana

25% in 4 mesi

Password trovate

Tipo di password trovate	taglia	matches	% su totale
User/account name	130	368	2,7%
Sequenze caratteri	866	22	0,2%
Numeri	427	9	0,1%
Cinese	392	56	0,4%
Nome luoghi	628	82	0,6%
Nomi comuni	2239	548	4,0%
Nomi femminili	4280	161	1,2%
Nomi maschili	2866	140	1,0%
Termini sportivi	238	32	0,2%
Fantascienza	691	59	0,4%
Film e attori	99	12	0,1%
Cartoni animati	92	9	0,1%
Bibbia	7525	83	0,6%
...	...	...	...

Password facili



http://graphs.net/statistics-password-security.html

Password più frequenti nel 2019

Rank	Password
1	123456
2	123456789
3	qwerty
4	password
5	1234567
6	12345678
7	12345
8	iloveyou
9	111111
10	123123
11	abc123
12	qwerty123
13	1q2w3e4r
14	admin
15	qwertyuiop
16	654321
17	555555
18	lovely
19	7777777
20	welcome
21	888888
22	princess
23	dragon
24	password1
25	123qwe

SplashData, Dicembre 2019

https://www.helpnetsecurity.com/2019/12/18/worst-passwords-of-2019/

Password più frequenti nel 2019

Rank	Password
1	123456
2	123456789
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7	12345
8	iloveyou
9	111111
10	123123
11	abc123
12	qwerty123
13	1q2w3e4r
14	admin
15	qwertyuiop
16	654321
17	555555
18	lovely
19	7777777
20	welcome
21	888888
22	princess
23	dragon
24	password1
25	123qwe

And, just for reference, here were the 10 most common passwords of 2018:

1. 123456
2. password
3. 123456789
4. 12345678
5. 12345
6. 111111
7. 1234567
8. sunshine
9. qwerty
10. iloveyou

SplashData

https://metro.co.uk/2019/12/19/10-worst-passwords-2019-revealed-nothing-changed-11932281

Invecchiamento password

Cambiare la password migliora la sicurezza!

… non troppo spesso però! (immaginate ad ogni log in)

Fissare il tempo di vita di una password

- L'utente è costretto a cambiare password
- Migliora la sicurezza (se una password è compromessa…)

Per evitare il riutilizzo di vecchie password

- Memorizzare tutte le password di un utente
- Fissare un minimo tempo di uso per ogni password

SVR4 UNIX: passwd -n 7 -x 50 ciro (min 7 max 50 giorni)

Password-strength evaluators

Ci sono parecchie applicazioni che valutano la bontà della password … prima che venga inserita

Password-strength evaluators

https://www.microsoft.com/it-it/security/pc-security/password-checker.aspx

Password-strength evaluators

Test Your Password		Minimum Requirements
Password:	We5?$"a'	• Minimum 8 characters in length • Contains 3/4 of the following items: - Uppercase Letters - Lowercase Letters - Numbers - Symbols
Hide:	☐	
Score:	100%	
Complexity:	Very Strong	

Additions		Type	Rate	Count	Bonus
✓	Number of Characters	Flat	+(n*4)	8	+ 32
✓	Uppercase Letters	Cond/Incr	+((len-n)*2)	1	+ 14
✓	Lowercase Letters	Cond/Incr	+((len-n)*2)	2	+ 12
✓	Numbers	Cond	+(n*4)	1	+ 4
✓	Symbols	Flat	+(n*6)	4	+ 24
✓	Middle Numbers or Symbols	Flat	+(n*2)	4	+ 8
✓	Requirements	Flat	+(n*2)	5	+ 10
Deductions					
✓	Letters Only	Flat	-n	0	0
✓	Numbers Only	Flat	-n	0	0
✓	Repeat Characters (Case Insensitive)	Comp	-	0	0
✓	Consecutive Uppercase Letters	Flat	-(n*2)	0	0
✓	Consecutive Lowercase Letters	Flat	-(n*2)	0	0
✓	Consecutive Numbers	Flat	-(n*2)	0	0
✓	Sequential Letters (3+)	Flat	-(n*3)	0	0
✓	Sequential Numbers (3+)	Flat	-(n*3)	0	0
✓	Sequential Symbols (3+)	Flat	-(n*3)	0	0

Legend

- **Exceptional:** Exceeds minimum standards. Additional bonuses are applied.
- **Sufficient:** Meets minimum standards. Additional bonuses are applied.
- **Warning:** Advisory against employing bad practices. Overall score is reduced.
- **Failure:** Does not meet the minimum standards. Overall score is reduced.

Test Your Password		Minimum Requirements
Password:	security	• Minimum 8 characters in length • Contains 3/4 of the following items: - Uppercase Letters - Lowercase Letters - Numbers - Symbols
Hide:	☐	
Score:	10%	
Complexity:	Very Weak	

Additions		Type	Rate	Count	Bonus
✓	Number of Characters	Flat	+(n*4)	8	+ 32
✗	Uppercase Letters	Cond/Incr	+((len-n)*2)	0	0
✓	Lowercase Letters	Cond/Incr	+((len-n)*2)	8	0
✗	Numbers	Cond	+(n*4)	0	0
✗	Symbols	Flat	+(n*6)	0	0
✗	Middle Numbers or Symbols	Flat	+(n*2)	0	0
✗	Requirements	Flat	+(n*2)	2	0
Deductions					
!	Letters Only	Flat	-n	8	- 8
✓	Numbers Only	Flat	-n	0	0
✓	Repeat Characters (Case Insensitive)	Comp	-	0	0
✓	Consecutive Uppercase Letters	Flat	-(n*2)	0	0
!	Consecutive Lowercase Letters	Flat	-(n*2)	7	- 14
✓	Consecutive Numbers	Flat	-(n*2)	0	0
✓	Sequential Letters (3+)	Flat	-(n*3)	0	0
✓	Sequential Numbers (3+)	Flat	-(n*3)	0	0
✓	Sequential Symbols (3+)	Flat	-(n*3)	0	0

Legend

- **Exceptional:** Exceeds minimum standards. Additional bonuses are applied.
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http://www.passwordmeter.com

Telepathwo

Telepathwords

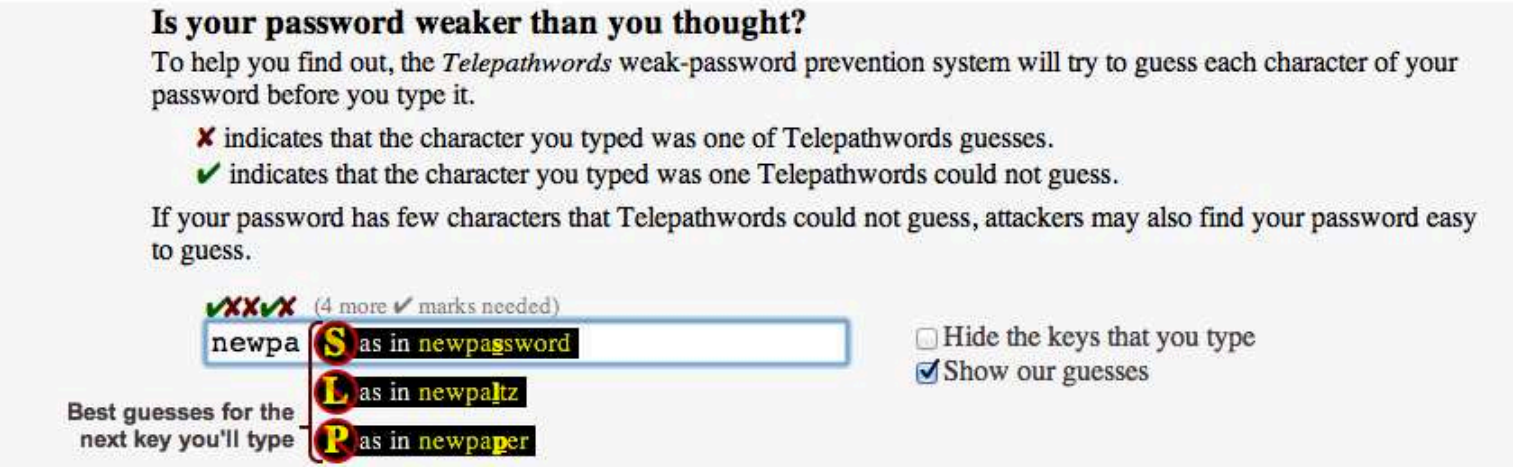
Preventing weak passwords by reading your mind

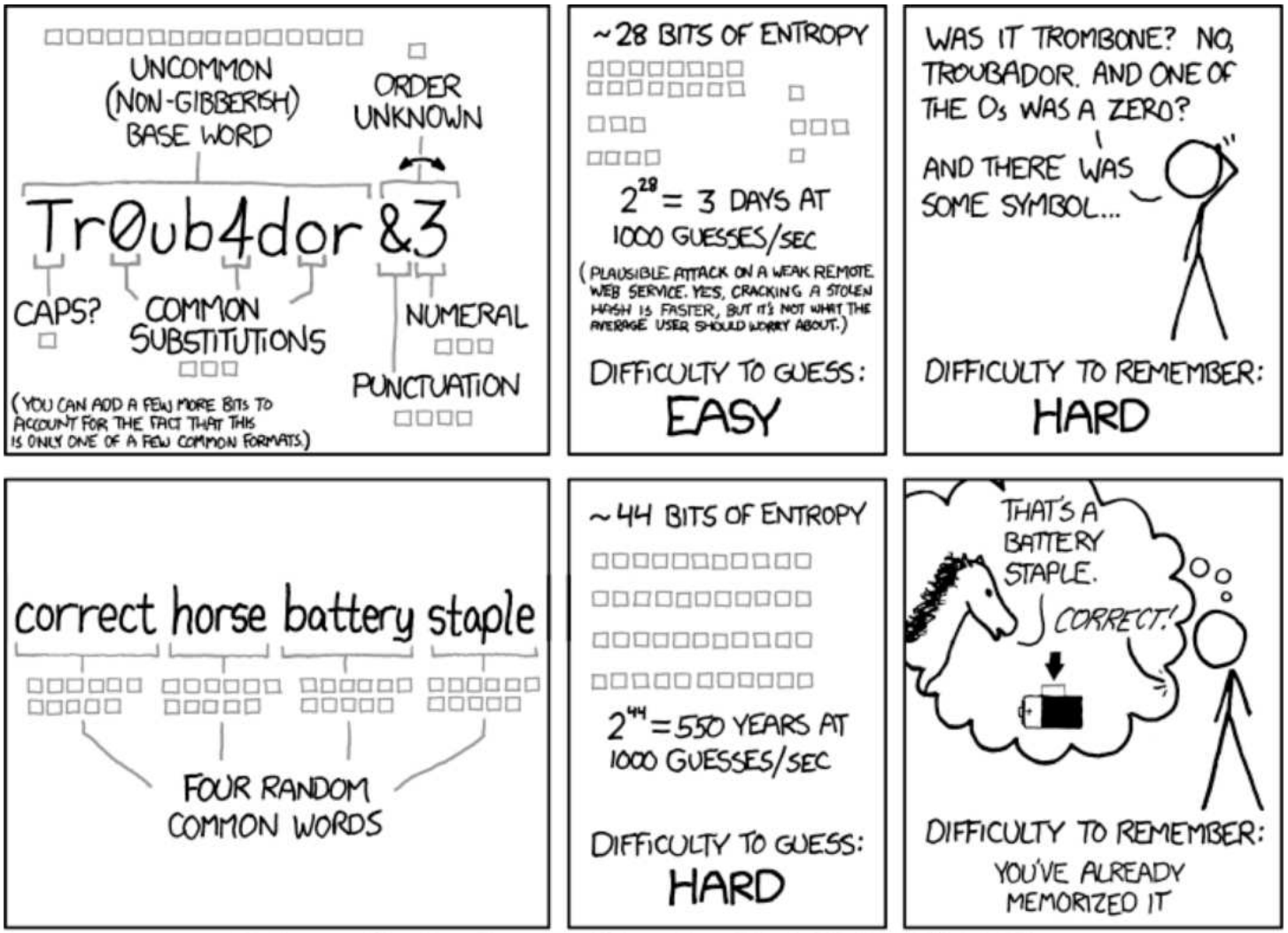
Microsoft Research

https://telepathwords.research.microsoft.com

Telepathwords tries to predict the next character of your passwords by using knowledge of:

- common passwords, such as those made public as a result of security breaches
- common phrases, such as those that appear frequently on web pages or in common search queries
- common password-selection behaviors, such as the use of sequences of adjacent keys





THROUGH 20 YEARS OF EFFORT, WE'VE SUCCESSFULLY TRAINED EVERYONE TO USE PASSWORDS THAT ARE HARD FOR HUMANS TO REMEMBER, BUT EASY FOR COMPUTERS TO GUESS.

http://xkcd.com/936/

CORRIERE DELLA SERA 10 aprile 2015

Gaffe della tv francese piratata da Isis Mandano in onda le password

La gaffe della tv francese piratata: tutte le password dietro all'intervistato
Certamente non era previsto: dopo l'attacco informatico di mercoledì sera alla televisione francese TV5Monde da parte di un gruppo di hacker che si richiama allo Stato Islamico, la redazione dell'emittente è incappata in una imbarazzante gaffe. Durante un'intervista col programma 13 Heures di France 2 (proprio sull'attacco hacker) un giornalista si è messo di fronte ad una parete sulla quale si vedono le password per il canale YouTube, Twitter e Instagram.

Password di YouTube:
"lemotdepassedeyoutube"

Social Engineering
(People Are the Weak Security Link)

REUTERS

TOP NEWS

Exclusive: Snowden persuaded other NSA workers to give up passwords - sources

Thu, Nov 07 22:07 PM EST

By Mark Hosenball and Warren Strobel

WASHINGTON (Reuters) - Former U.S. National Security Agency contractor Edward Snowden used login credentials and passwords provided unwittingly by colleagues at a spy base in Hawaii to access some of the classified material he leaked to the media, sources said.

A handful of agency employees who gave their login details to Snowden were identified, questioned and removed from their assignments, said a source close to several U.S. government investigations into the damage caused by the leaks.

Snowden may have persuaded between 20 and 25 fellow workers at the NSA regional operations center in Hawaii to give him their logins and passwords by telling them they were needed for him to do his job as a computer systems administrator, a second source said.

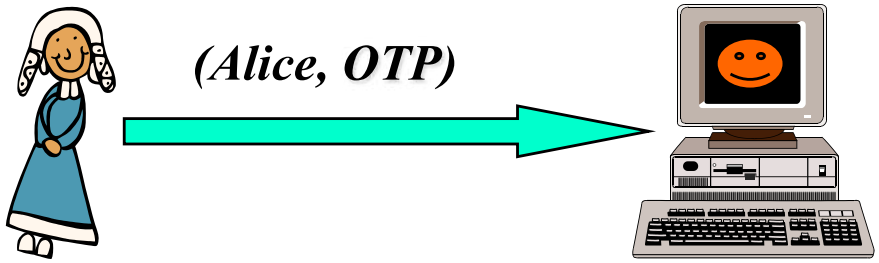
The revelation is the latest to indicate that inadequate security measures at the NSA played a significant role in the worst breach of classified data in the super-secret eavesdropping agency's 61-year history.

Sommario

- Introduzione
- Password
- One-time password
- Challenge-Response
- Two-factor Authentication

One-time Password

Ogni password è usata solo una volta!



Vedremo:

- Lista condivisa
- Schema di Lamport
- HMAC-Based One-Time Password
- Time-Based One-Time Password

One-time Password

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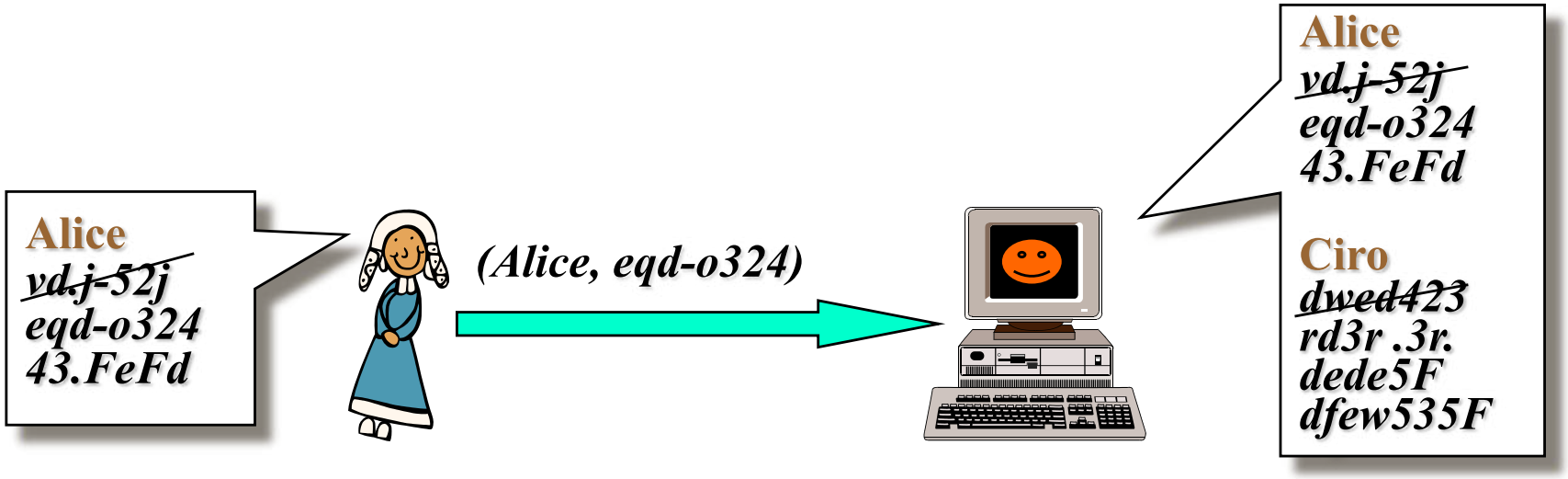
Lista condivisa

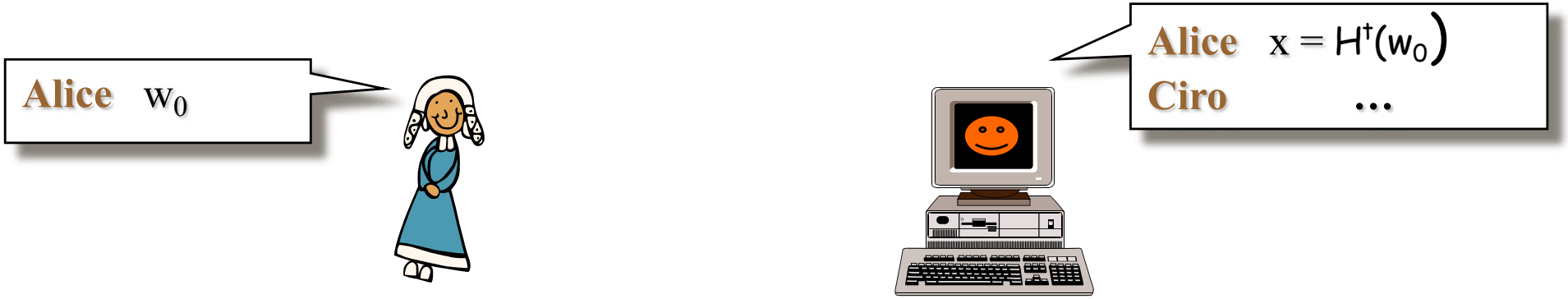


Schema di Lamport

Schema di Lamport per t autenticazioni (H funzione hash)

Alice sceglie w_0. Sia $H^i(w_0) = \underbrace{H(H(\ldots H(w_0)\ldots))}_{i \text{ volte}}$

Inizializzazione



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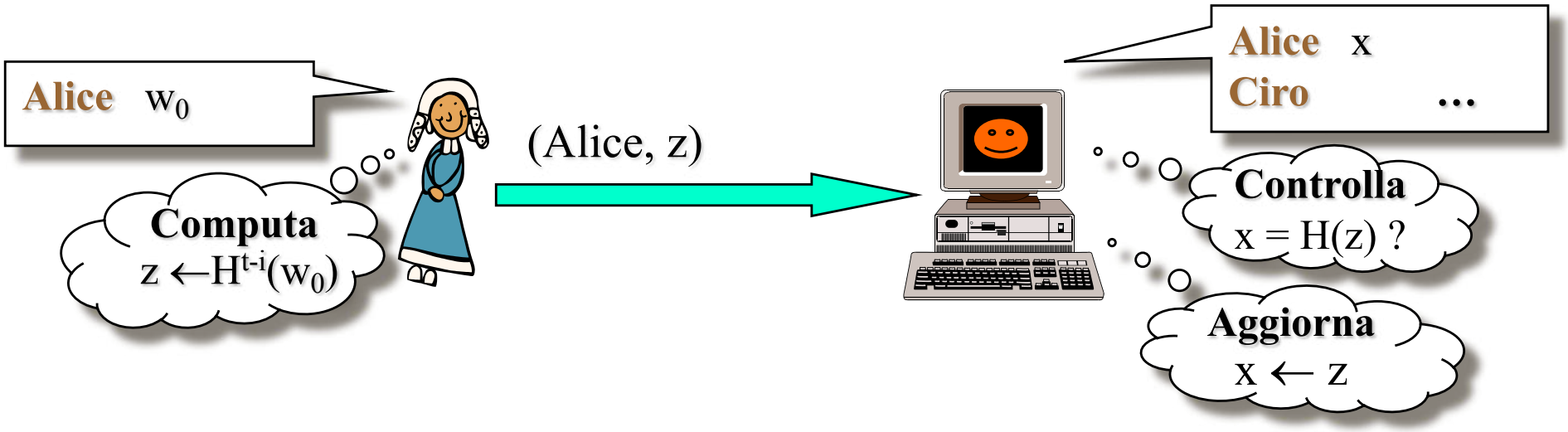
Per l'i-esima autenticazione



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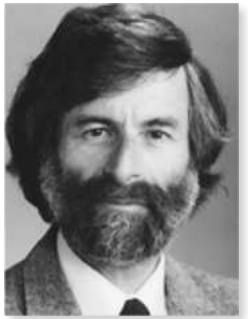


Leslie Lamport,

"Password Authentication with Insecure Communication"

Communications of the ACM, November 1981

S/Key, sviluppato nei laboratori Bellcore

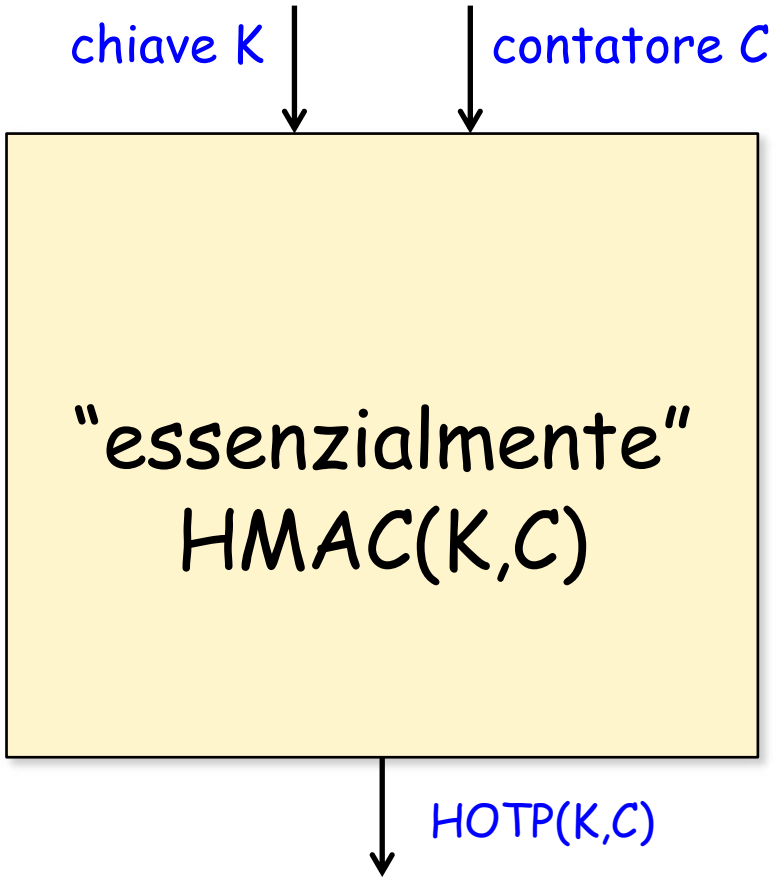
RFC 1760, The S/KEY One-Time Password System,
febbraio 1995

HMAC-Based One-Time Password Algorithm

Pubblicato come RFC 4226

HOTP: An HMAC-Based One-Time Password Algorithm

(dicembre 2005)



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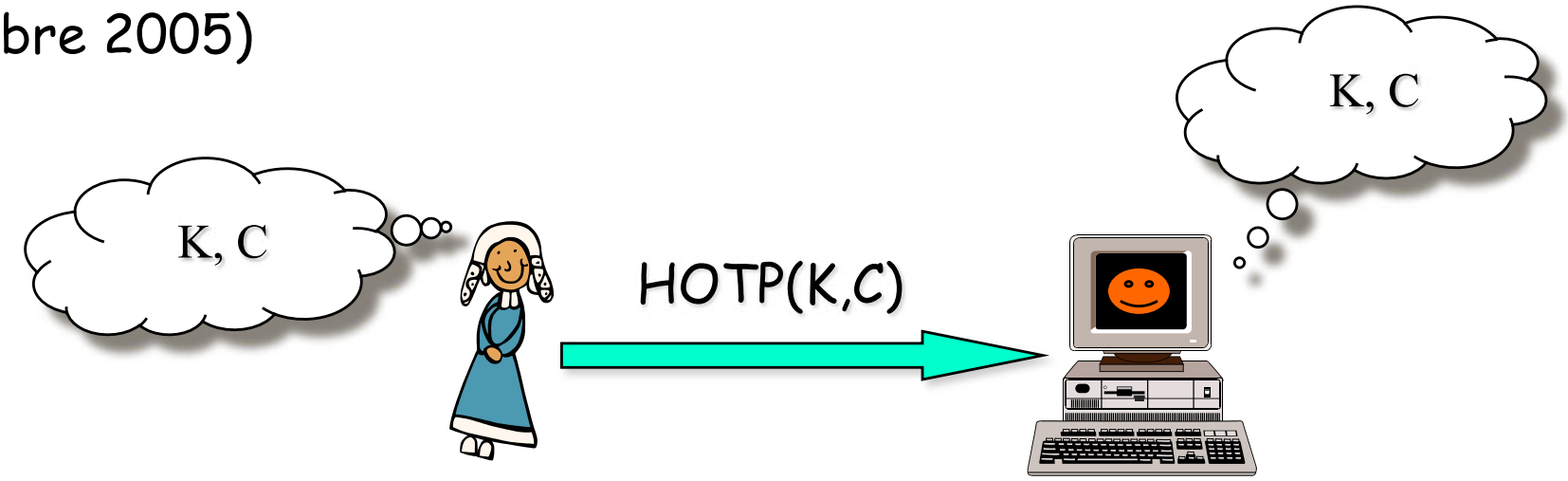

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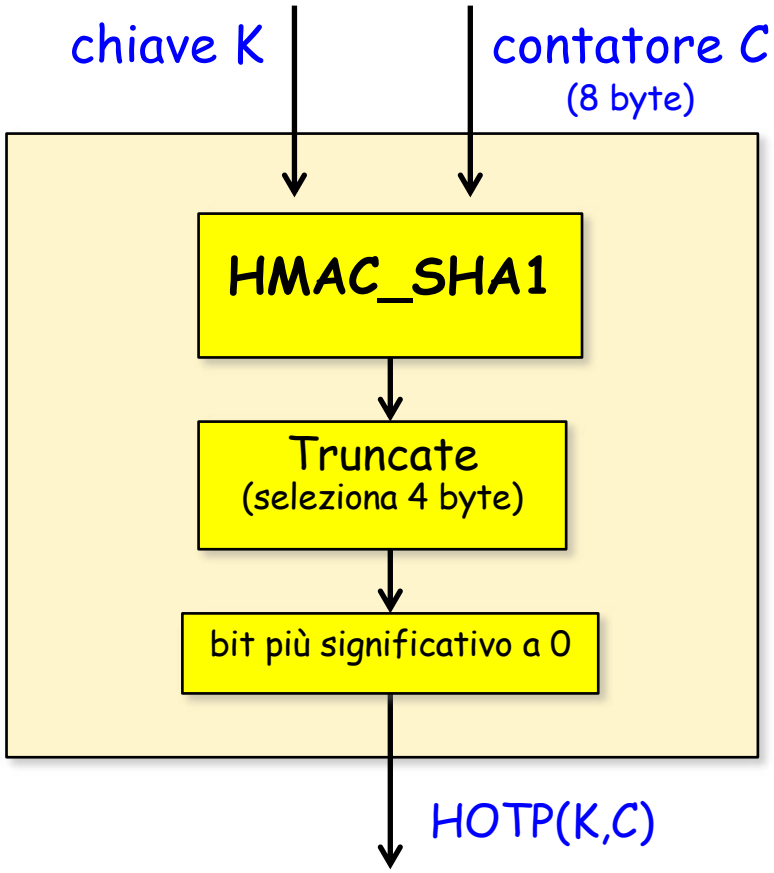

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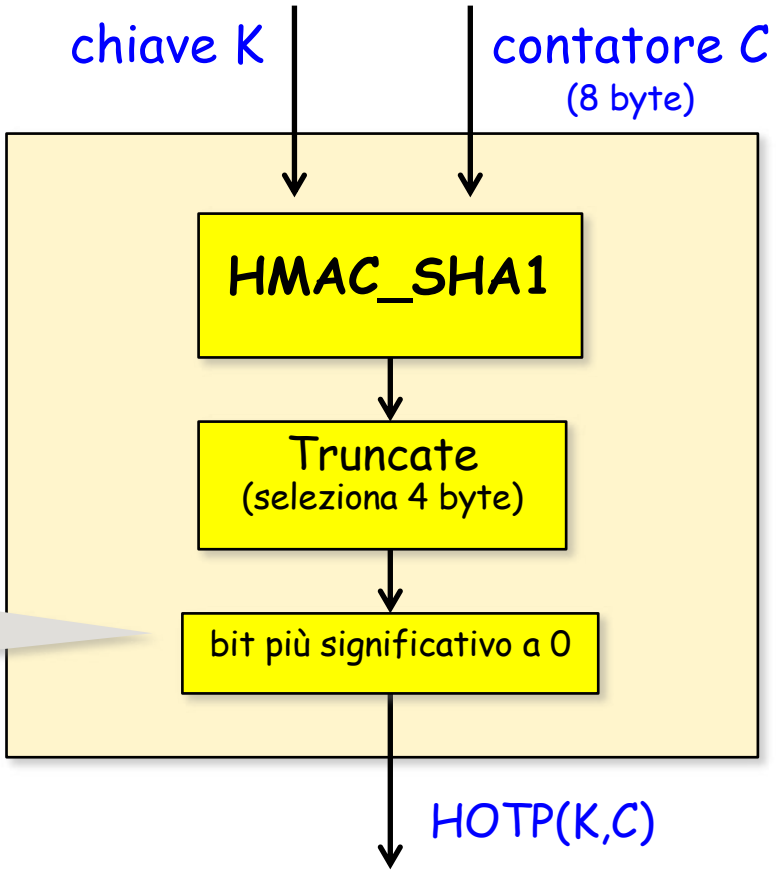

AND con 0x7FFFFFFF

serve per evitare ambiguità nella possibile interpretazione come intero signed / unsigned

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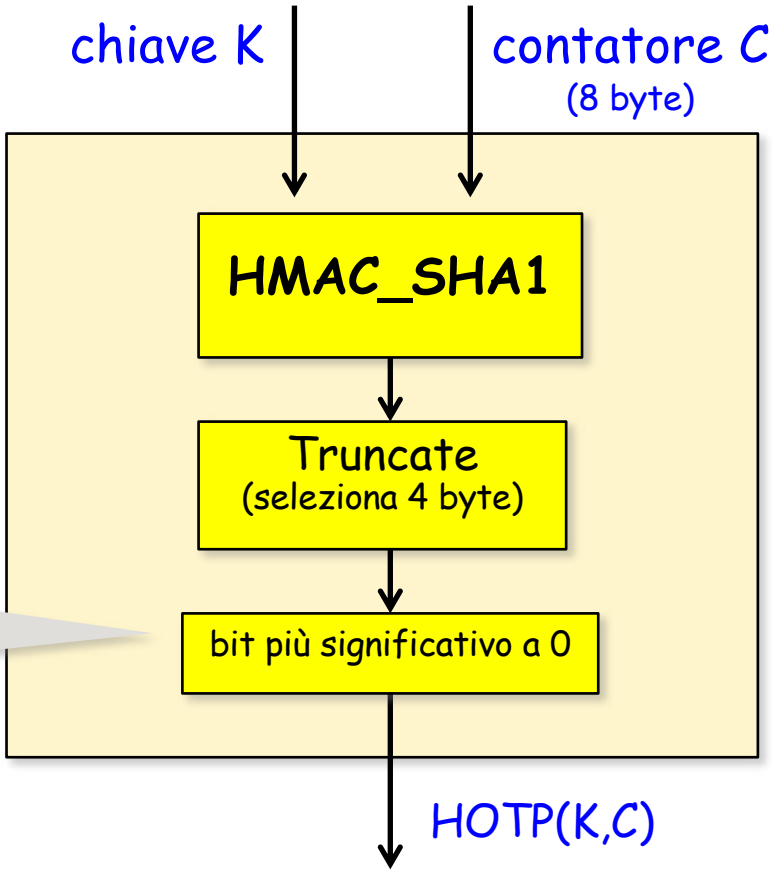

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Conversione in numero in $\{0,1,\ldots,2^{31}-1\}$

Numero digit d scelto in {6,7,8}

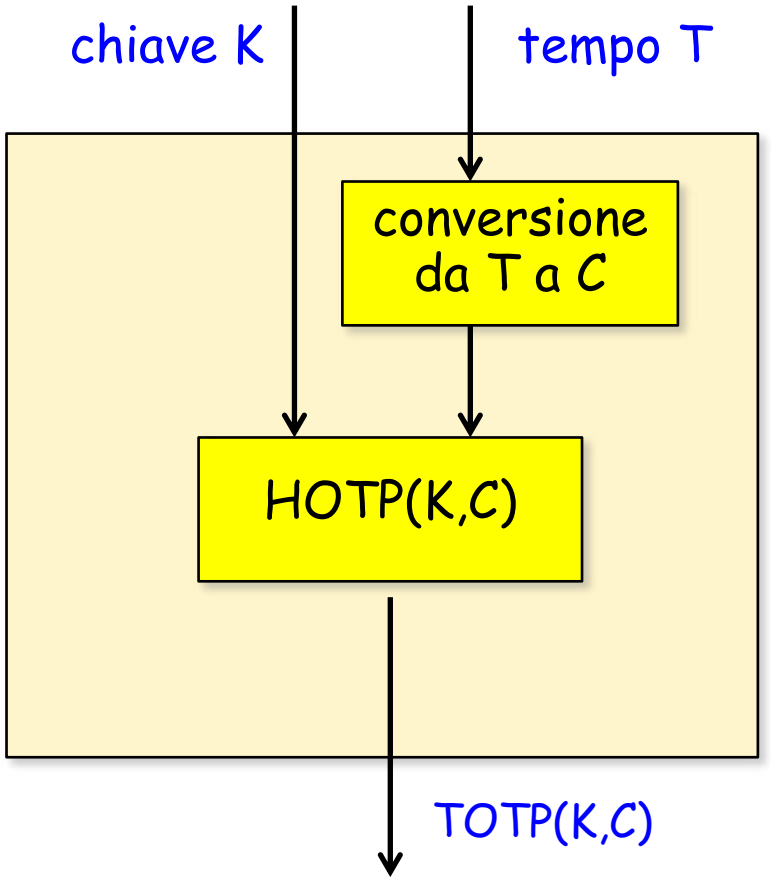
Utile per una persona

HOTP value = HOTP(K,C) mod 10^d

Time-Based One-Time Password Algorithm

Pubblicato come RFC 6238

TOTP: Time-Based One-Time Password Algorithm (maggio 2011)



Time-Based One-Time Password Algorithm

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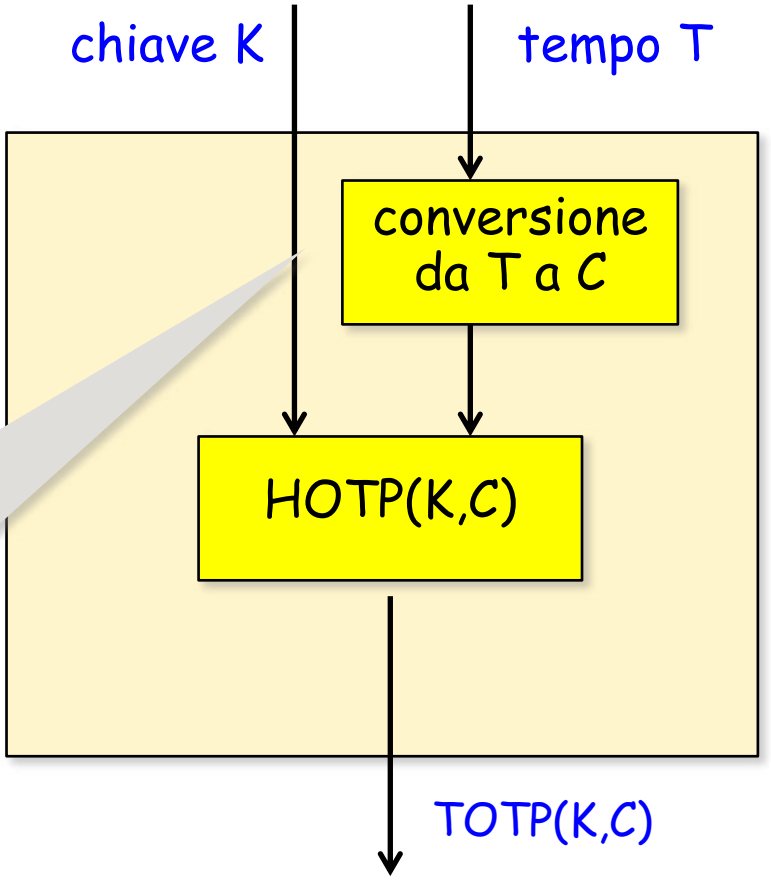
TOTP: Time-Based One-Time Password Algorithm (maggio 2011)

$$C = \frac{\text{tempo corrente} - \text{tempo inizio}}{\text{time step}}$$

Tempo inizio concordato
Time step: default 30 secondi



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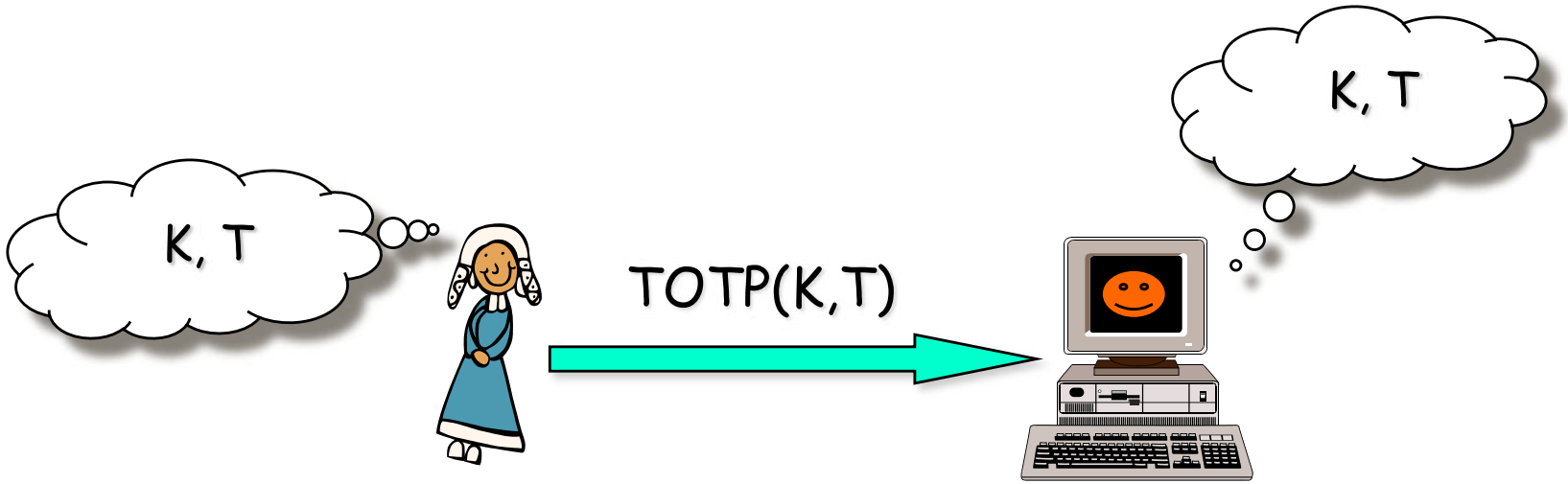

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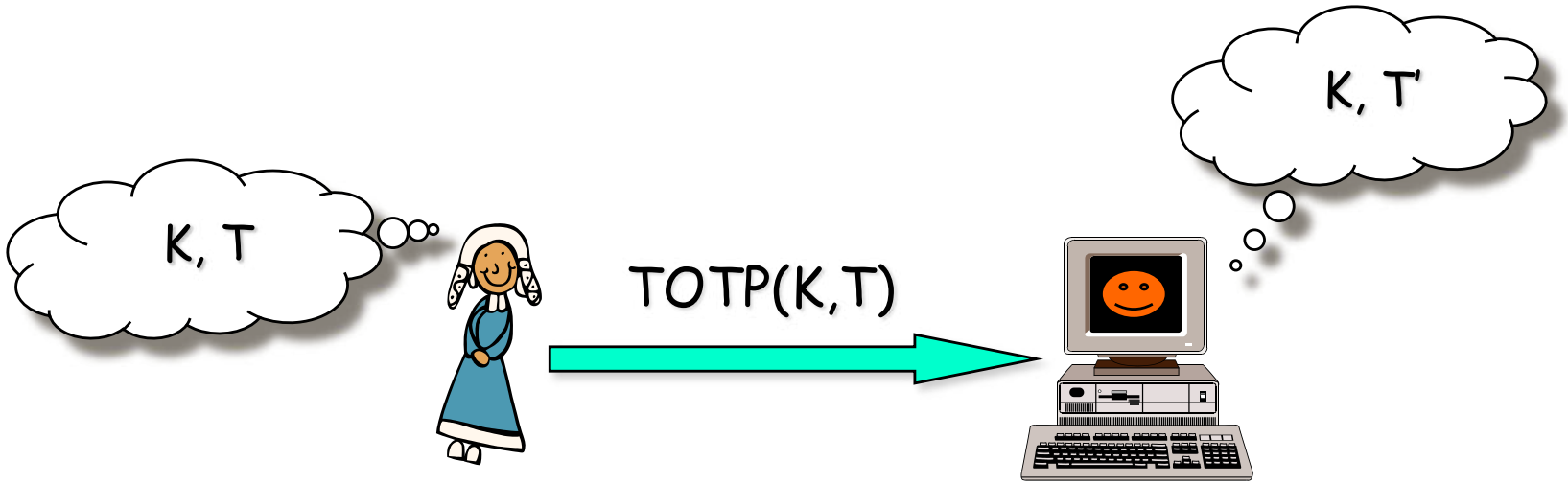
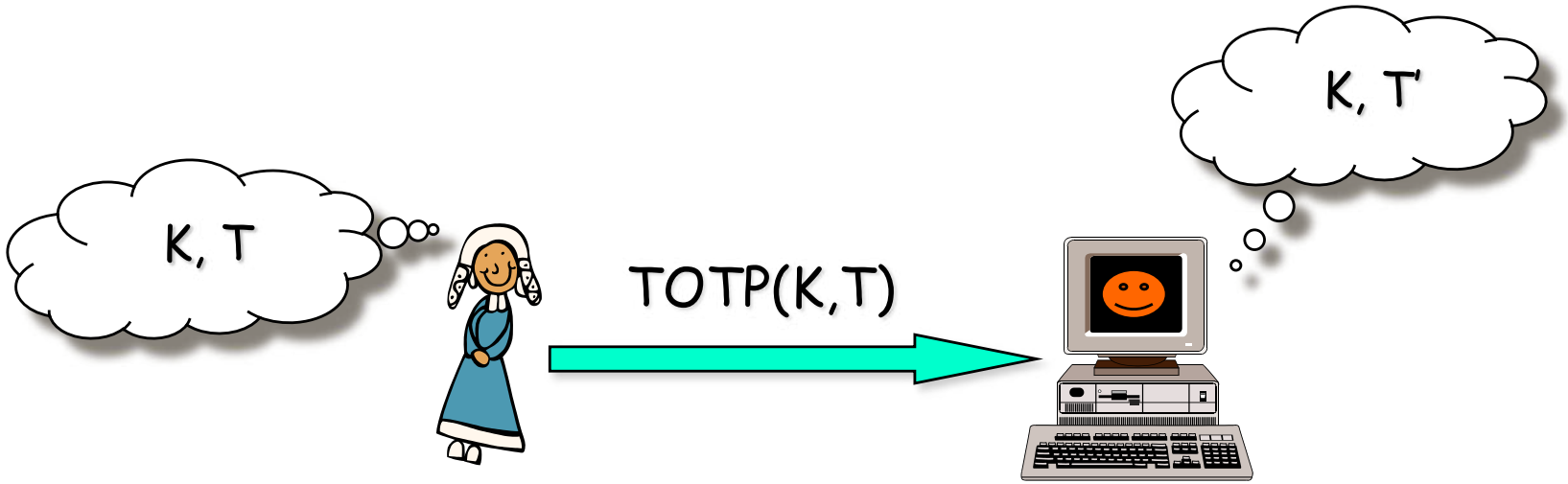


Il tempo potrebbe non essere lo stesso: $T \neq T'$

- Differenza tempo dei sistemi
- Ritardo input dell'utente

Time-Based One-Time Password Algorithm



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- Differenza tempo dei sistemi
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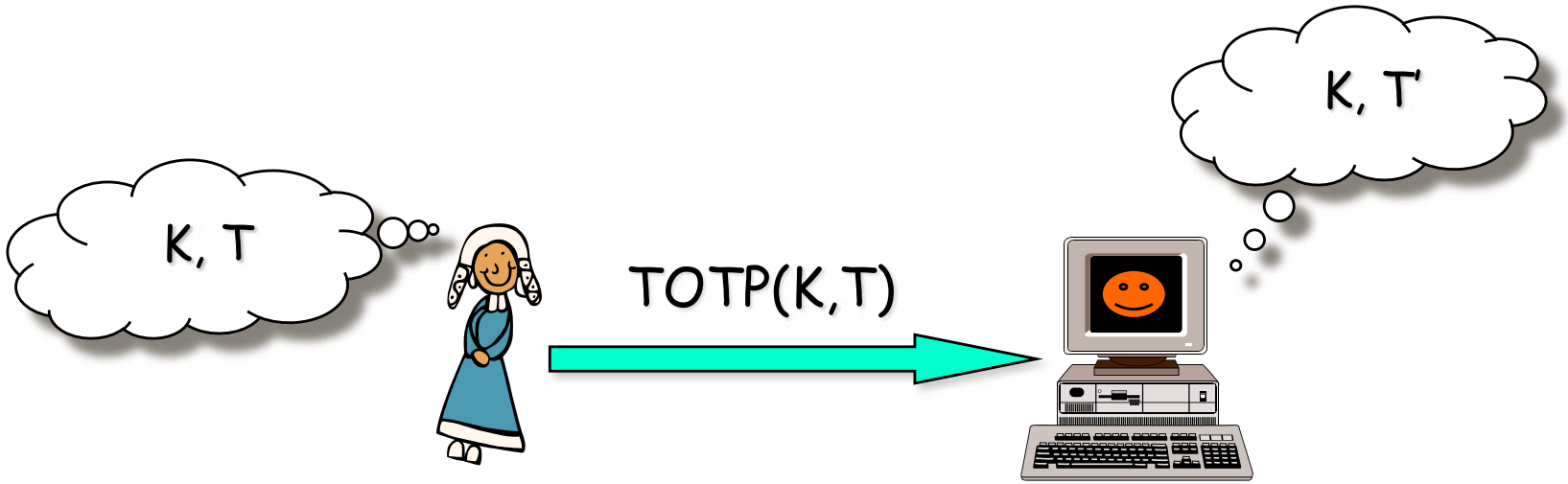
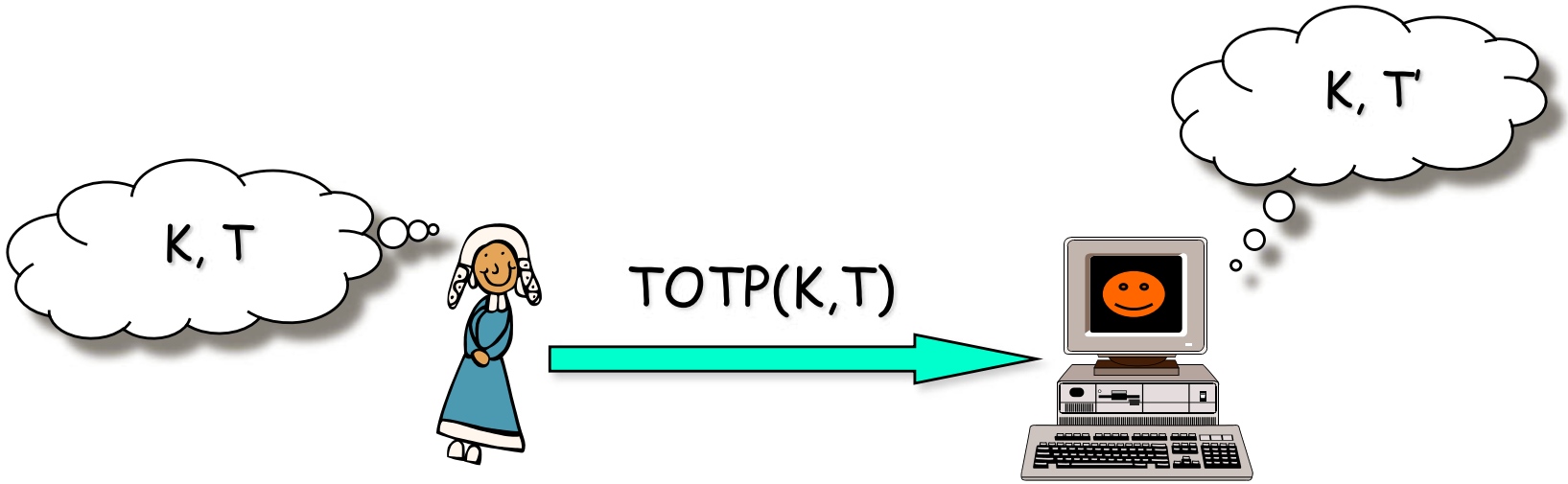
Server controlla
2 o 3 time windows

Time-Based One-Time Password Algorithm



Attacco di replay

Time-Based One-Time Password Algorithm



Attacco di replay

Server accetta ogni password una sola volta

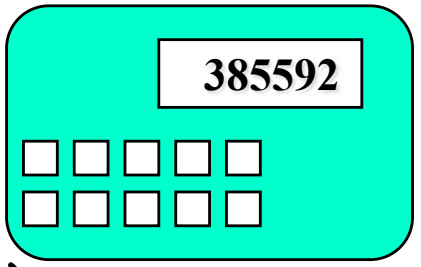
One-time Password Token

One-time Password computate

Computazione della prossima password

(in dipendenza di: tempo, funzione segreta, ID, serial number,…)

Token Card



- valore display ⟶ password
- protetta da un PIN
- Il valore cambia ogni 30-90 secondi ed è sincronizzato con il server
- Svantaggi: fragilità, costo, …noiose

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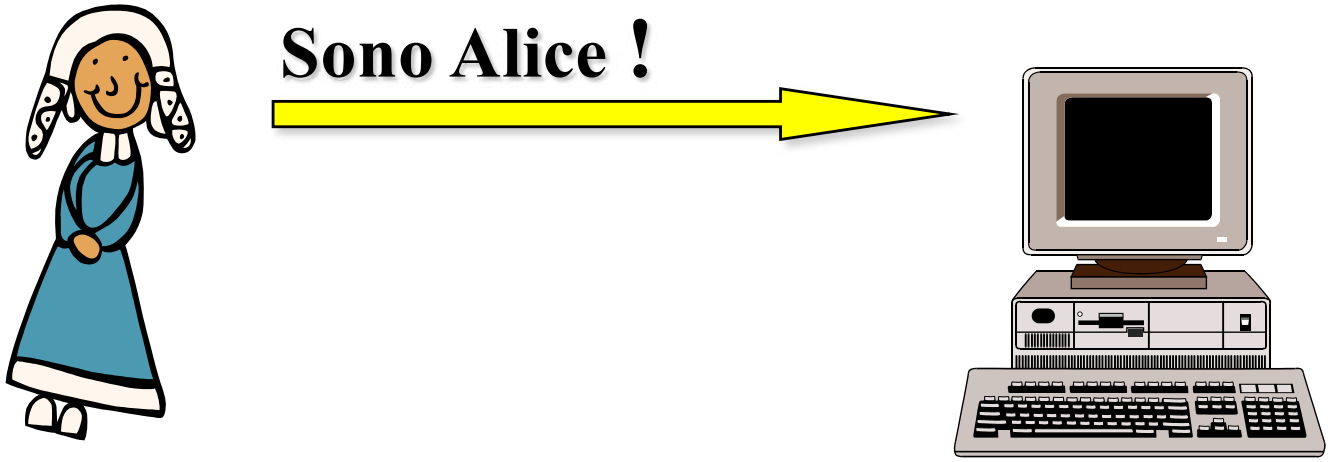
- Challenge-Response
- Two-factor Authentication

Challenge - Response

L'utente deve rispondere alle diverse sfide del sistema



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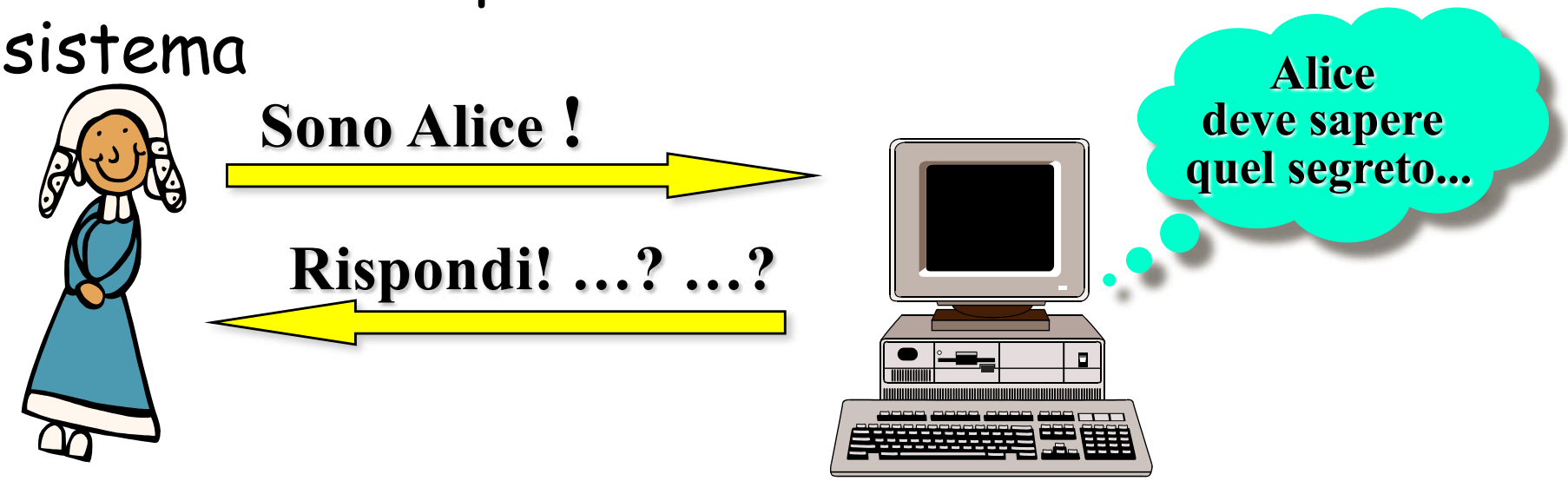

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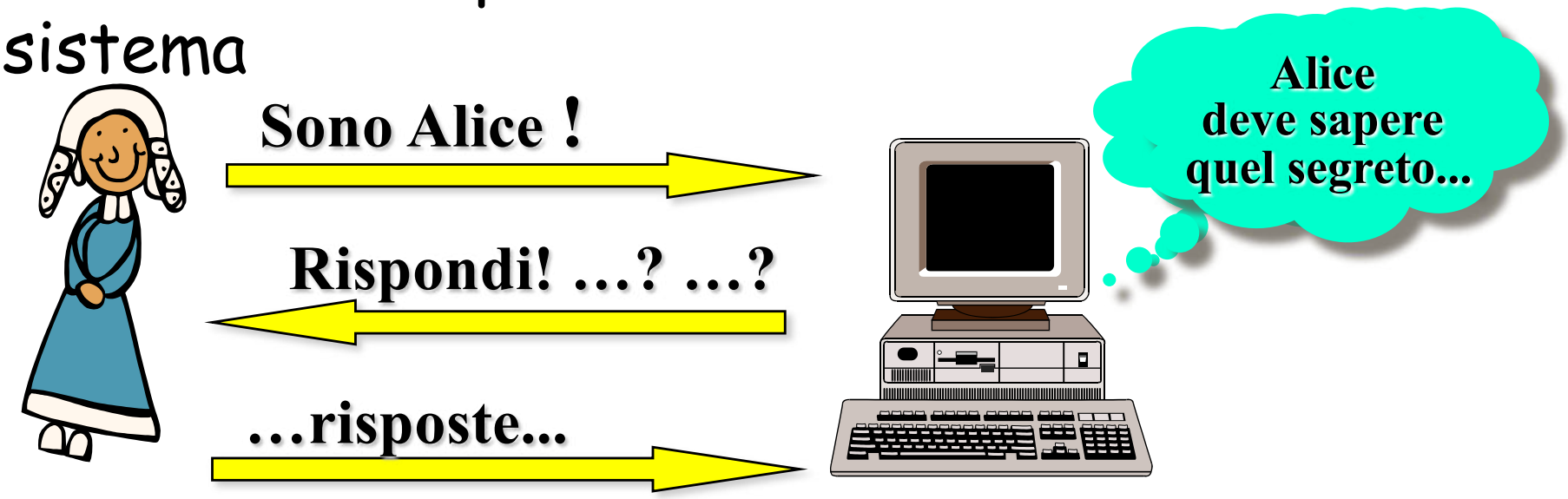

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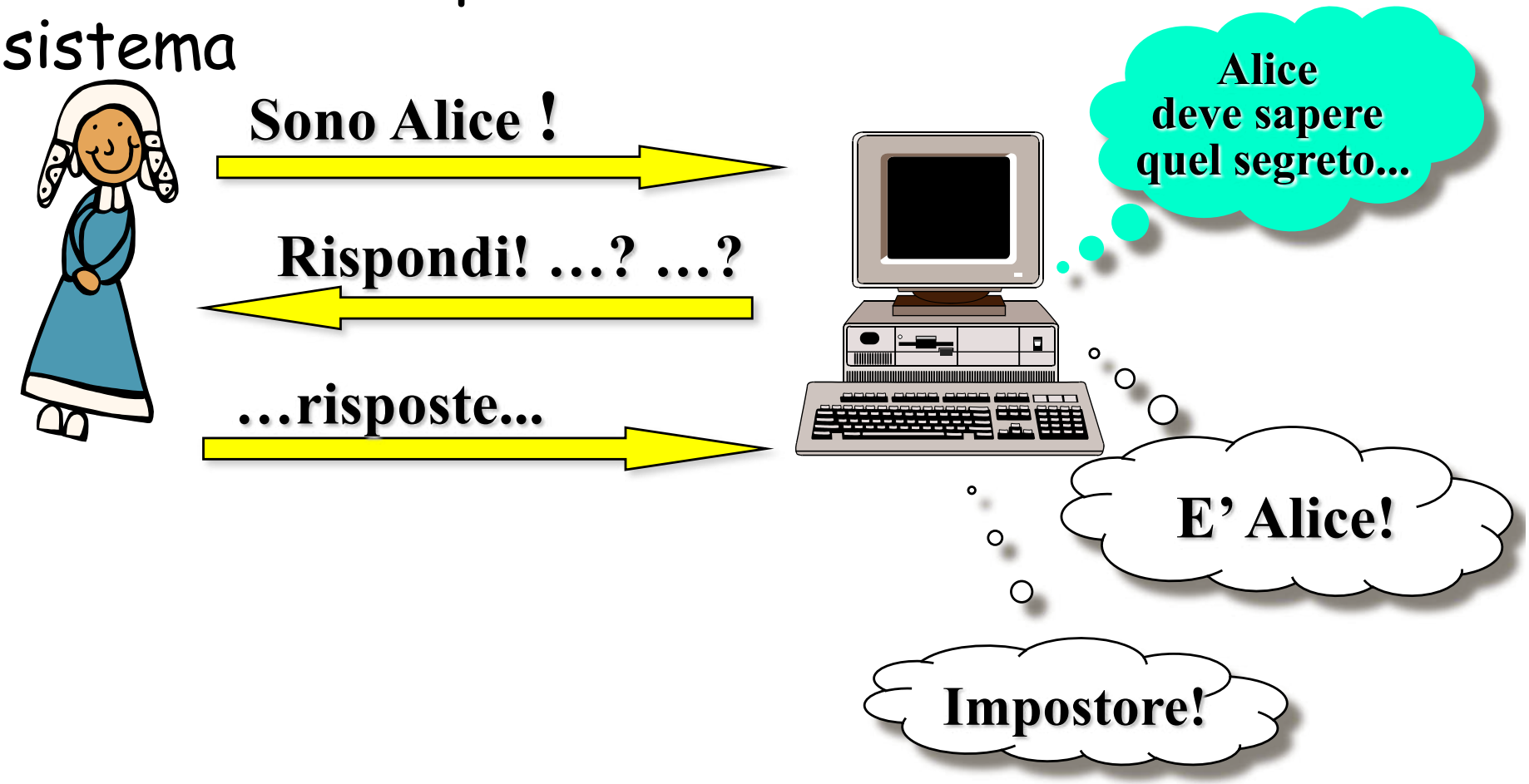
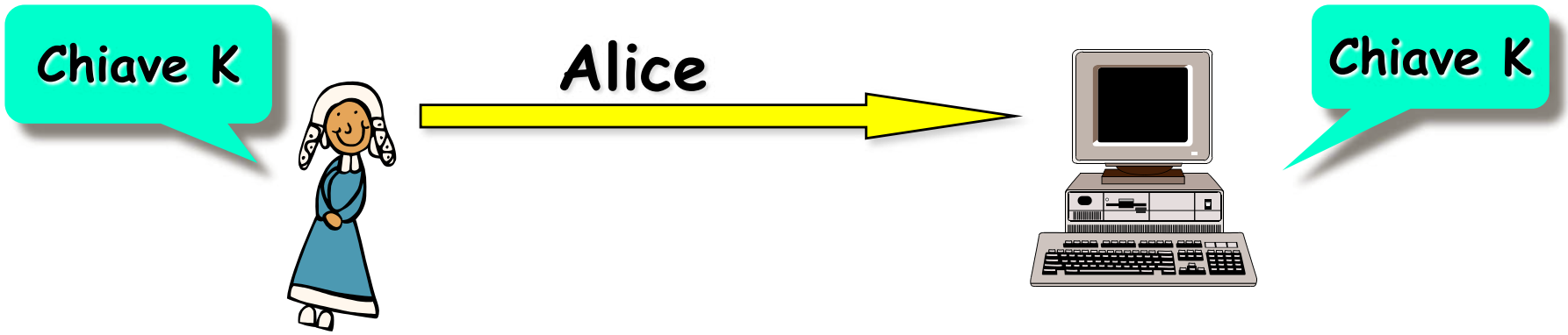


Protocolli per Challenge-Response



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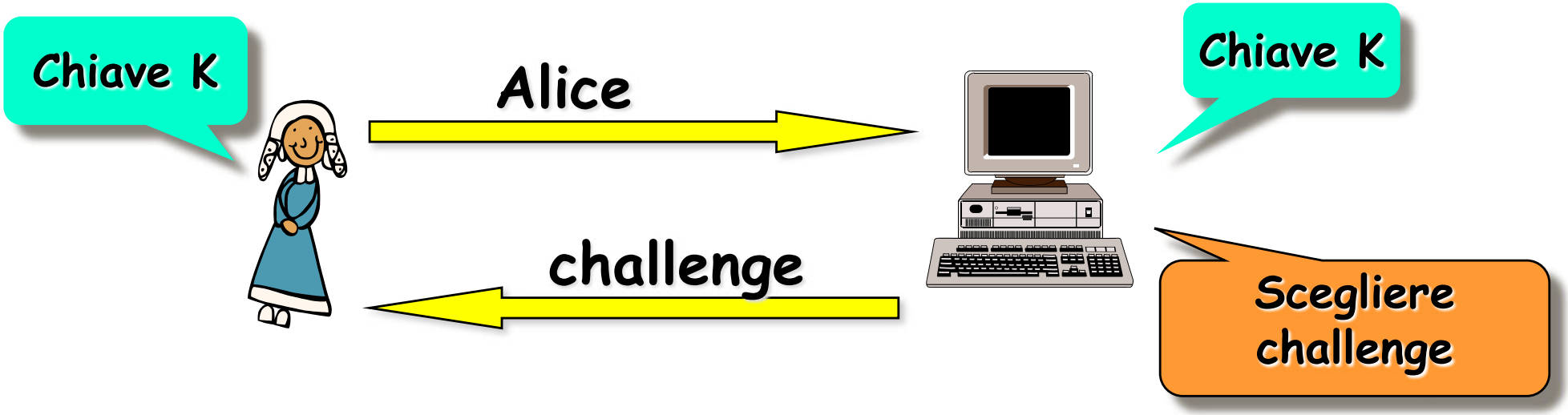

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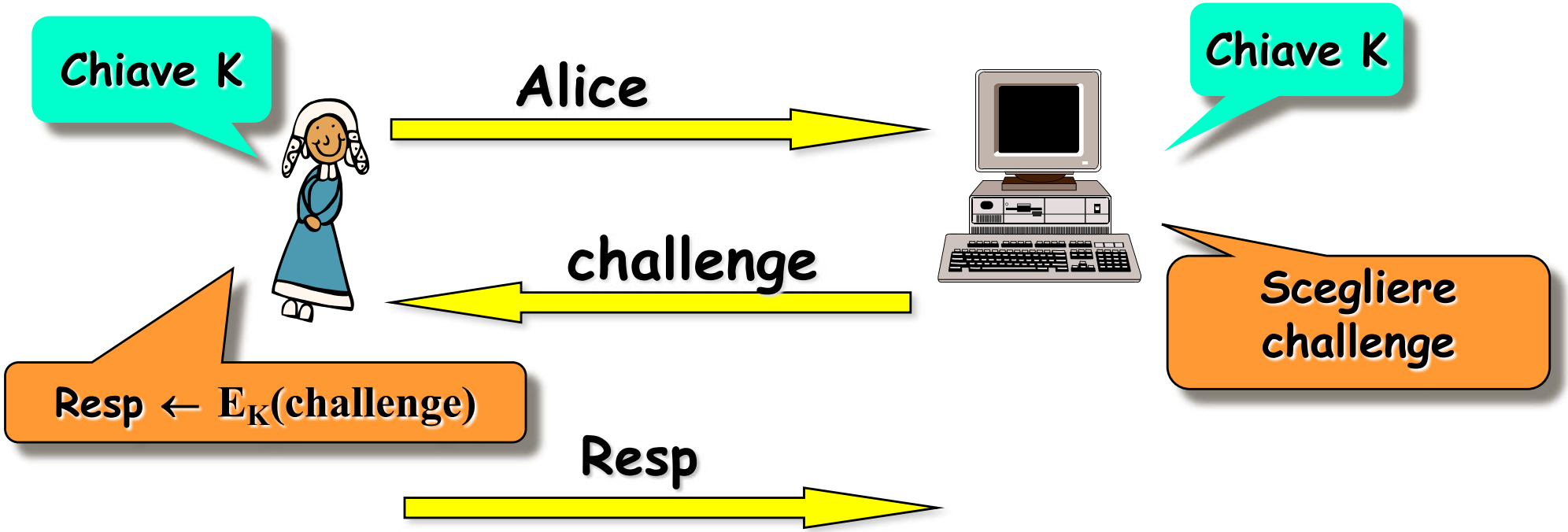

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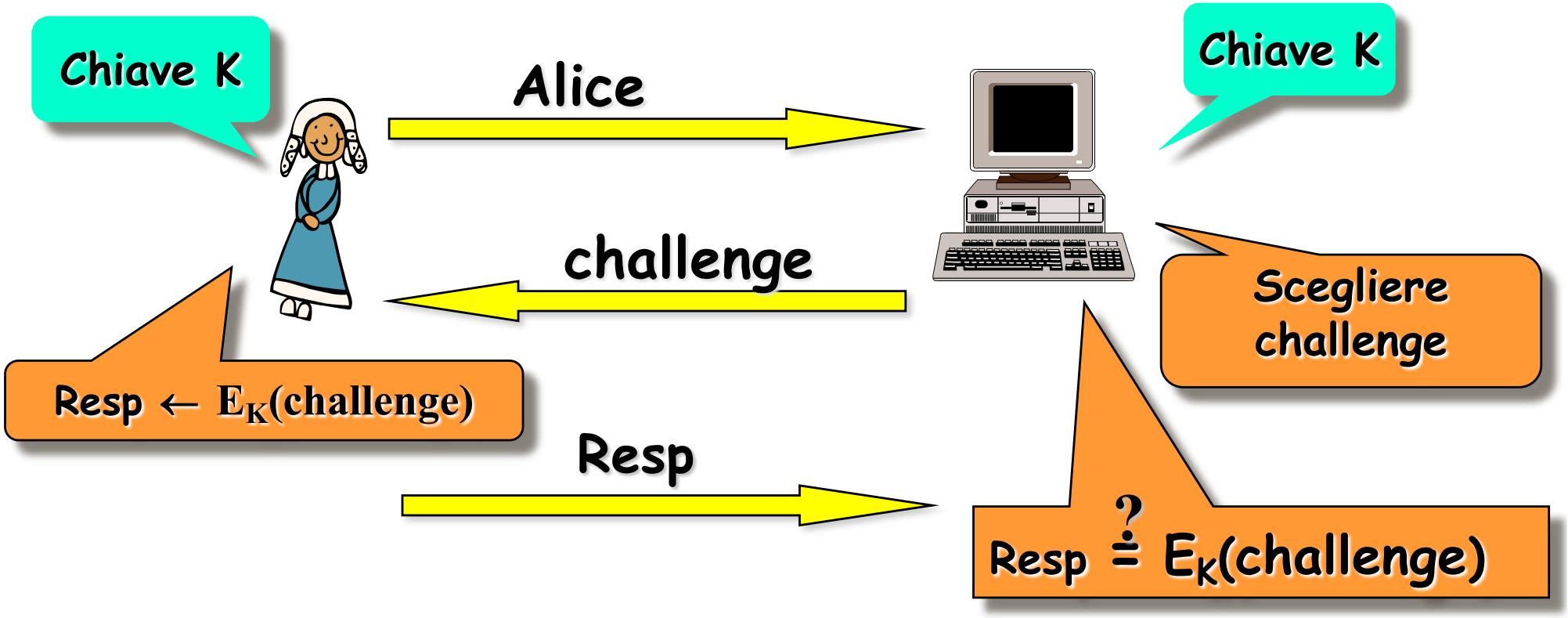

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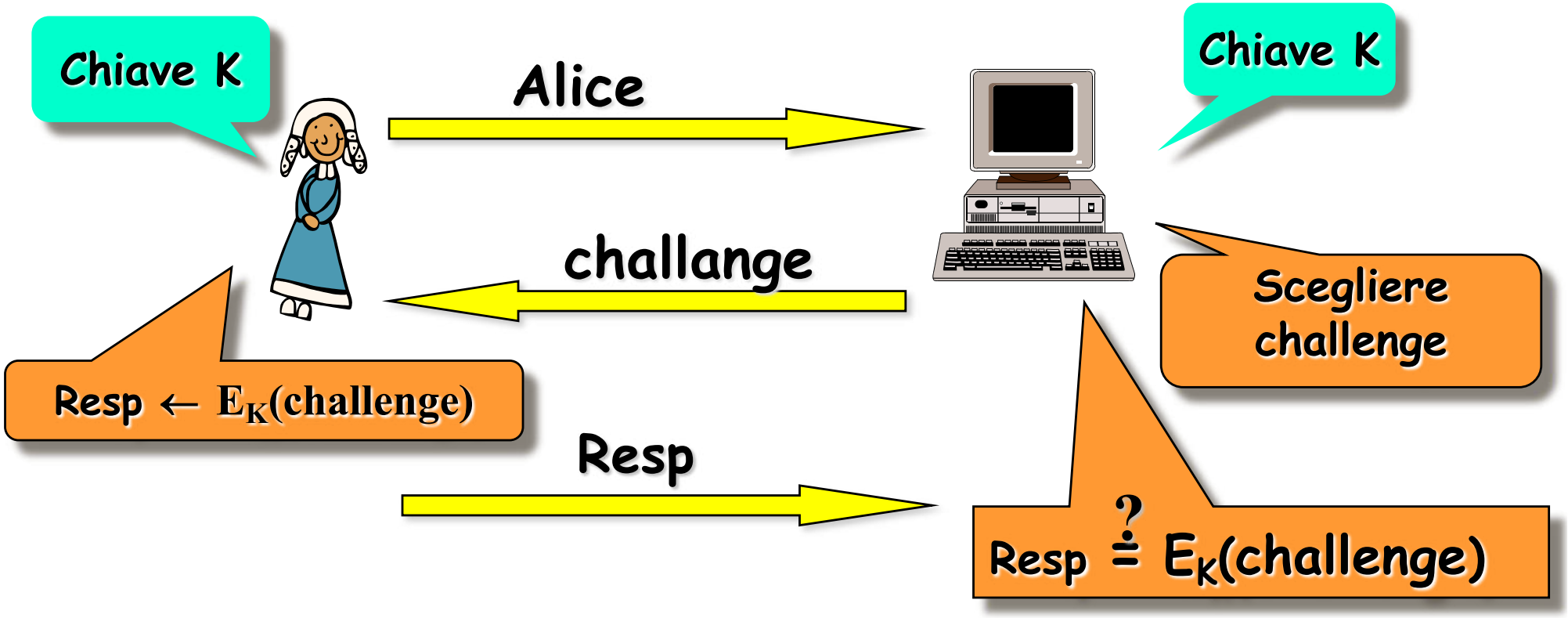
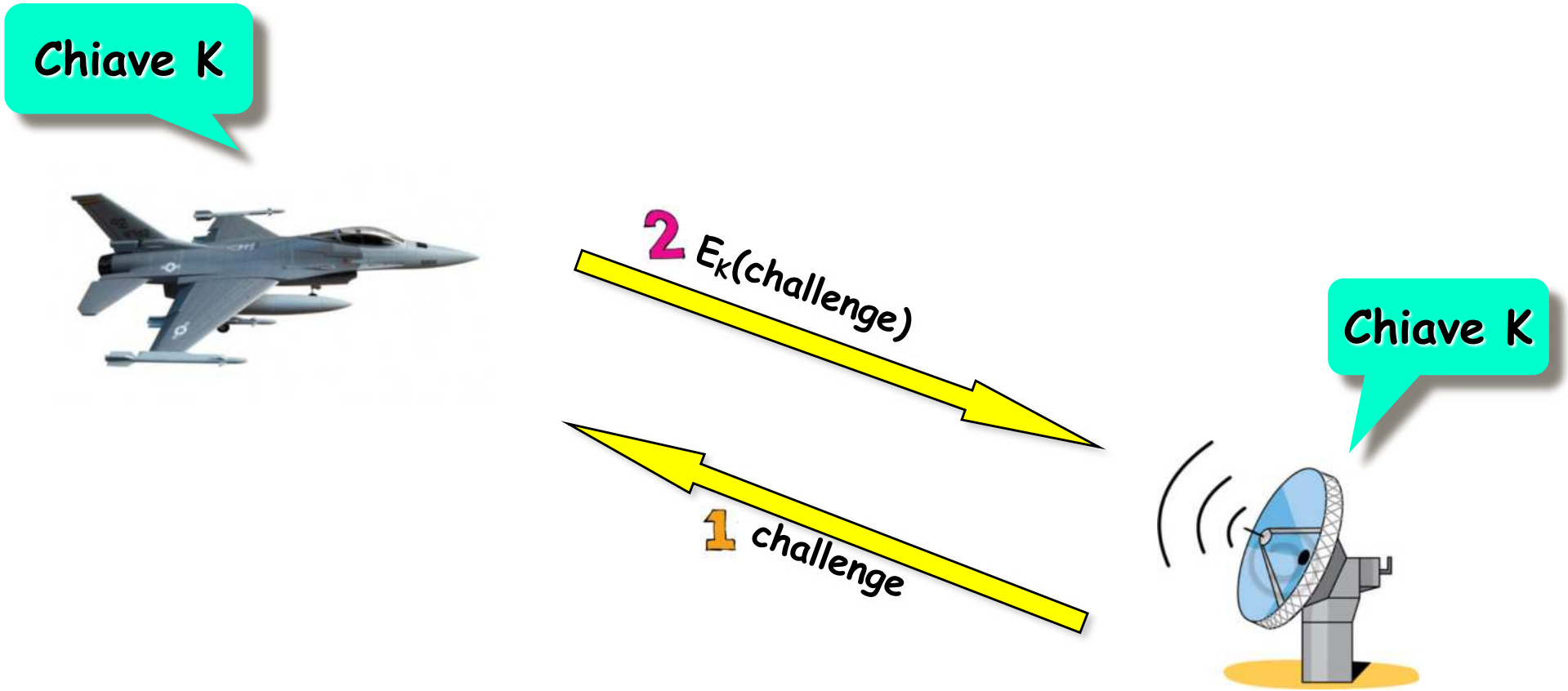


Caratteristiche di challenge
Possibili attacchi

Protocolli per Challenge-Response



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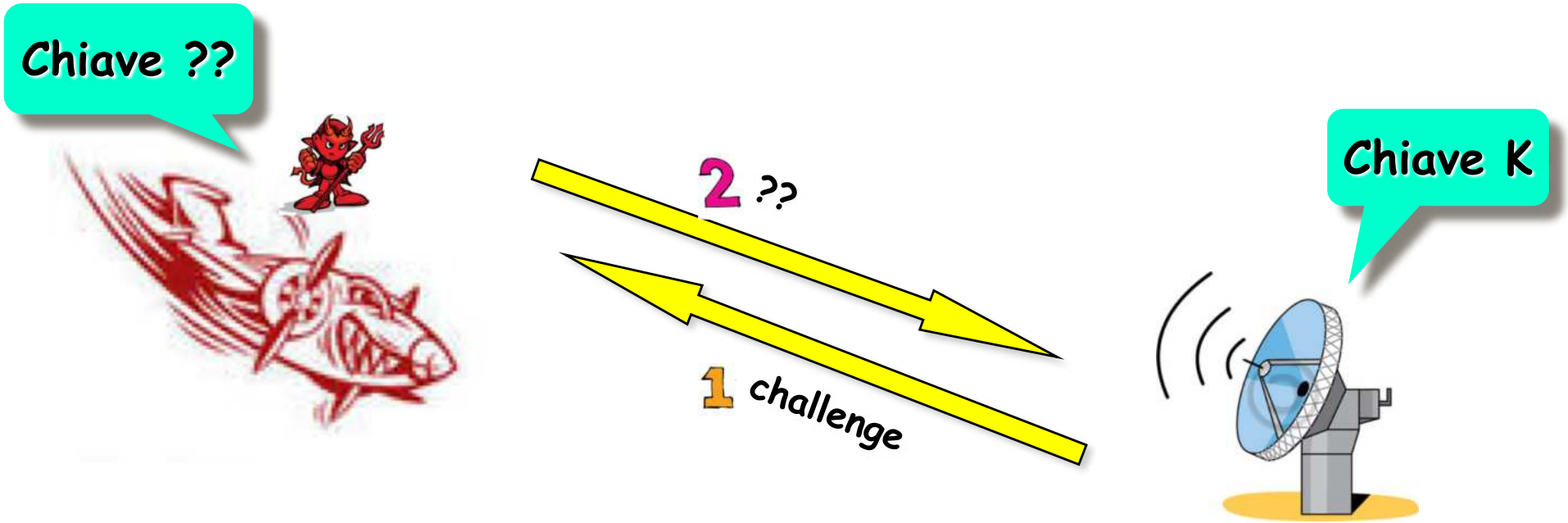

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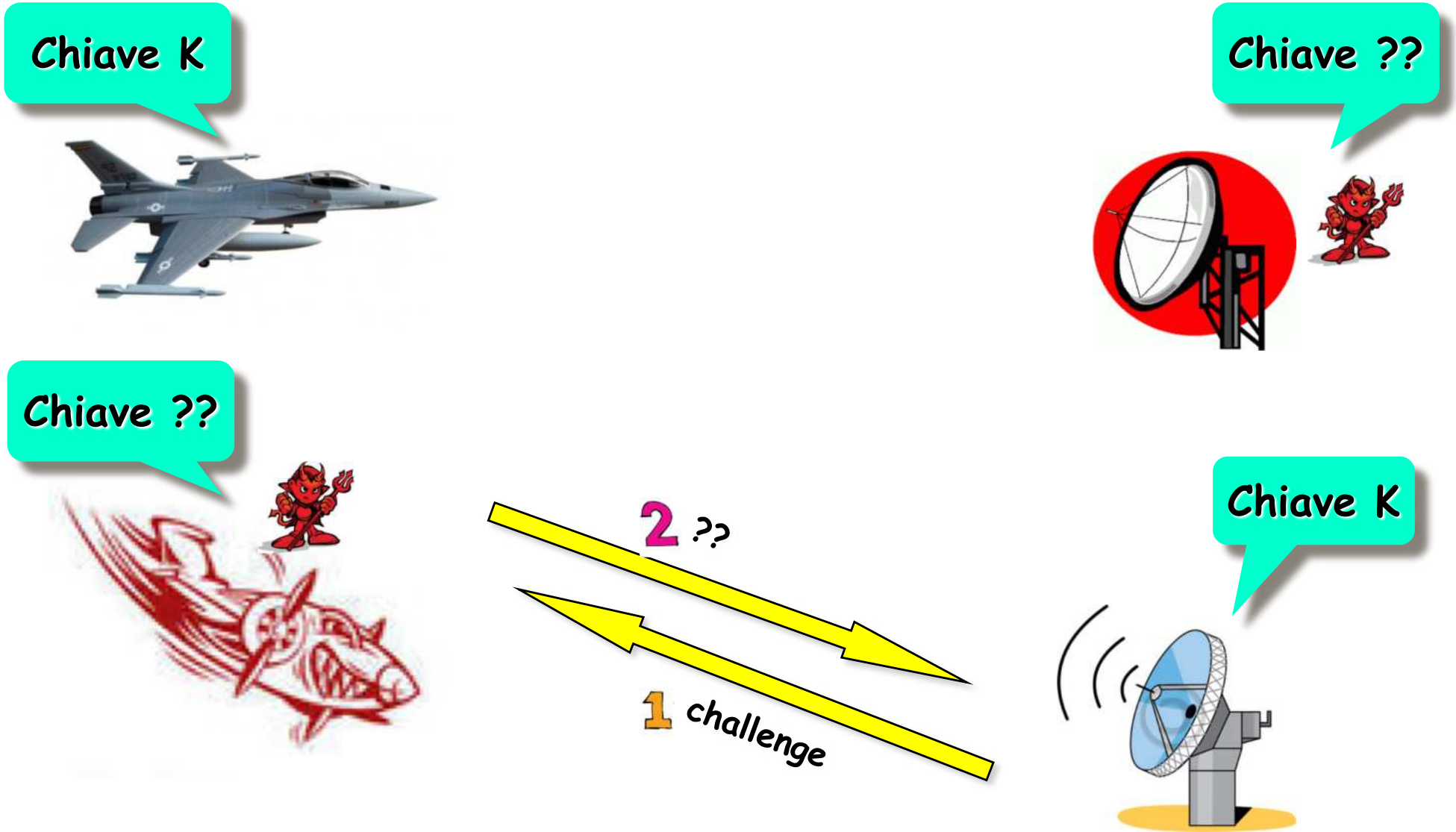

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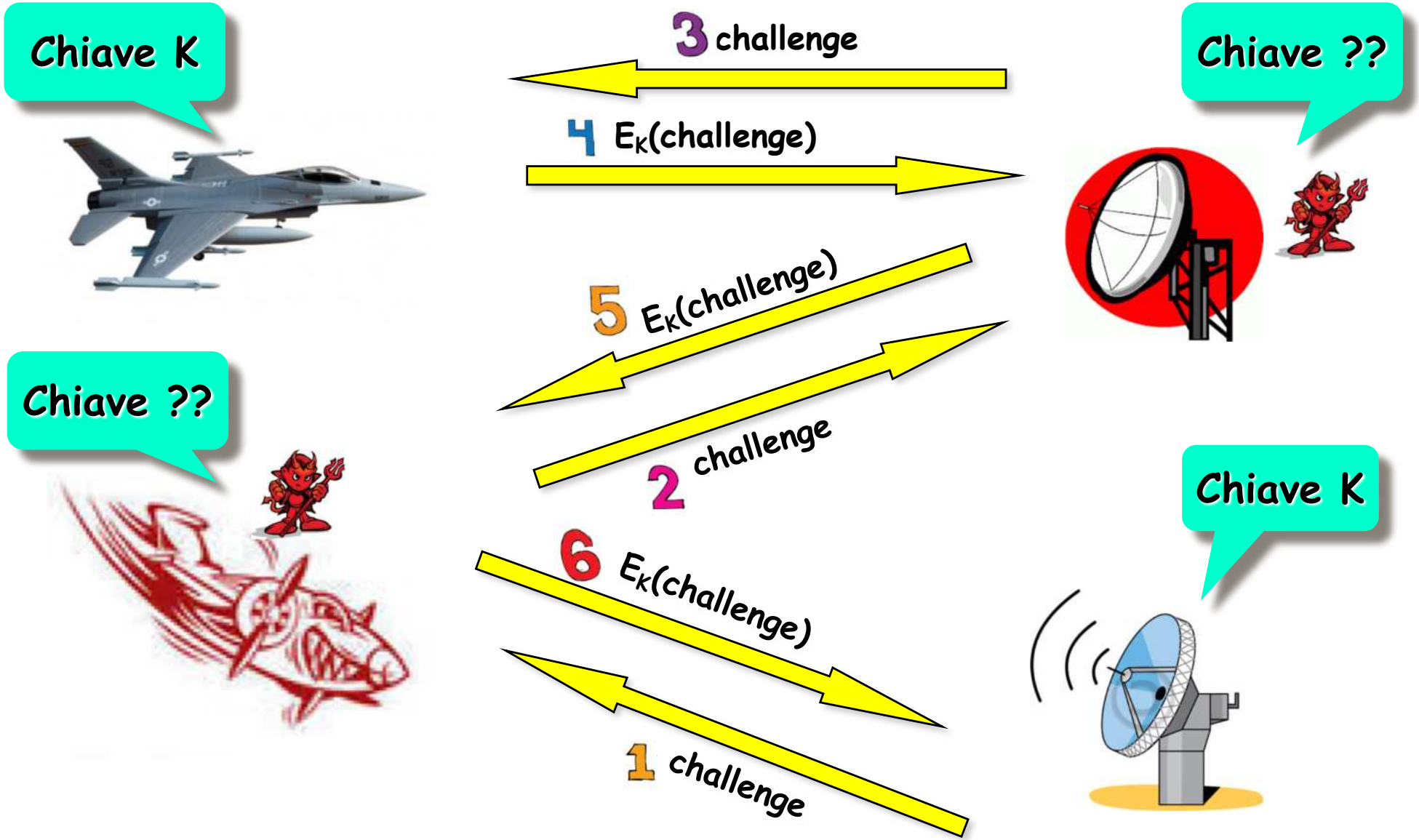

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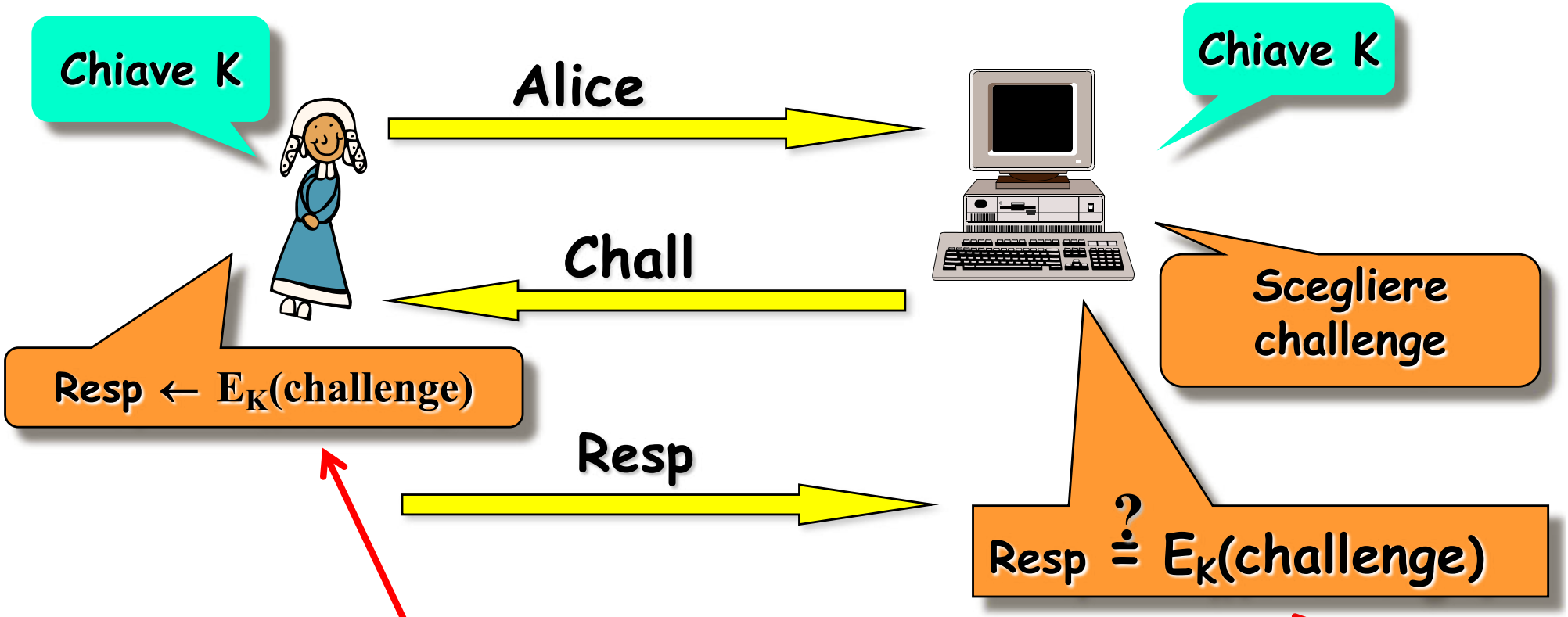

$E_K(challenge, ID_{sistema})$ *opzionale*

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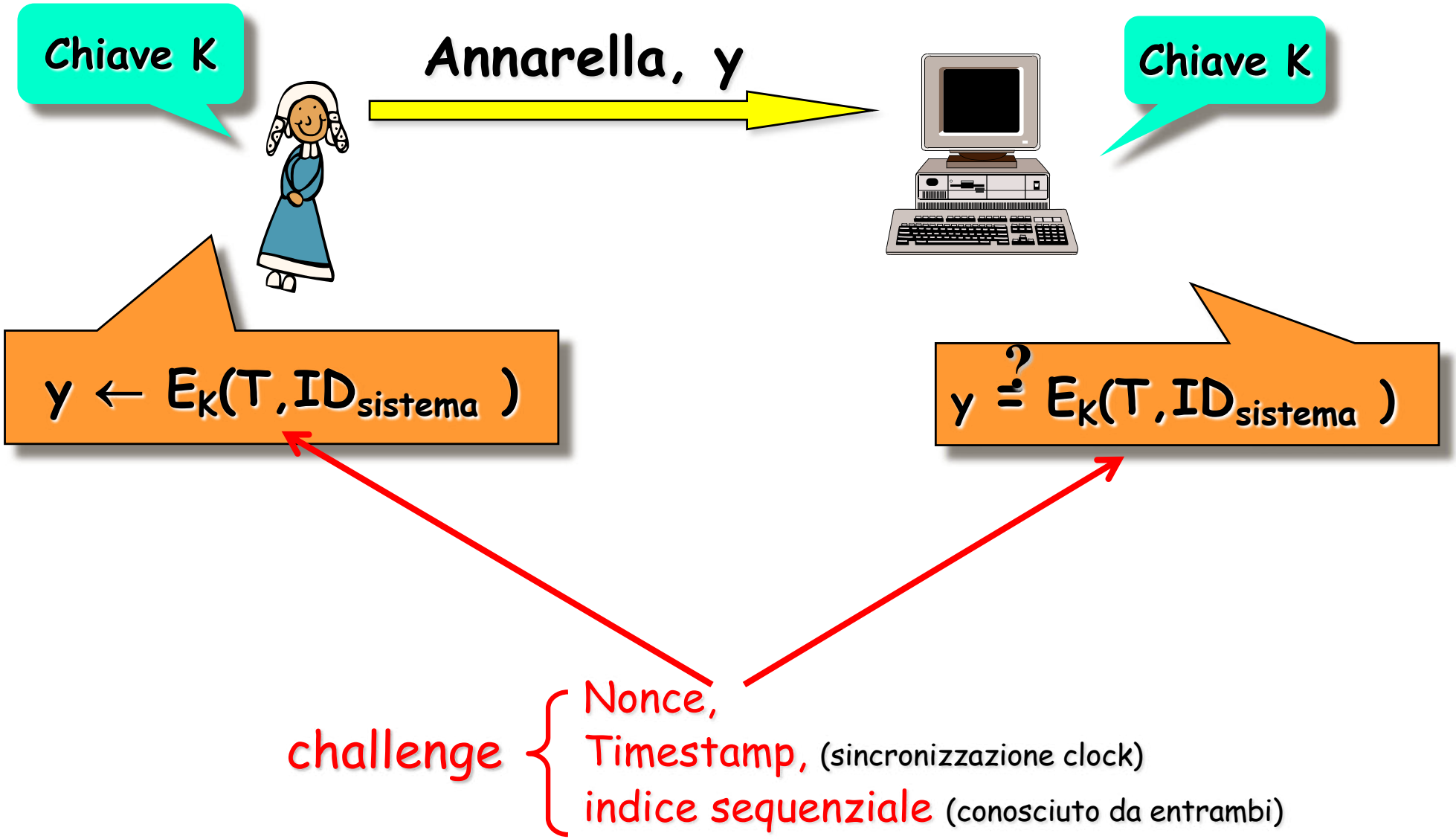

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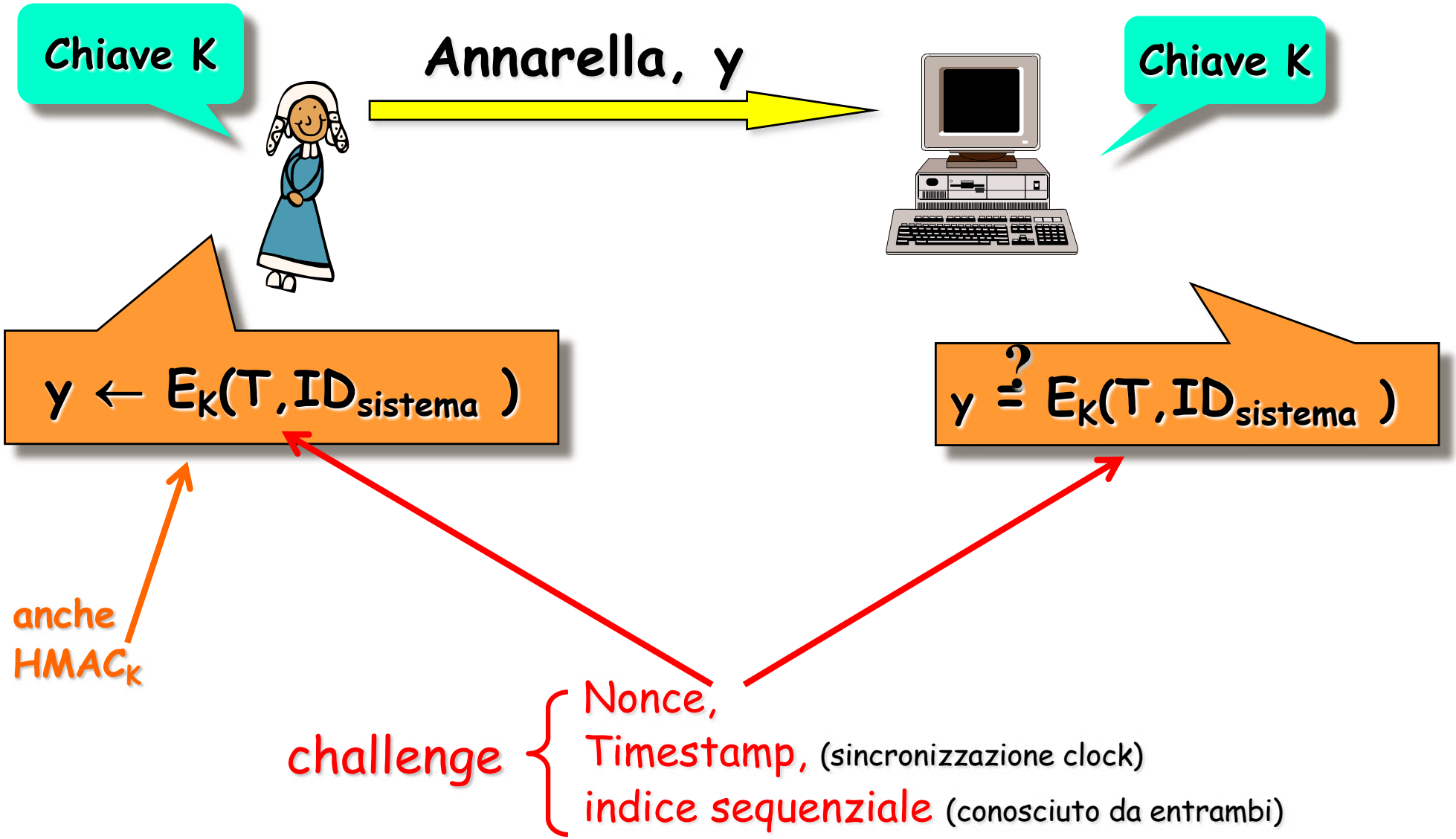

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Two-factor authentication

Due fattori per verificare identità

Qualcosa che l'utente **POSSIEDE**

- cose fisiche o elettroniche, …

Qualcosa che l'utente **CONOSCE**

- password, PIN,…

Qualcosa che l'utente **E´**

- **biometria**, cioè misura di proprietà biologiche

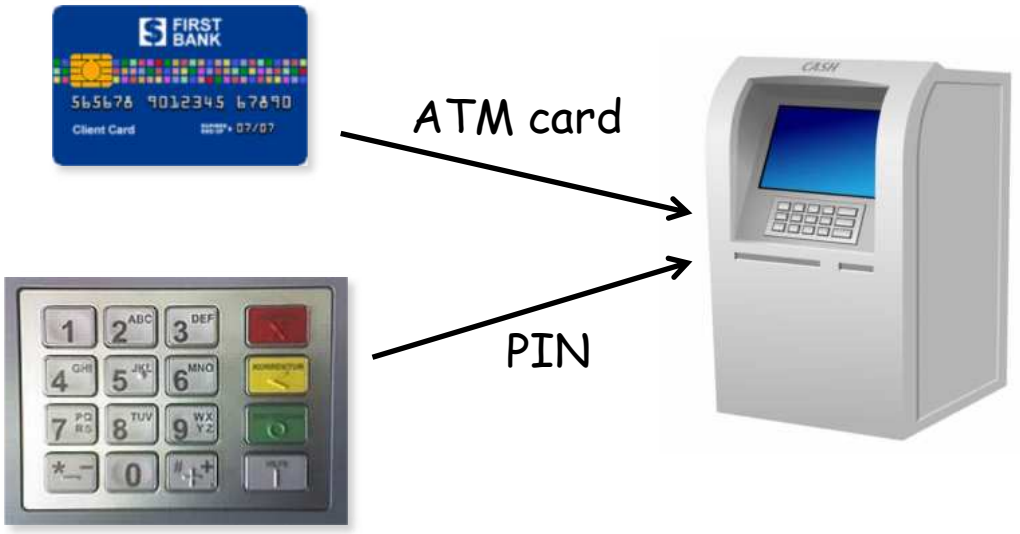
Multi-factor authentication

Almeno due dei tre fattori per verificare identità

Two-factor authentication

Due fattori per verificare identità

Automated teller machine (ATM)



Two-factor authentication

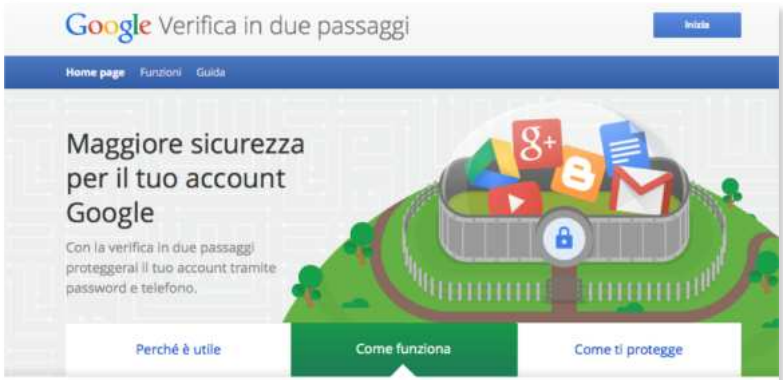
Due fattori per verificare identità

Two-factor authentication

Due fattori per verificare identità

Google

password



Token usb

interazione con Google Chrome

da ottobre 2014

Two-factor authentication

Due fattori per verificare identità

Google 2-Step Verification

Get Started

Home **Features** Help

Get codes via text message

Google can send verification codes to your cell phone via text message. Your carrier's standard messaging rates may apply.

Want a phone call instead?

Google can call your cell or landline phone with your verification code.

No connection, no problem

The Google Authenticator app for Android, iPhone, or BlackBerry can generate verification codes. It even works when your device has no phone or data connectivity.

Keep your account even more secure

Instead of using verification codes, you can insert a Security Key into your computer's USB port for even more protection against phishing.

Backup phone numbers

Add backup phone numbers so Google has another way to send you verification codes in case your main phone is unavailable.

Backup codes

You can print or download one-time use backup codes for times when your phones are unavailable, such as when you travel.

Register your computers

During sign-in, you can choose not to use 2-Step Verification again on your computer. We'll still ask for codes or Security Key on other computers.

Two-factor authentication for Apple ID

Two-factor authentication is an extra layer of security for your Apple ID designed to ensure that you're the only person who can access your account, even if someone knows your password.

Two-factor authentication

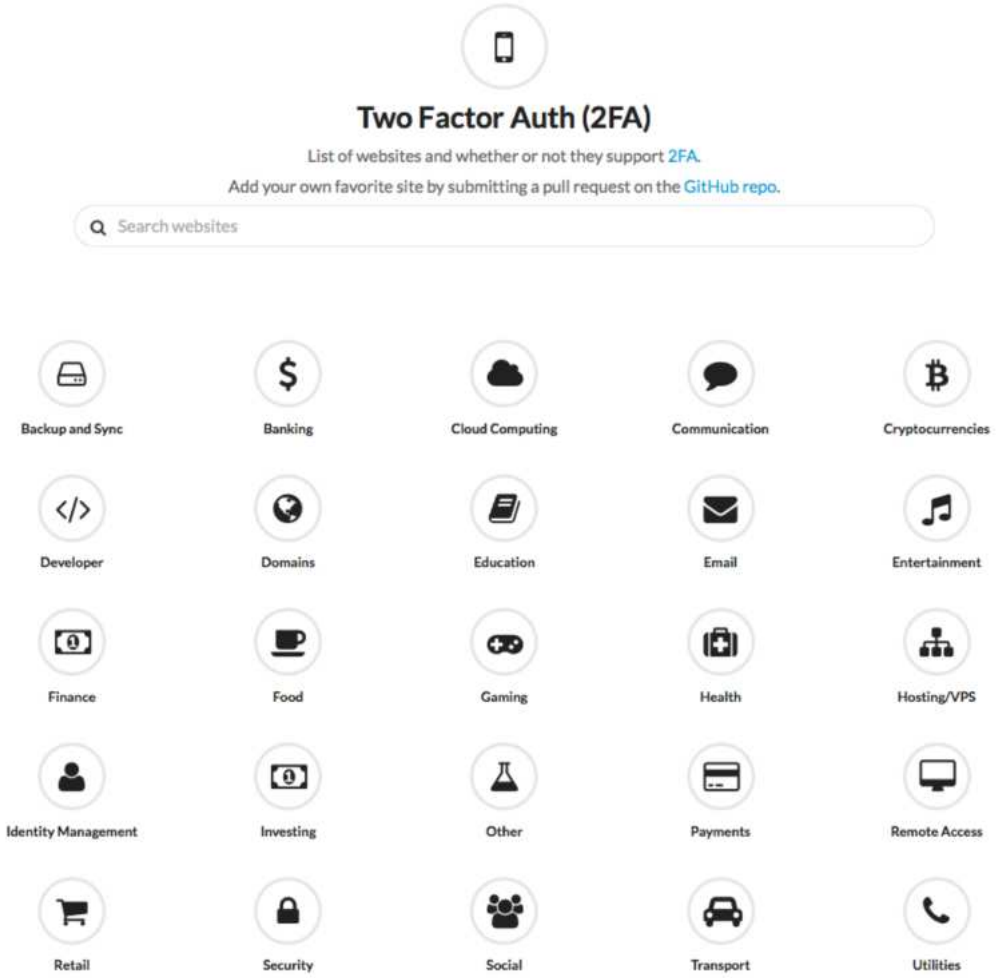
Due fattori per verificare identità

Web service che usano two-factor authentication

Two-factor authentication Siti Web

Lista siti web che supportano two-factor authentication

https://twofactorauth.org



Two-factor authentication con smartphone

Codice inviato/generato con sms/app

Vantaggi:

- User friendly
- Facile configurazione
- Non occorrono token aggiuntivi

Two-factor authentication con smartphone

Svantaggi:

- Privacy del numero telefono, (e forse spam)
- sms sono insicuri
- sms possono avere ritardi di ricevimento

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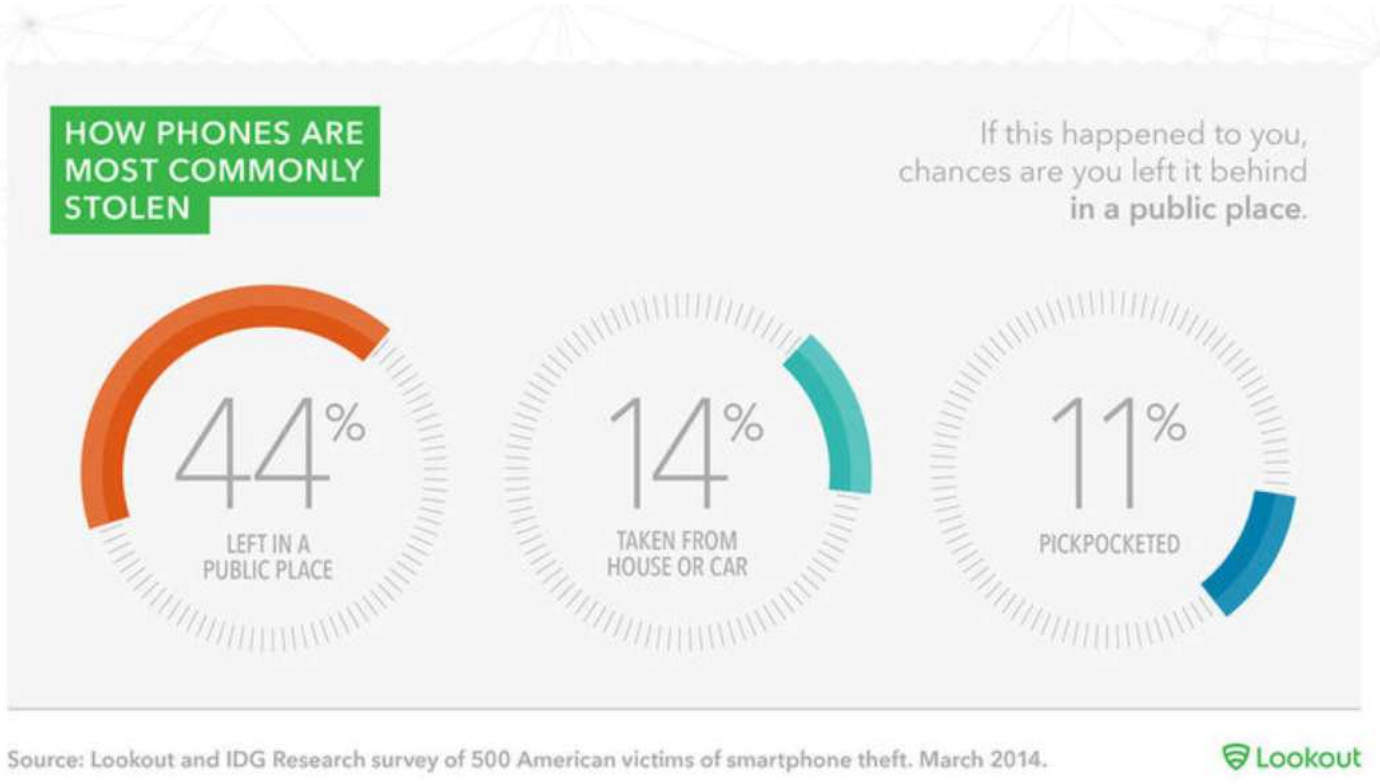
Pericoli:

- Smartphone usati anche per email
- Account recovery
  - Reset password ed invio per email
- Furto smartphone
  - Utente in genere loggato nella propria email
  - Accesso ad email per recupero
- Come se fosse un solo fattore e non due

Furto smartphone

- Nel 2013: 3,1 milioni americani vittime di furto di smartphone
- 68% non l'hanno riavuto



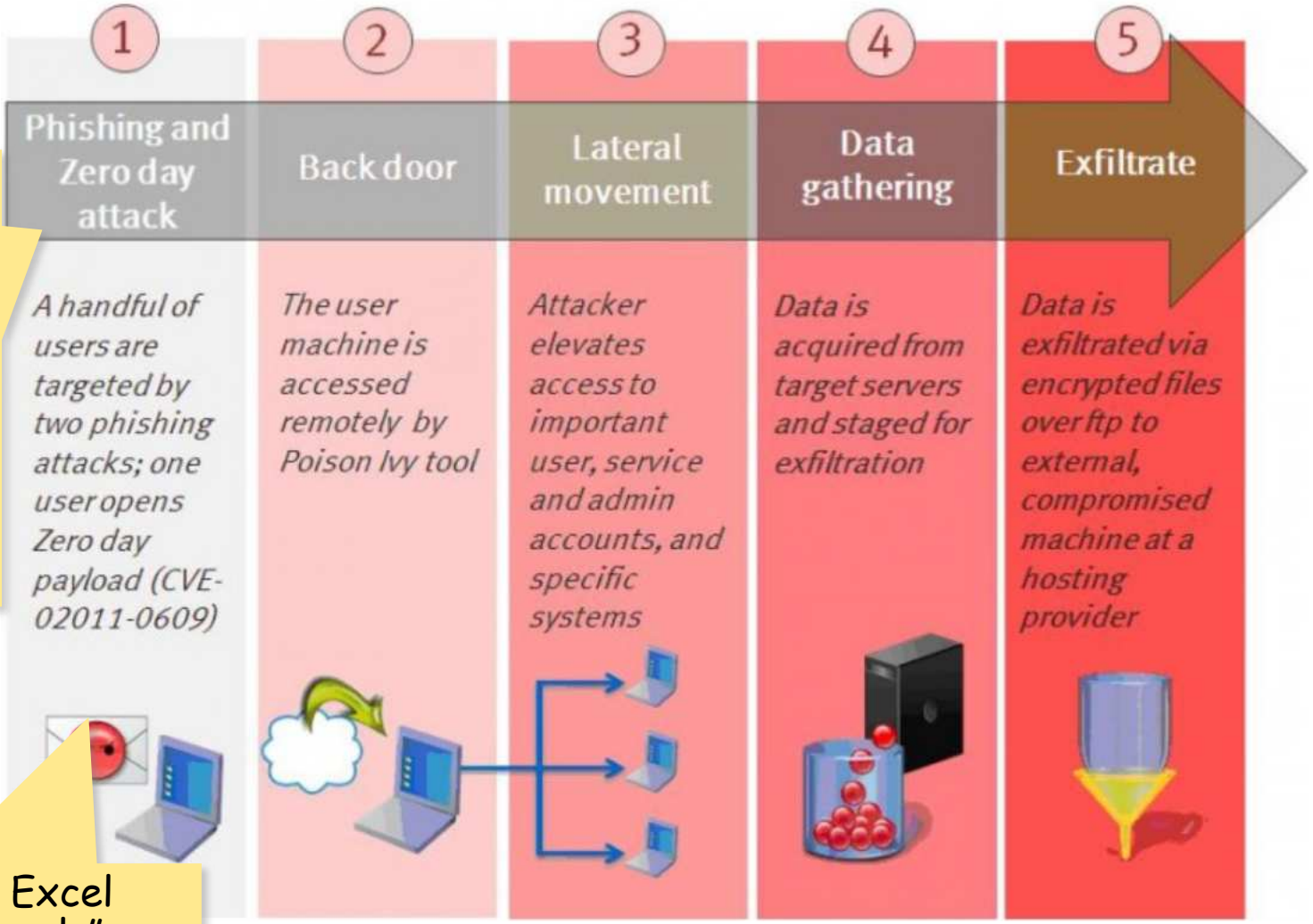
Attacco ad RSA, marzo 2011

- RSA annuncia di essere stata vittima di "an extremely sophisticated cyber attack", *17 marzo 2011*
- Problemi con SecureID
- "this information could potentially be used to reduce the effectiveness of a current two-factor authentication implementation"
- RSA offri sostituzione del SecureID a 30.000 clienti, 6 giugno 2011
- Valutazione della perdita economica $66.3 million
- Vediamo l'attacco (RSA non ha fornito tutti i dettagli …)
  - http://blogs.rsa.com/anatomy-of-an-attack/

Anatomia dell'attacco

2 differenti *phishing* email in 2 giorni a dipendenti di RSA

Subject email: 2011 Recruitment plan



email con allegato file Excel "2011 Recruitment plan.xls" contenente malware

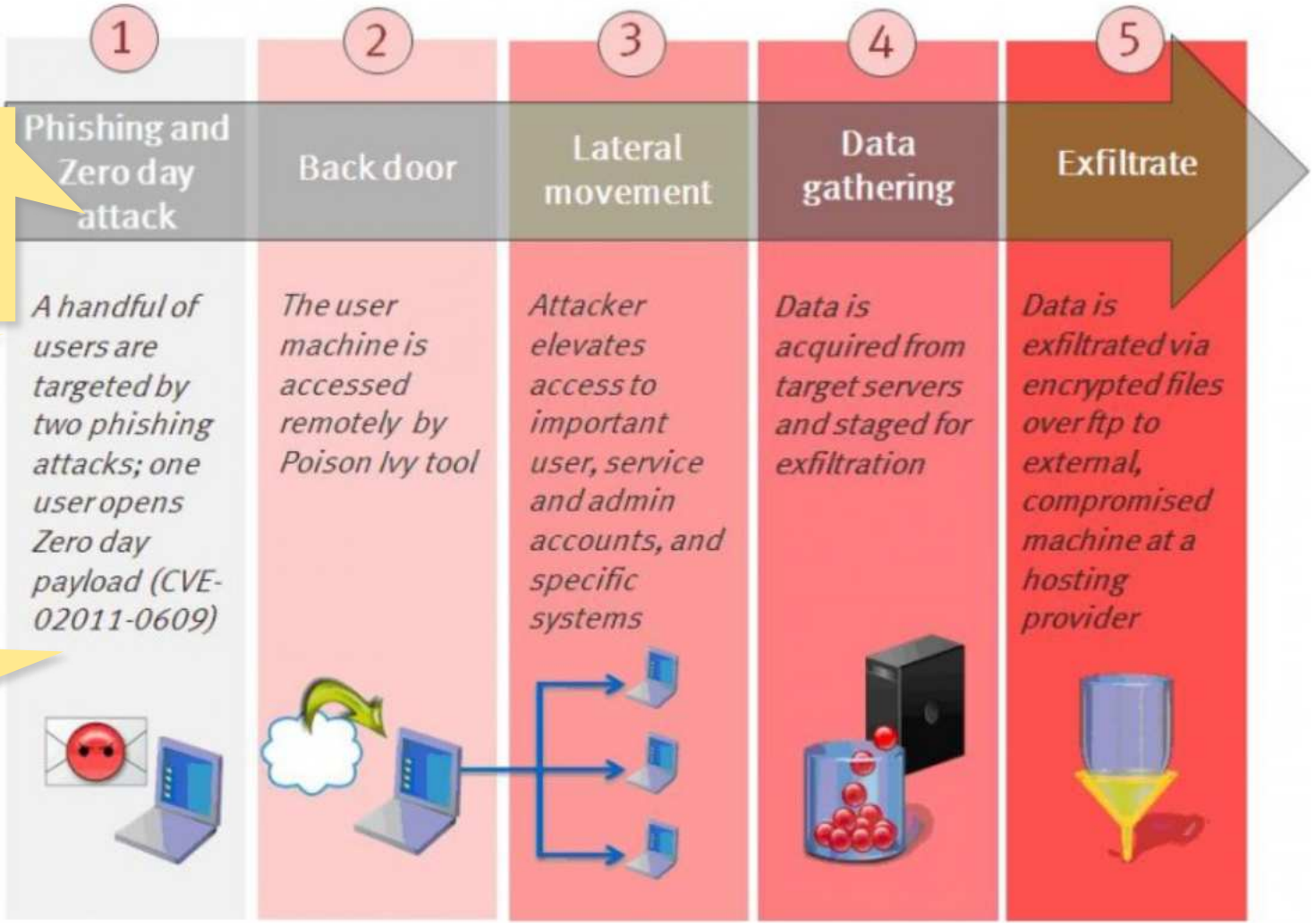
Classificata come spam

Anatomia dell'attacco

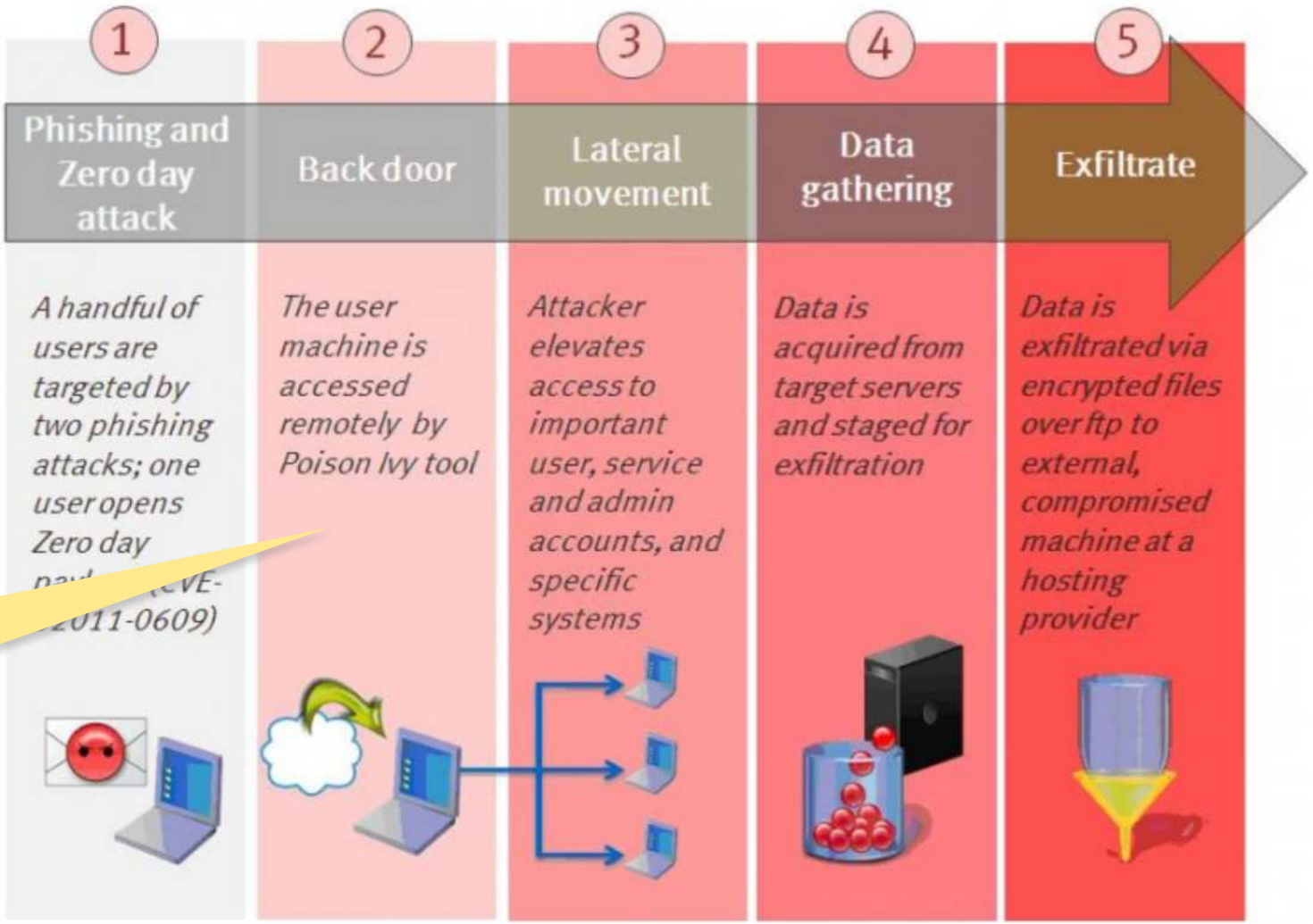
Un dipendente apre il file Excel, prelevandola dallo spam

Il malware sfrutta una vulnerabilità in Adobe Flash

Il malware installa una backdoor sul pc del dipendente

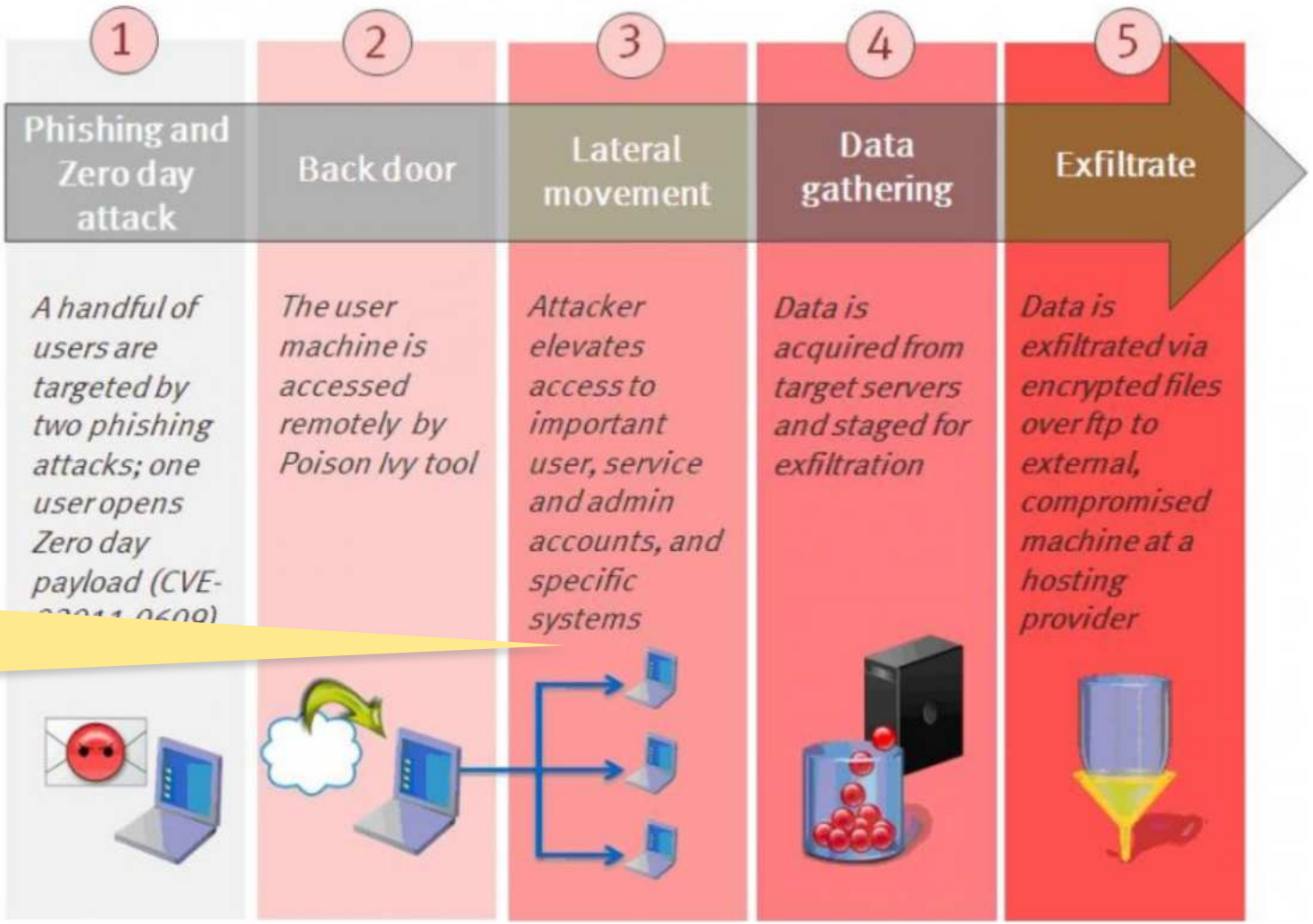


Anatomia dell'attacco



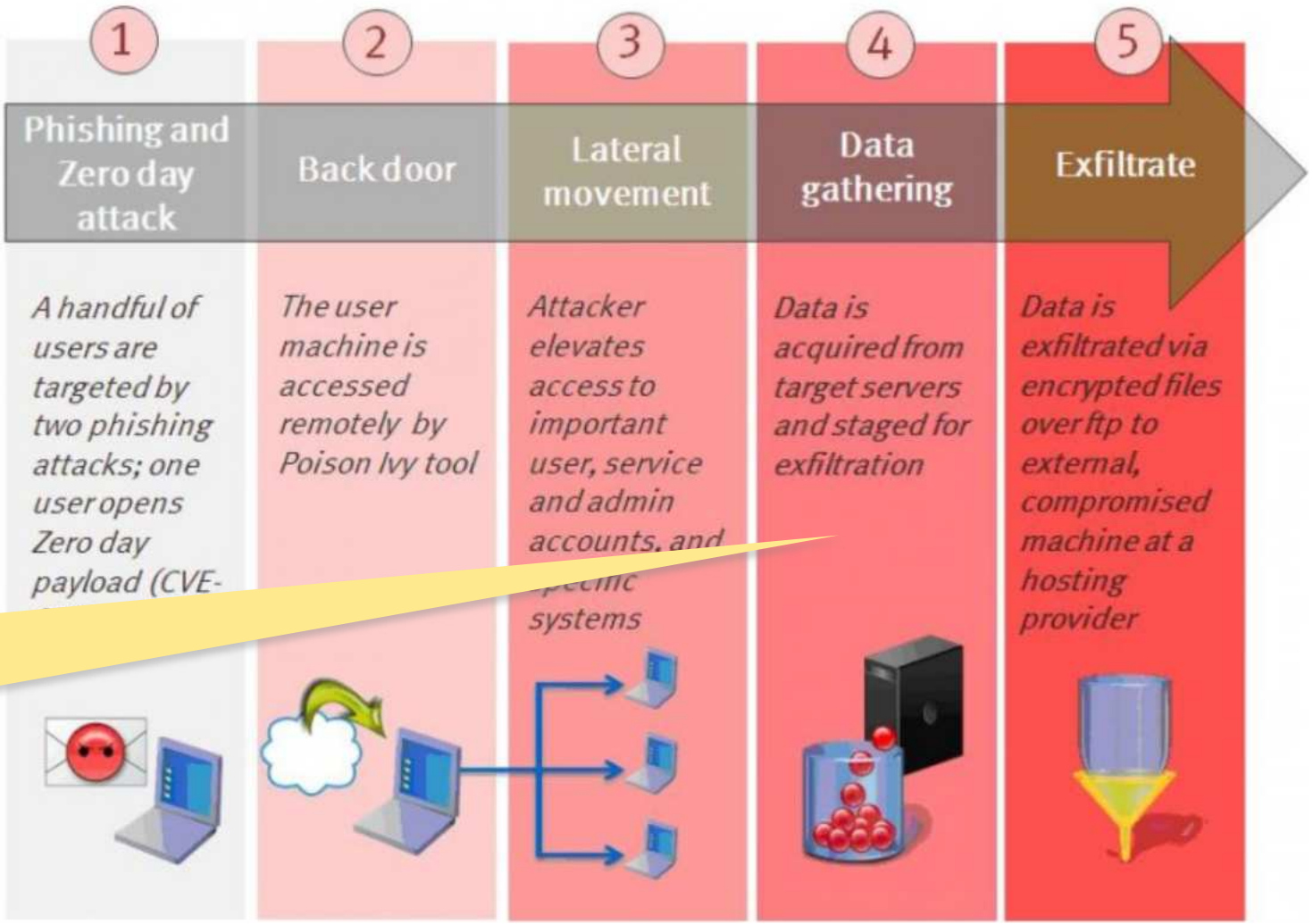
Accesso al PC del dipendente con Poison Ivy Remote Administration Tool

Anatomia dell'attacco



Attaccanti ebbero controllo delle macchine e dei server nella rete RSA

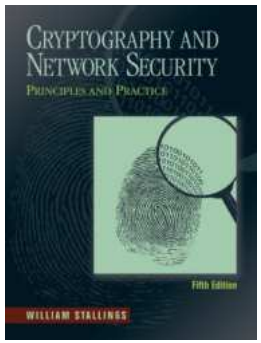
Anatomia dell'attacco



Database con corrispondenza tra numeri seriali token e segreto dei token (probabilmente)

Bibliografia

- Cryptography and Network Security
  by W. Stallings, 2010
  - cap. 18
- Tesina di Sicurezza su reti
  - Autenticazione utente + password



Domande?