HotSec08 Presentation – July 29, 2008

Digital Objects as Passwords

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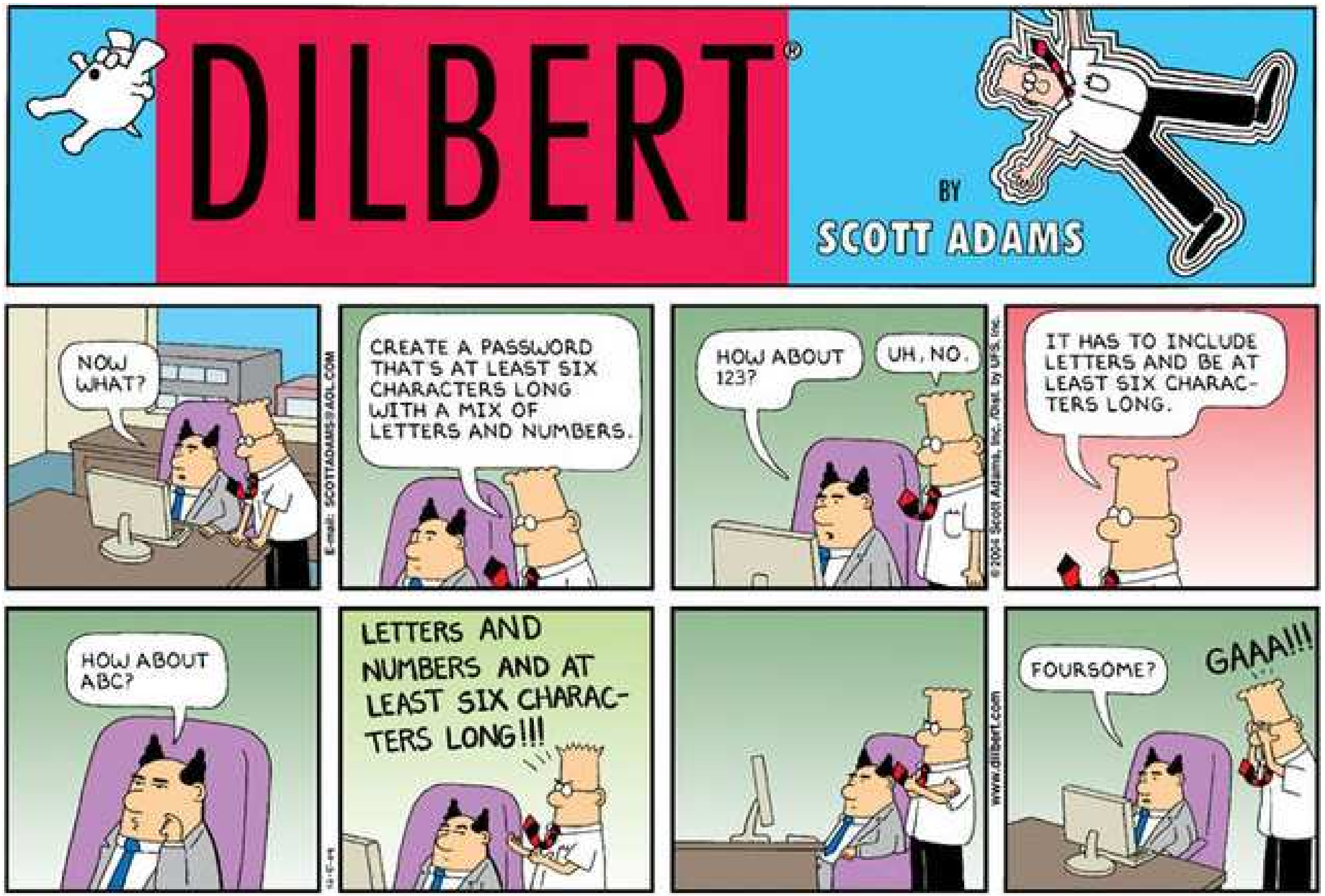
The fun of password generation


DILBERT®
BY SCOTT ADAMS
NOW WHAT?
CREATE A PASSWORD THAT'S AT LEAST SIX CHARACTERS LONG WITH A MIX OF LETTERS AND NUMBERS.
HOW ABOUT 123?
UH, NO.
IT HAS TO INCLUDE LETTERS AND BE AT LEAST SIX CHARACTERS LONG.
HOW ABOUT ABC?
LETTERS AND NUMBERS AND AT LEAST SIX CHARACTERS LONG!!!
FOURSOME?
GAAA!!!
E-mail: SCOTTADAMS@AOL.COM
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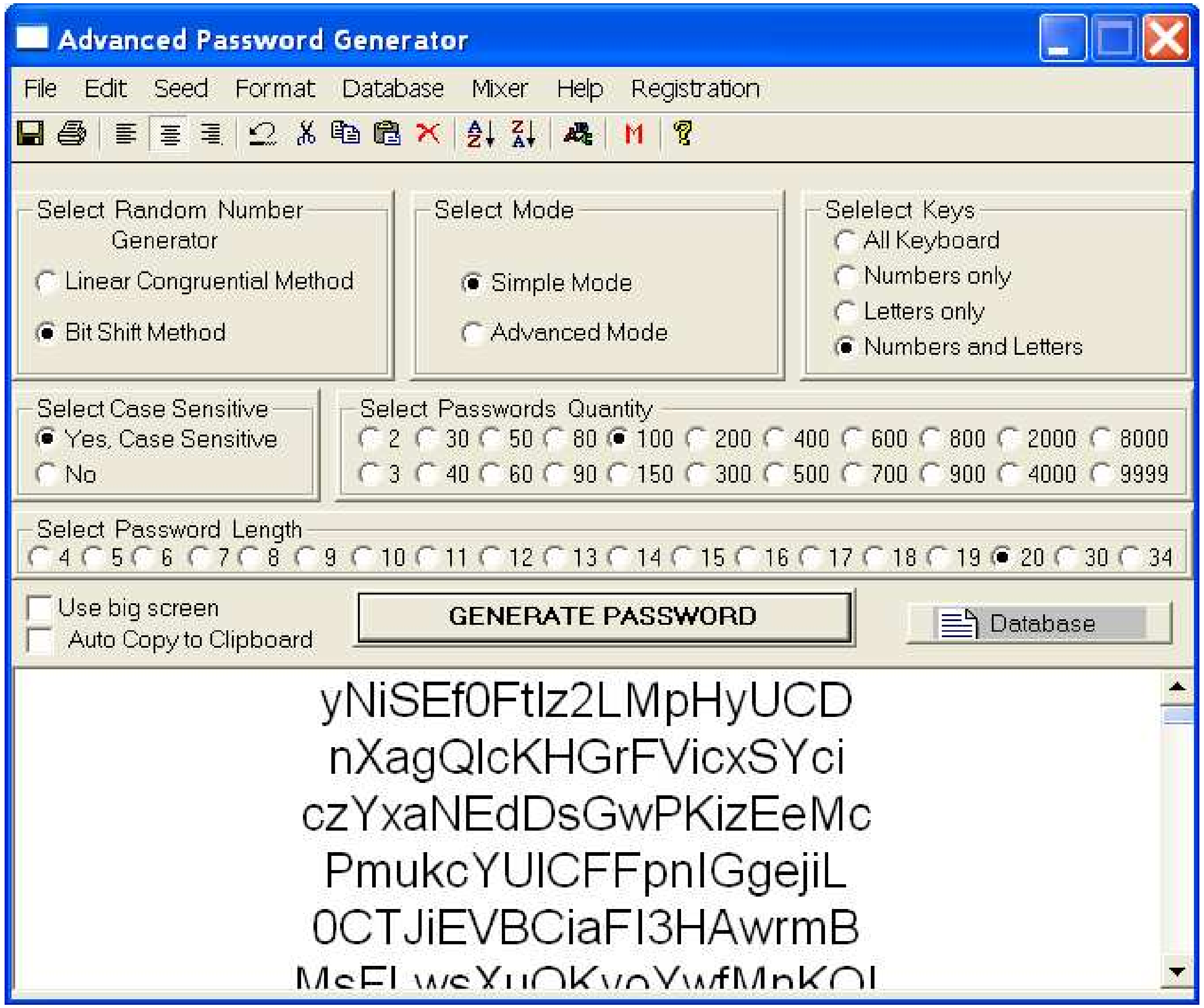
Use random generators?


Advanced Password Generator
File Edit Seed Format Database Mixer Help Registration
GENERATE PASSWORD
Database

Select Random Number Generator: Linear Congruential Method [✓ Bit Shift Method]

Select Mode: [✓ Simple Mode] Advanced Mode

Selelect Keys: All Keyboard Numbers only Letters only [✓ Numbers and Letters]

Select Case Sensitive: [✓ Yes, Case Sensitive] No

Select Passwords Quantity: 2 30 50 80 [✓ 100] 200 400 600 800 2000 8000 3 40 60 90 150 300 500 700 900 4000 9999

Select Password Length: 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 [✓ 20] 30 34

Use big screen
Auto Copy to Clipboard

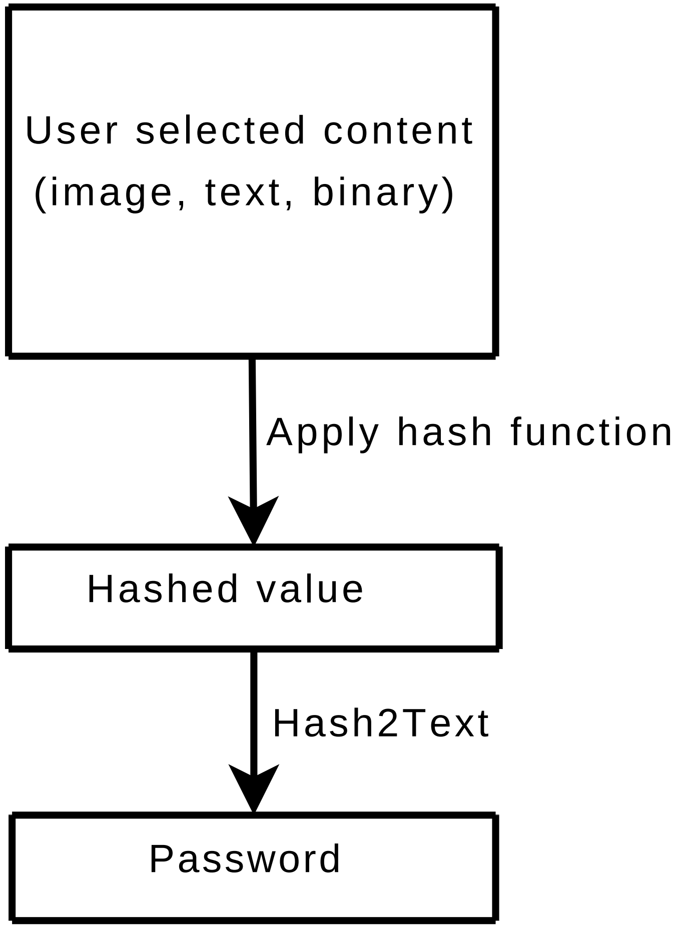
```
yNiSEf0Ftlz2LMpHyUCD
nXagQIcKHGrFVicxSYci
czYxaNEdDsGwPKizEeMc
PmukcYUlCFFpnIGgejiL
0CTJiEVBCiaFI3HAwrmB
```

What we focus on

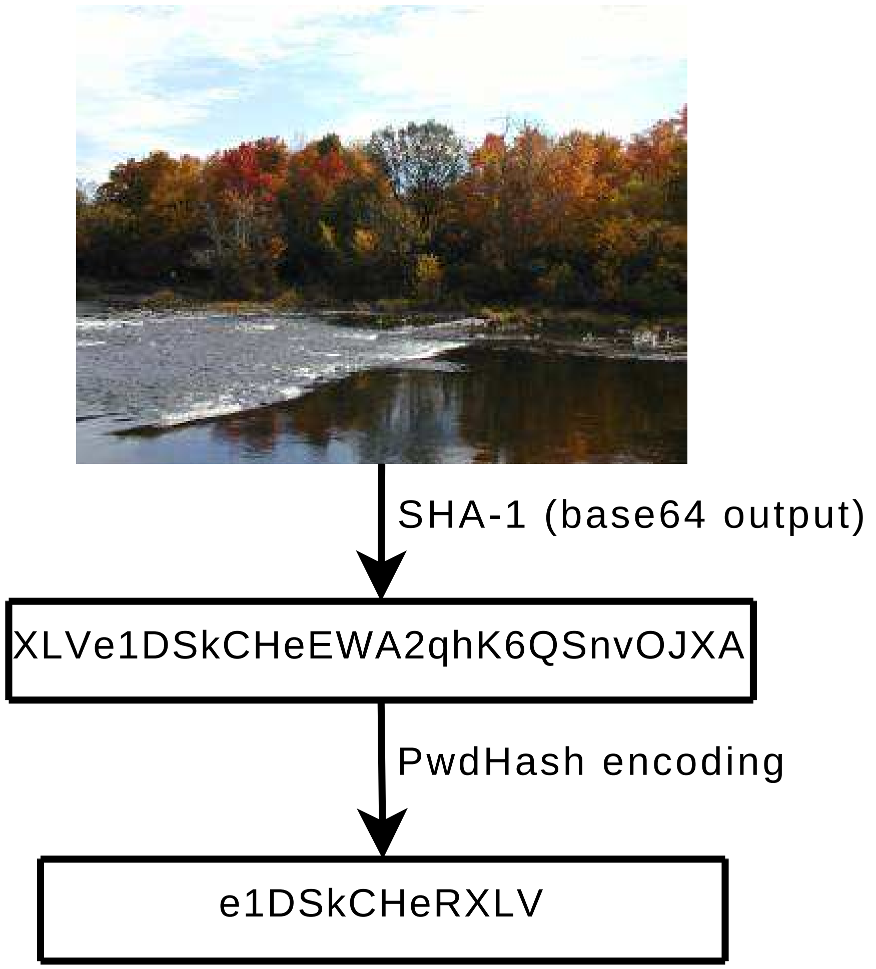
1. Usable strong password
   - password generation
   - password recall
2. Infrequently-used password
   - Personal Verification Questions (PVQs)
   - tax filing password

“easy to remember = easy to guess”

Your object is your password: ObPwd



(a) Generic steps in ObPwd



(b) An example of ObPwd

Password objects

1. Object features
   - personal or personally meaningful
   - stable (long-lived) content
2. Object sources
   - private objects: inaccessibility
   - web objects: vast richness

Password objects (cont.)

1. Private objects
   - local disk, mobile media (USB stick)
   - images, documents, text passages, executables, emails
2. Web/public objects
   - Internet Archive, Project Gutenberg, Google Books, ACM/IEEE digital archive
   - images, text passages, files

ObPwd variants

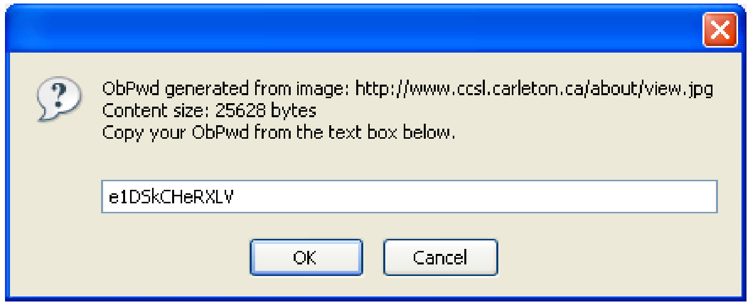
1. Append a salt with the selected object
   - pwd = Hash2Text(Hash(object, salt))
   - harder to generate password from compromised objects
2. Append a URL
   - pwd = Hash2Text(Hash(object, URL))
   - may prevent password phishing (cf. PwdHash)

Better protection but ... usability, portability?

Prototype implementations

1. Firefox add-on (cross platform, web objects)
2. Windows XP application (local objects)
3. Linux/Mac command-line program (local objects)

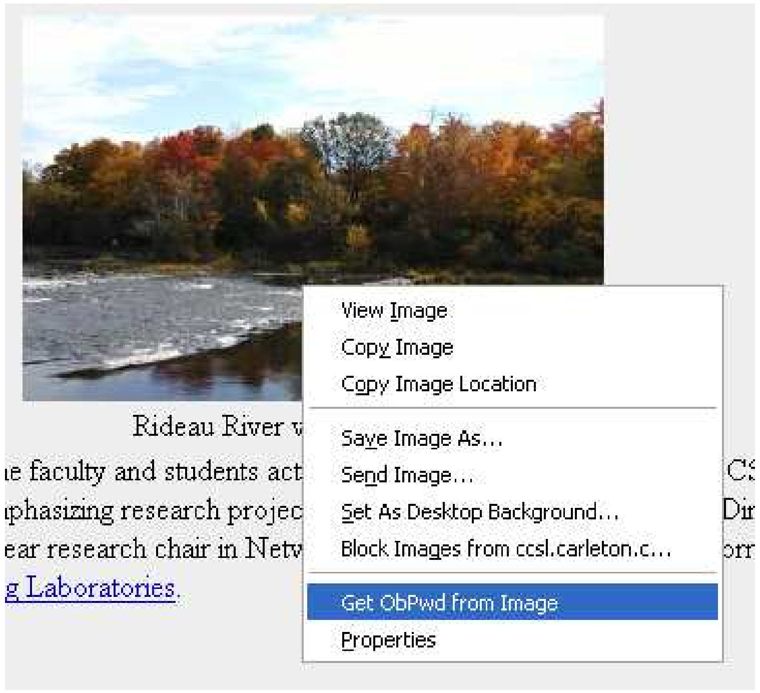
Prototype implementations



ObPwd generated from image: http://www.ccsl.carleton.ca/about/view.jpg
Content size: 25628 bytes
Copy your ObPwd from the text box below.

e1DSkCHeRXLV

Password generated from the selected image



Rideau River v
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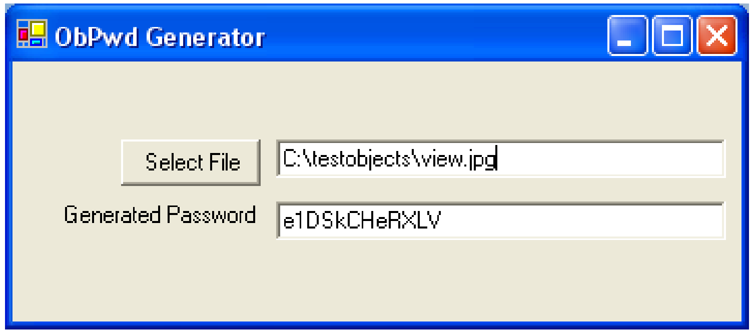
ıphasizing research projec
ear research chair in Netw
g Laboratories.



Select File: C:\testobjects\view.jpg

Generated Password: e1DSkCHeRXLV

ObPwd extension menu in Firefox

ObPwd Win32 application

Implementation choices

1. PwdHash encoding as Hash2Text
   - 12 characters, alphanumeric
   - omit special character option
2. Min. object size $= 30$ bytes, truncate at: $100,000$ bytes

Limitations

1. Shoulder surfing
2. Obvious public objects
   - Facebook profile photo
3. Password objects visible to network attacker
   - mostly affects web login (use Tor?)
4. Interference: passwords from different objects
5. Rootkits ☹

Related ideas

1. TrueCrypt allows files as an encryption key
   - resulting key isn't exposed to users
2. Photos as PVQs (Ariel Rabkin, SOUPS 2008)
   - upload a selected photo to an authenticating site
   - answer "who is the person in the photo?"

Some benefits

1. Reduced memory load: remember only a hint
2. Generating global password dictionary seems difficult
   - dictionaries for regular and passphrase/mnemonic password exist
3. Written backup: not feasible for graphical passwords
   - middle ground between text and image based schemes
   - rich selection space: human seeded attacks are harder
4. Password sharing through hints
   - better than email password sharing?

Open issues

1. Is ObPwd a usable technique to generate strong password?
   - user testing required
2. Can we expose more options to users without confusing them?
   - password length, special chars, look-alike chars (1, l, 0, O)
3. How to deal with site-specific password requirements?

Try from:

`http://www.ccsl.carleton.ca/~mmannan/obpwd`