Security Through Obscurity

... powered by HTTPS!

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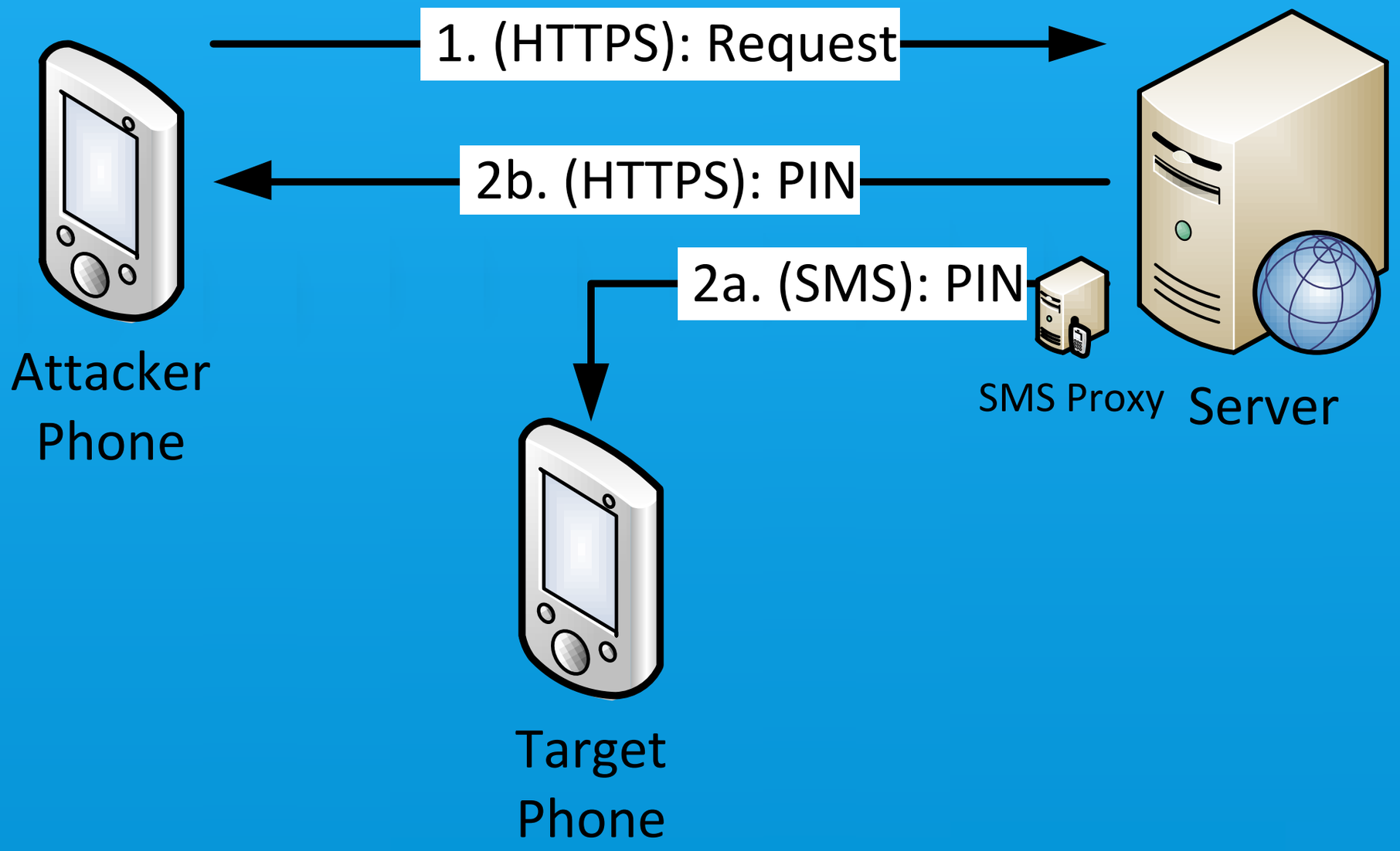
Sebastian Schrittwieser, FH St. Pölten

redacted version

Live-Demo on Wowtalk


1. (HTTPS): Request
2b. (HTTPS): PIN
2a. (SMS): PIN
Attacker Phone
Target Phone
SMS Proxy
Server

SSL != protection against protocol analysis

SSL interception enables man-in-the-middle attacks for protocol analysis purposes

transport layer encryption cannot replace good protocol design!

Certificates?

```
if ((err = ReadyHash(&SSLHashSHA1, &hashCtx)) != 0)
    goto fail;
if ((err = SSLHashSHA1.update(&hashCtx, &clientRandom)) != 0)
    goto fail;
if ((err = SSLHashSHA1.update(&hashCtx, &serverRandom)) != 0)
    goto fail;
if ((err = SSLHashSHA1.update(&hashCtx, &signedParams)) != 0)
    goto fail;
    goto fail;
if ((err = SSLHashSHA1.final(&hashCtx, &hashOut)) != 0)
    goto fail;

    err = sslRawVerify(ctx,
                       ctx->peerPubKey,
                       dataToSign,                /* plaintext */
                       dataToSignLen,             /* plaintext length */
                       signature,
                       signatureLen);
        if(err) {
            sslErrorLog("SSLDecodeSignedServerKeyExchange: sslRawVerify "
                "returned %d\n", (int)err);
            goto fail;
        }

fail:
    SSLFreeBuffer(&signedHashes);
    SSLFreeBuffer(&hashCtx);
    return err;

}
```

http://opensource.apple.com/source/Security/Security-55471/libsecurity_ssl/lib/sslKeyExchange.c

Quizduell

extremely popular in Germany

Für eine größere Ansicht klicken Sie auf das Bild

Für Kunden: Stellen Sie Ihre eigenen Bilder ein.

Hier reinlesen und suchen

Quizduell [Taschenbuch]

Quizduell (Autor)

★★★★☆ (6 Kundenrezensionen)

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Empfehlen

extremely popular in Germany

Let’s play a round of Quizduell ;)

Curiosity

November 2012 - May 2013

326 layers

69 billion small cubes

4 million players

3,000,000,000 coins for a diamond chisel

Bonus points for clearing the entire screen!

Parameter for multiplier is set by the server!

[...]
&backgroundColor=**blue**
&backgroundText=**Curiosity**
&bonusMultiplier=~~**10**~~ 10000000
&hardwareID=**<UDID>**&
[...]


8108
22:21:27.4
login
1 294 989 562

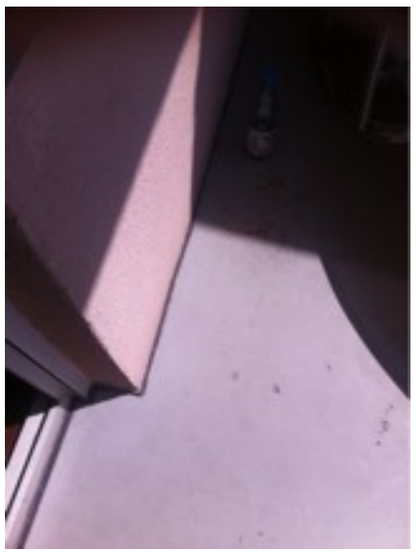
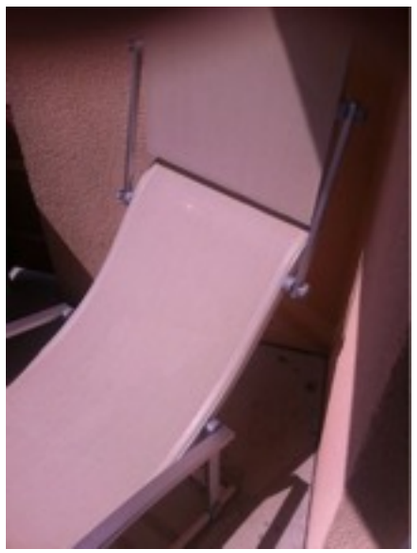
iPhone Apps

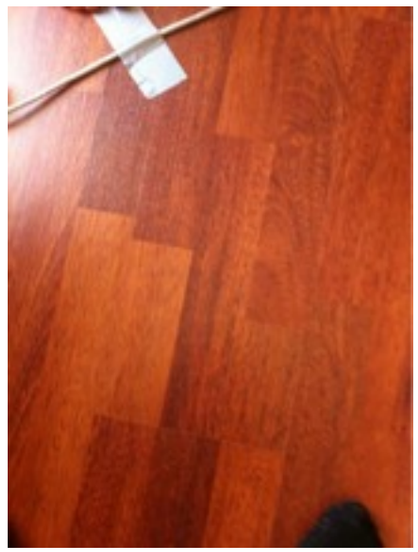
PhotoSwap
Social Networking

Photo-swap
Entertainment

SuperSwap
Social Networking

Photoswap

http://www.server.com/images/12345.jpg

http://www.server.com/images/12347.jpg

http://www.server.com/images/12349.jpg

http://www.server.com/images/12351.jpg

http://www.server.com/images/12353.jpg

```
for i in {1..12345}; do
wget -k http://www.server.com/images/$i.jpg;
done
```

Demo

Countermeasures?

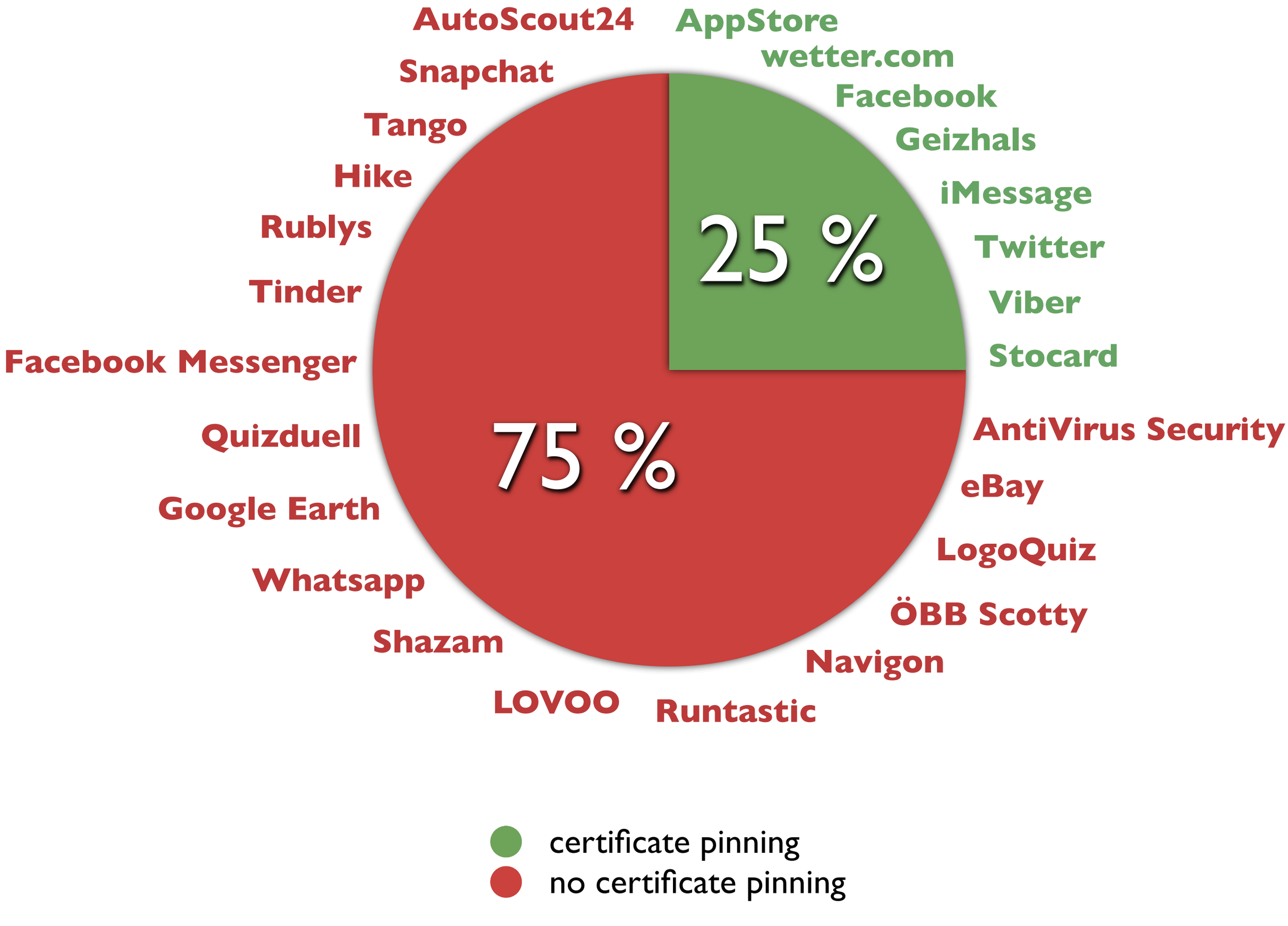
Certificate Pinning

Verification if particular certificate is used

Increased security

Reduced costs

Less flexibility


AutoScout24
Snapchat
Tango
Hike
Rublys
Tinder
Facebook Messenger
Quizduell
Google Earth
Whatsapp
Shazam
LOVOO
Runtastic
Navigon
ÖBB Scotty
LogoQuiz
eBay
AntiVirus Security
Stocard
Viber
Twitter
iMessage
Geizhals
Facebook
wetter.com
AppStore
25 %
75 %
certificate pinning
no certificate pinning

Deutsche Bank

Westpack Banking

Erste Bank

Sparkasse

BNI Internet Banking

Union Bank

Alpha Bank

UBS Mobile Banking

Commerzbank

Postbank

E-Banking apps?

Raiffeisen Bank

BPN Paribas

Eniteo DZ Bank

Bank Republic

Volksbank

Bank Austria

Volksbanken Raiffeisenbanken

Targobank

ING Diba

never ever trust the client
(even if it's your own client)!

(the 80's called and want their advice back)

server-side validation of every client request

secure side channel

establish a trusted second channel

Conclusions

- Many smartphone applications implement insecure protocols

- These protocols are hidden behind transport encryption, which does not prevent protocol analysis

- Don’t rely on *Security through Obscurity*

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Mobile Security | Digital forensics in Databases

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Code obfuscation | Fingerprinting of anonymized microdata
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