http-auth side meeting

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IETF 80 Prague

Agenda

- How we work with http authentication?
- A short introduction of my proposal
- Discussions

Web authentication

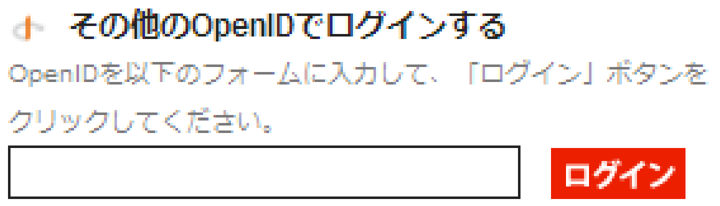
- Many peoples might agree it is broken
- How?
  - People continues to use Form/plaintext auth.
  - People does not use HTTP authentication although there is it
  - We failed to solve any kind of existing problems
    - Phishing…
    - Hardness of using any cryptography…

Things what we have now

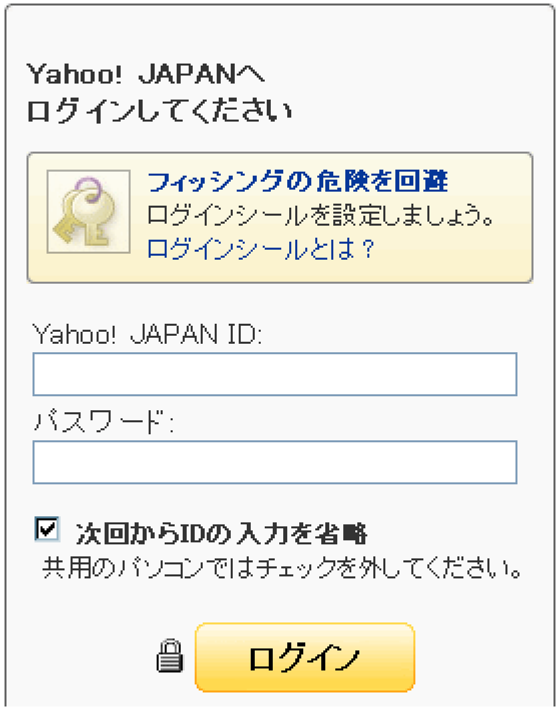
- HTTP authentication schemes
  - Basic
  - Digest… more or less died
  - NTLM, Negotiate, … limited usage
- TLS
  - Client authentication … very limited usage
- Form authentication
  - Very widely used
  - Causes LOTS of problems

Problem with federated Auth/authz

- Users have to input passwords in a redirect page
  - How we can make sure it is not a phishing page?


その他のOpenIDでログインする

OpenIDを以下のフォームに入力して、「ログイン」ボタンをクリックしてください。


Yahoo! JAPANへ
ログインしてください

フィッシングの危険を回避
ログインシールを設定しましょう。
ログインシールとは？

Yahoo! JAPAN ID:

パスワード:

☑ 次回からIDの入力を省略
共用のパソコンではチェックを外してください。

Can you carefully check identity of this form every time without mistake?

True cause of problem

- HTTP etc. has provided no *usable* solutions
  - Recent Web application evolved to provide lots of security-related application features
  - Most of these hard to be implemented on HTTP/TLS authentication

→ people has difficulty/distaste of using HTTP authentication, prefers Form-based auth

True cause of problem

- (Incomplete) list of modern features implemented by using application-level auth
  - Complex timeout management of log-in status
  - Forced/user-originated log-out
  - Persistent log-in
  - Site-wide single-sign-on
  - Federated log-in
  - Multiple authentication realms (user-name spaces)

Application-level auth… drawbacks

- No protection of passwords to the server
  - Form and server-provided HTML have full control of what is inputted
  - Plaintext always available (often sent) to the server (on TLS, though)
  - No cryptographic protection against fraudulent servers
    - So-called “Phishing”, many variations

Chicken and Egg problem

- "Improving HTTP-auth is boring, if people does not use those instead of Form auth."
  - Or, "Why they do not use this incredibly-secure solution existing now?"
    - *it often does not meet application/business requirements*
- "If there is only HTTP-Basic useful, no one have good reasons to throw Form auth. away."

So what we need?

- We need to cut the Gordian knots
  - We must provide enough-Secure mechanisms to address existing security problems
  - We must, *at the same time*, provide enough useful mechanisms so that people can move to the new things

Possible authentication means

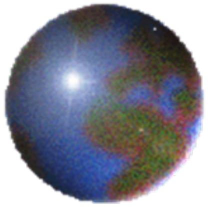
- Passwords
  - Most simple, easy-to-understand credential

  → HTTP Mutual authentication proposal

- Certificates, keys in smart cards
- Two-factor authentications (e.g. HW token)
- Federated Authentications
- Use existing backend (SASL, Kerberos etc.)

What “I” want to talk about today

- Discussion on the “Problem space”
  - What we should solve from this year
  - What we are required to solve
  - What we can use now
- Discussion on the time scope
  - Possible future timeline/schedule?
- “Cloud/association” of people interested
  - We need friends to work with



A (relatively) short description of HTTP Mutual authentication

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Goal

- A better authentication which will enable
  - Password-based authentication
  - Strong protection of password,
    even if it is either eavesdropped or phished
    - Note: hash is not enough strong against
      password-crack on recent computers
  - Prevent that *phishing site to make authentication succeed, or even pretend it succeeded*
  - Works well with recent web applications design
- *Mid-/Long-term solution: very secure, but requires both client/server implementation changes*

HTTP “Mutual” auth.

- New access authentication method for HTTP
  - Secure (⇔ HTTP Basic/Digest, HTML Form)
    - No offline password dictionary attack possible from received/eavesdropped traffic
  - Easy to use (⇔ TLS client certificates)
  - Provides *Mutual authentication*:
    clients can check server’s validity
    - Authentication will ONLY succeed with servers possessing valid authentication secrets
    - Rogue (phishing) servers can’t make authentication to succeed

Basic design

- Implemented on top of RFC2617
  - Standard WWW-auth/Auth-info headers used
- Password-based Mutual authentication
  - Using PAKE as underlying crypto primitive
- Authentication only
  - Can be used both with HTTP and HTTPS
  - Encryption/integrity provided by HTTPS
- No long-term storage required

  (↔ Client Certificate, pwd-mgr + auto-gen etc.)

To overcome "usability" problem

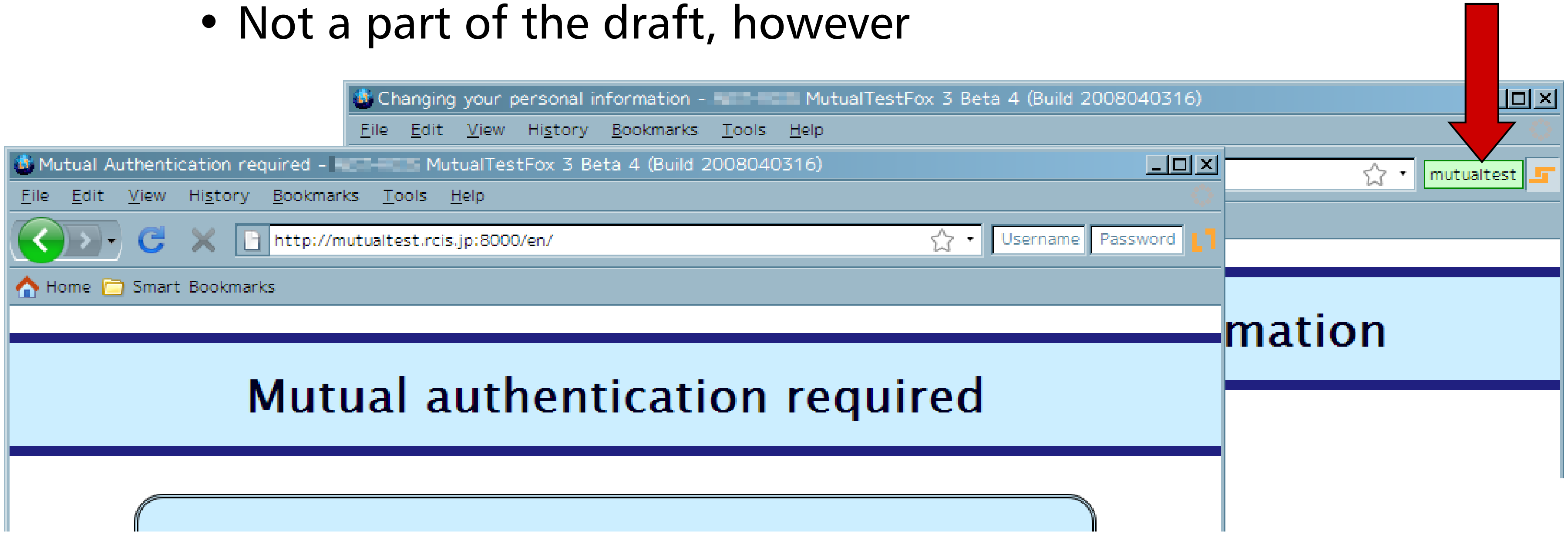
- Support for recent Web application design
    - To solve several current issues with HTTP auth: covers reasons to use Form-based auth.
  - Optional authentication
    - Single URI can serve both auth/unauth contents
    - Support for sites like Slashdot, Google or Yahoo
  - Timed/server-initiated logout
  - log-on/log-off page redirection
    - More to be needed?
      - I need a feedback for that, too

Draft organization

- As of draft-08:
  - 1.: Introduction
  - 2.-9.: Core part
    - message syntax, state machines, session caching
    - Single-sign-on treated in 5.
  - 10.: Authentication-Control header
    - Extensions to make it usable with Web apps.
    - “application” peoples comments needed
  - 11.: Authentication Algorithms
    - All boring mathematics ☺
    - “security” people’s comments needed
  - 12-16.: all finish-ups
    - IANA, security consideration, references etc.

UI consideration

- Trusted display for mutual authentication result will be needed
  - We propose new UI for this auth scheme
    - Uses browser chrome area
    - Not a part of the draft, however



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Mutual Authentication required - [redacted] MutualTestFox 3 Beta 4 (Build 2008040316)
File Edit View History Bookmarks Tools Help
http://mutualtest.rcis.jp:8000/en/
Username
Password
Home
Smart Bookmarks
Mutual authentication required

Current status

- Spec draft: draft-oiwa-http-mutualauth-08
- Draft Implementations
  - Server-side: Apache, Ruby webrick
  - Client-side:
    - Mozilla-based implementation (Open-source)
    - Pure-Ruby reference implementation (to appear)
    - IE-based implementation (closed-source)
  - Available from project homepage: https://www.rcis.aist.go.jp/special/MutualAuth/
    - Trial website there!

Thank you

- More resources
  - Our project homepage: https://www.rcis.aist.go.jp/special/MutualAuth/
  - Draft:
    - Official: https://datatracker.ietf.org/drafts/draft-oiwa-http-mutualauth/
    - Some preliminary drafts (before submission) may be on our homepage