VIROLAB

A virtual laboratory for decision support in viral disease treatment

A Security Infrastructure for MOCCA Component Environment

http://virolab.cyfronet.pl

1. Objective

Concept and development of a new security system for H2O and MOCCA

2. Target environment

- **H2O**
  - Middleware platform for distributed computing
  - Providers setup H2O kernel (container)
  - Allowed parties can deploy pluglets (components)
- **MOCCA**
  - Distributed,CCA-compliant component framework
  - Build on top of H2O, uses its security mechanisms

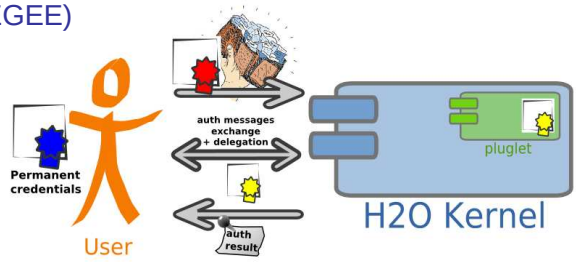
3. Authentication in H2O

- Extensible, pluggable architecture
  - Tunneled
  - Chain of authenticators
  - Based on message exchange
  - Similar to Pluggable Authentication Modules
  - Returns Subject object – for JAAS authorization
- **Only basic Password Authenticator by default**
  - Low level of security
  - Simple to intercept
  - Not applicable for SSO and delegation
  - Hardly possible to manage validity lifetime
  - Careless users…

Our Challenge !

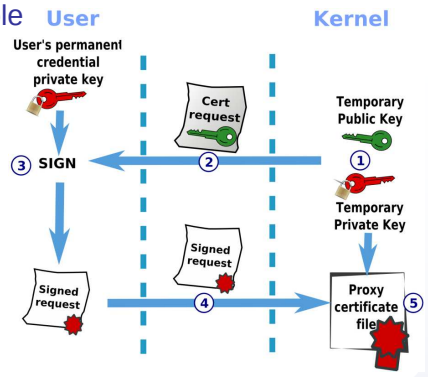
4. Concept and implementation

- H2O-applicable authenticator
  - based on PKI and X.509
  - providing delegation based on proxy certificates
- Compliant with GSI
  - Single Sign-On and delegation using proxy certificates
  - Widely deployed on production infrastructures (EGEE)



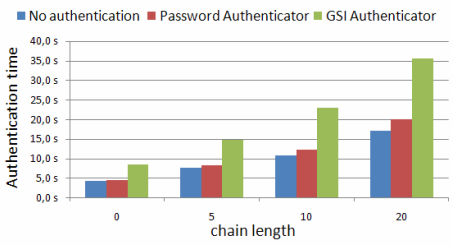
Authentication steps:

- Identity introduction – with (proxy) certificate
  - Kernel verifies validity and checks if the issuing CA is trusted
- Identity confirmation – simple challenge-response algorithm:
  - Kernel encrypts a nonce and sends it to the client
  - Client decrypts and signs the nonce and sends back to the kernel
- Credential delegation:

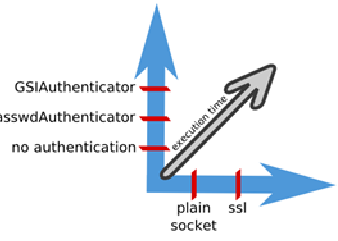


5. Performance

- Authenticators comparison
- SSL/TLS and server authentication overhead



- Risk analysis
  - How much security are we ready we loose?
  - How much performance can we gain?



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