Lemonade Status Updates for IETF’65:
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(*) Other updates are to be presented by others and missing from this presentation
draft-maes-lemonade-xencrypted-01

• Status update:
  – New draft for object encryption in answer to request for proposal
  – Address proxy based deployments identified by OMA
  – Discuss security issues / key management
**Operator Proxy Deployment Model**

- Operator desires relationship with customer
- Operator wants to provide push-email like experience
- Operator wishes to provide this for enterprises which do not have Lemonade compliant servers deployed
- Enterprises demand security between the client and server
Problem: Security

- Operator proxy cannot be pass-thru SSL/TLS tunnel because of the need to process Lemonade commands and responses
- Proxy must be able to issue IMAP commands on behalf of client to IMAP server
- Proxy must not be able to see non-protocol related information (message content)
- Proxy must not be able to spoof outgoing messages on behalf of user (fake message contents, replace distribution list or headers when sending email)
Object Level Encryption

- Proposal: Object Level encryption. Introduce new “encrypted literal” syntax similar to IMAP binary
- Server decides which message attributes require confidentiality and integrity, and transmit data in encrypted literal format instead of as IMAP strings, literals, or literal8
- Proxy sees IMAP responses, but opaque message attributes, suitable for parsing and reformatting for Lemonade clients if necessary
- Client can create messages with Trio using encrypted literal
Problem: Key Management

- Encryption keys must be securely negotiated between client and server
- Solutions?
  - Out-of-band transfer (another socket, SSL or HTTPS request, SMS or XDMS?)
  - Leverage SASL: SASL includes steps for client and server to compute a session key when confidentiality is requested
    - Introduce new type of SASL security request? Object-level vs transport level? Client and server perform all steps in SASL Digest of computing keys, but use them only for literals
  - Use custom key exchange IMAP protocol extension (yuck)
Concerns covered in Draft

- Spoofing: Client APPENDs, proxy substitutes message
- Attacking with SMTP: Proxy uses URLAUTH+BURL to forward messages from IMAP to attacker address
- Proxy mutating flags (e.g. causing spurious deletions)
- Proxy substituting entirely fake messages in client view
- Many More!
Challenging deployment model

• Clear that this model poses many risks
• Is not the preferred deployment model (preferred is Lemonade server or gateway at Enterprise)
  – It is demanded
• Right now, proprietary solutions exist that address these issues
  – A standard would be preferable
• Calling security experts to help
• Perfect solution to all of these concerns is not expected
So, for draft-maes-lemonade-xencrypted-01 …

• Next steps:
  – Rationalize integrity and confidentiality mechanism with SASL mechanism
  – More rigorous enumeration and definition of out-of-band key exchange mechanisms
  – Mechanism to prohibit proxy from obtaining URLAUTHs except as those specifically requested by client
  – Client Selective reveal of data for transcoding
  – Allow multiple encryption schemes? (CAPABILITY XENCRYPTED=3DES,RC4,AES etc)
  – Allow client to select preferred algorithm
  – Enhanced security concerns section, dealing with proxy hiding stronger encryption schemes
  – MUST implements (3DES?)

• Take to the list
• Status update: (Following Beijing’s plan)
  – Carried over from draft-maes-lemonade-http-binding-04
  – Added REST and WebDAV binding discussion.
  – Clarified HTTP response codes.
• Editor’s note:
  – Took name selected in Beijing BUT better name would be: mobile-network-binding or non-tcp-binding
    ...
  • Motivation is not just firewalls but also and may be even more important the phone stacks and the network intermediary behaviors (e.g. TCP time-out on IDLE for 2.5G and even more for 3G)
Next steps:

- Should an OPTIONS HTTP request be supported to allow a client to probe HTTP binding capabilities, such as which protocol a given URL is bound to, or whether chunking is supported?
- Should separate content types exist for IMAP and SMTP since the entity body in the HTTP request is different?
- Standardizing the form of the URL for the binding may permit firewall administrations to impose better filtering.
- Produce more rigorous rules for mapping IMAP and SMTP ABNF to SOAP, REST, and DAV.
- Provide ways to declare supported bindings or select a binding.