SSL Web Server and Client Configuration

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Introduction

- SSL/TLS provide a method of entity authentication as well as encrypted communications
- Client proposes, server disposes
- Client should protect itself and not allow connection unless a FIPS approved algorithm is being used.

The issue

- FIPS Approved Algorithms
  - Triple DES or AES Encryption
  - SHA-1 hashes or HMAC
- Can common servers & clients be set to use only FIPS approved algorithms?
  - What do you have to do?
  - What are the limitations and side effects?

Disclaimer

- NIST does not endorse or recommend any of the software or products mentioned in this talk
- We did not consider whether the products used validated crypto modules or not
- We we tested the interoperability of clients (browsers) and servers when configured to use cipher suites with FIPS approved algorithms, but did not test the correctness of TLS implementations

Server Statistics

- Servers were picked based on usage.
- Statistics available at http://www.netcraft.com

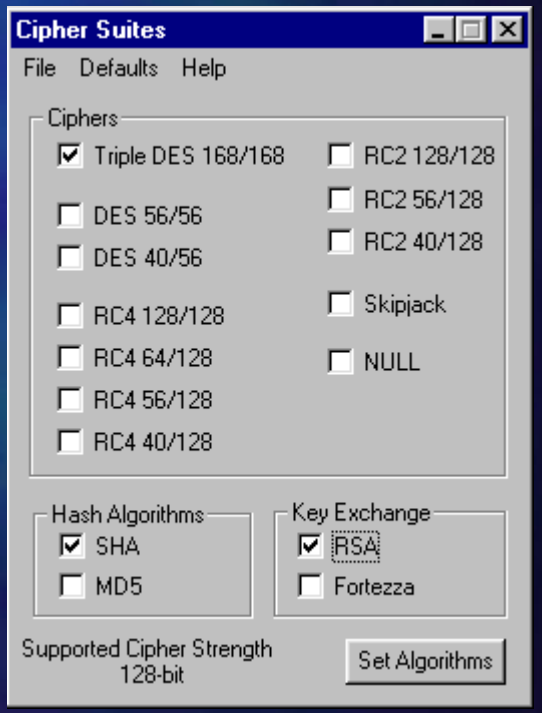
Product	Usage	Percent
Apache	21,120,388	56.21%
Microsoft IIS	11,902,821	31.68%
Zeus	849,089	2.26%
iPlanet	824,245	2.19%

Apache 2.0.35

- FIPS compliance
  - EDH-RSA-DES-CBC3-SHA
  - EDH-DSS-DES-CBC3-SHA
  - DES-CBC3-SHA
  - ADH-DES-CBC3-SHA
- Configuration
  - conf/ssl.conf
  - SSLCipherSuite '3DES:!MD5'

Microsoft IIS 4.0

- FIPS Compliance
  - DES-CBC3-SHA
  - Special patch needed for Diffie-Hellman
  - Prefers RC4 algorithm – will select if the client offers it
- Configuration
  - Must edit the registry to disable ciphers
    - NIST developing utility
    - Affects all applications that use crypto service provider



Zeus Web Server 4.0

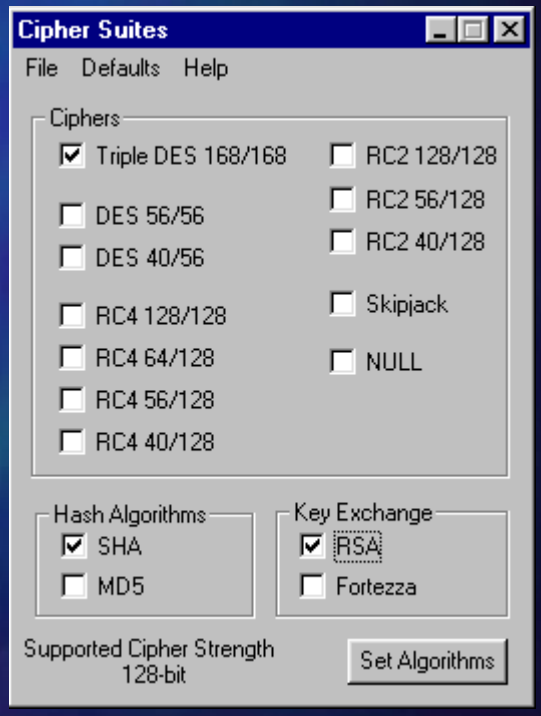
- FIPS Compliance
  - Does not support any FIPS based cipher suites
- Configuration
  - No configuration options

iPlanet 6.0

- FIPS Compliance
  - DES-CBC3-SHA
  - FIPS-140 DES-CBC3-SHA
    - Netscape specific cipher suite
- Configuration
  - Easy to use interface. Enable ciphers with mouse.

Internet Explorer 6.0

- FIPS Compliance
  - Supports DES-CBC3-SHA but prefers RC4
- Configuration
  - Must edit the registry to disable ciphers
    - NIST developing utility
    - Affects all applications that use crypto service provider



Netscape Navigator 6.2

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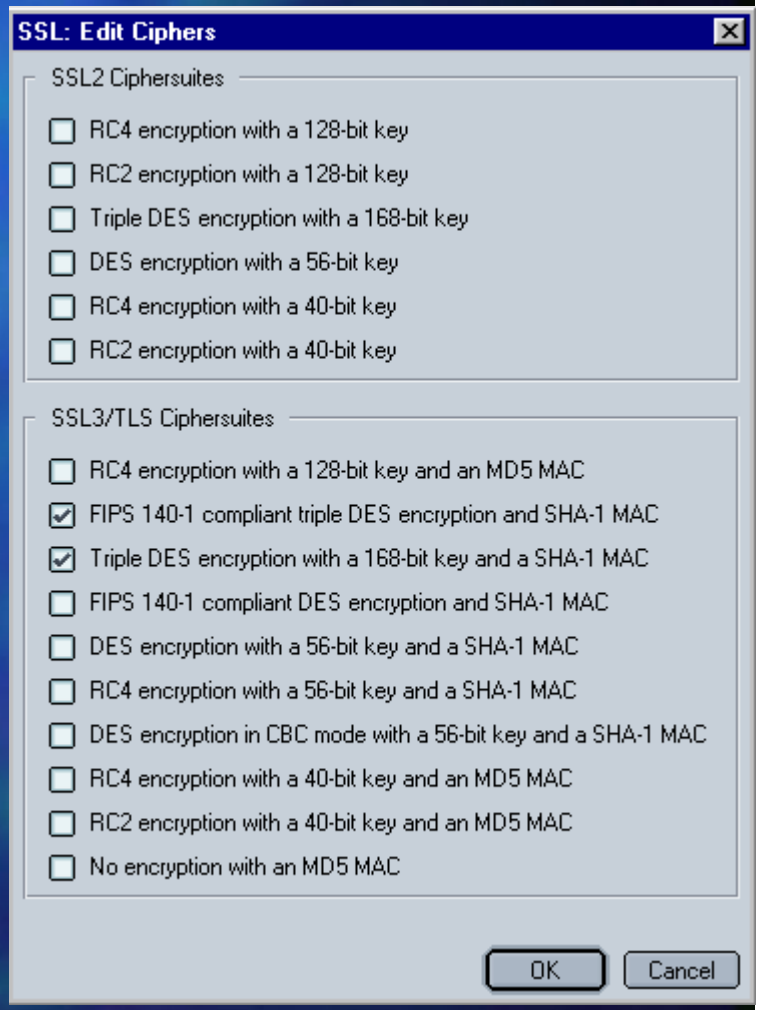

Mozilla 1.1a

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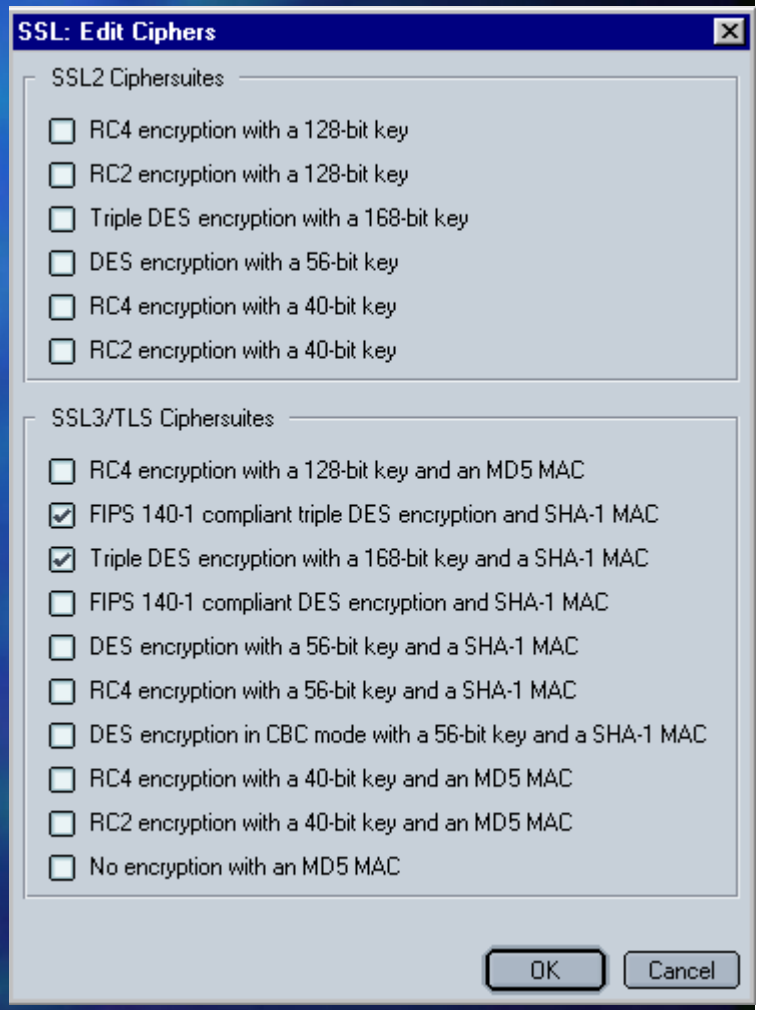
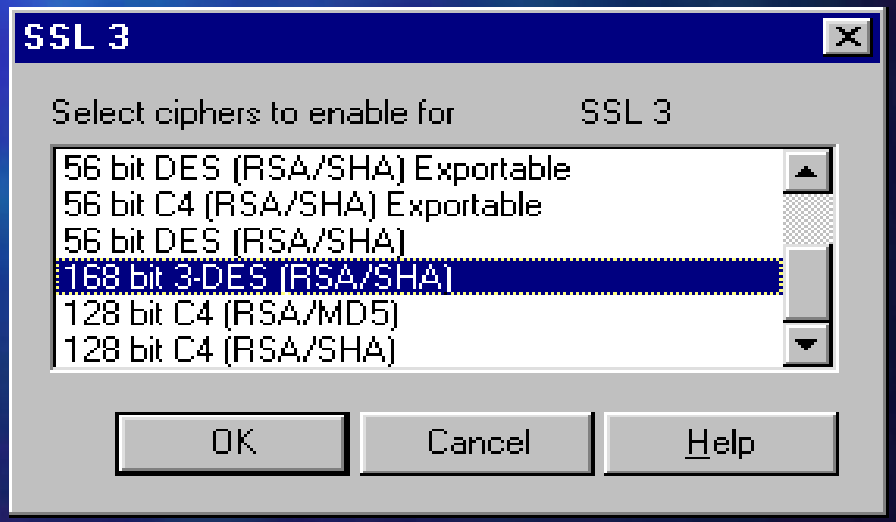


Opera 6.03

- FIPS Compliance
  - DES-CBC3-SHA
- Configuration
  - Highlight allowed ciphers



Conclusion

- Can configure most products to do only 3-DES
- Apache supports most number of FIPS compliant cipher suites
- Apache allows changing cipher suite preference (if client cannot do 3DES, fall back to RC4)
- No tested client contains preference list
- The only way to ensure that FIPS compliant ciphers are being used in a SSL/TLS connection is to force either the client or the server to allow only 3DES and SHA-1.

Questions and Answers