

Task 4.4

TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

Authentication:

- RSA for key exchange and signing
- ECDHE states that the elliptic curve diffie-hellman algorithm is used for the key exchange

Encryption:

- Symmetric encryption with AES 128 GCM
- 128 is the key size
- GCM states the mode used for encryption

Integrity:

- Hash function SHA256 is used to obtain integrity
- 256 states the size of the output

TLS_RSA_RC4_128_MD5

Authentication:

- RSA (see above)

Encryption:

- Symmetric encryption with RC4
- 128 bit long key is used

Integrity:

- Hash function MD5 is used

Three reason why the first suite is more secure:

1) RC4

RC4 takes a key and transforms it into a long random string, which is XORed with the plain text. At this point, it was detected that the random generator isn't that random and with the help of a large amount of connection of the same encrypted data, this data can be decrypted by obtaining resembling pattern. Therefore an amount of 2^{30} connections is needed.

Source: <http://www.heise.de/security/meldung/Erneuter-Krypto-Angriff-auf-SSL-TLS-VerschluesSELung-1822963.html>

2) MD5

With the help of a collision attack it is possible to get the same output from MD5 for two different inputs. Such that for $i_1 \neq i_2$ the MD5 hash algorithm computes $H(i_1) = H(i_2)$. The attack could enforce a collision at digital certificates.

Source: <http://www.heise.de/security/artikel/Konsequenzen-der-erfolgreichen-Angriffe-auf-MD5-270106.html>

3) RC4

Various sources claim that the NSA decrypt RC4 encryption in real time. How this is accomplished isn't really sure. These experts advises to stop using the RC4 algorithm, because it isn't safe anymore.

Source: <http://www.heise.de/security/meldung/Erneuter-Krypto-Angriff-auf-SSL-TLS-Verschlueselung-1822963.html>