
Mobile
Arts

An Erlang WTLS Implementation

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Introduction

- Master thesis
  - Extending the SoWap WAP gateway to support Wireless Transport Layer Security

ROYAL INSTITUTE
OF TECHNOLOGY

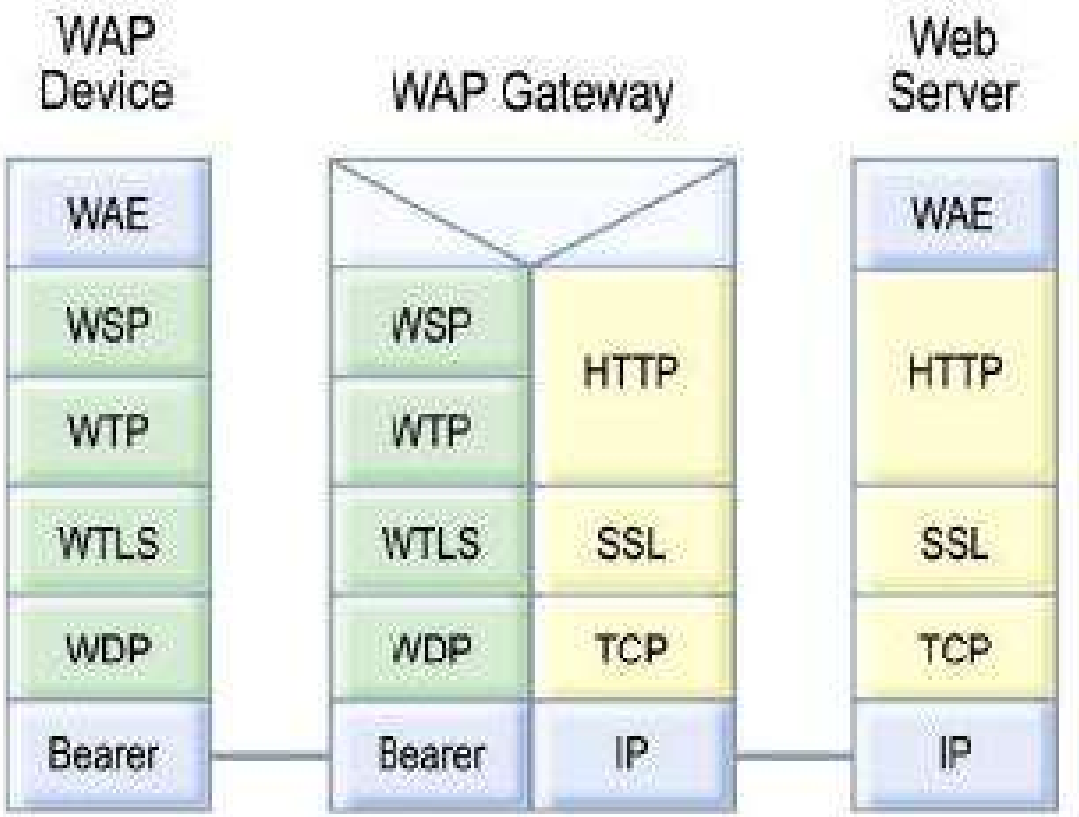
Mobile Arts

- Implementing WTLS
- Extending Erlang cypto library support

Background

- WAP – Wireless Application Protocol
- SoWap – Erlang Open Source WAP Gateway
  - History
  - Future

WAP Gateway



Wireless Transport Layer Security

- Security goals
  - Privacy
  - Integrity
  - Authentication
- WTLS vs TLS
  - Processor speed
  - Bandwidth

Wireless Transport Layer Security

- Cryptographic standards

  Symmetric ciphers (bulk ciphers)
  - DES, 3DES, RC5, IDEA

  Asymmetric key exchange algorithms
  - RSA, Diffie-Hellman, ECDH

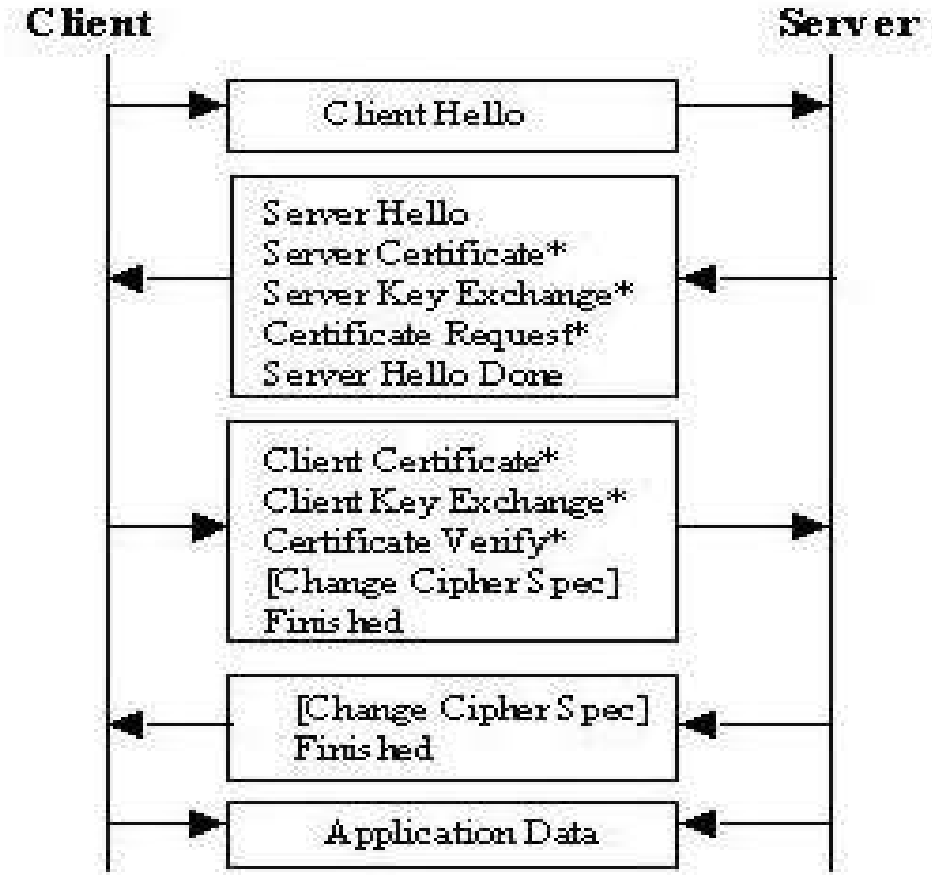
  Keyed hash algorithms (MAC)
  - MD5, SHA

  Certificates
  - X.509, X9.68, WTLS Certificate

WTLS Handshake

- Negotiate security algorithms
- Exchange random values and security settings
- Exchange certificates
- Calculate secret

WTLS Handshake



WTLS in Erlang

- Advantages
  - Concurrency – many connections running
  - WTLS engine is a state machine - gen_fsm
- Disadvantages
  - Not enough crypto support

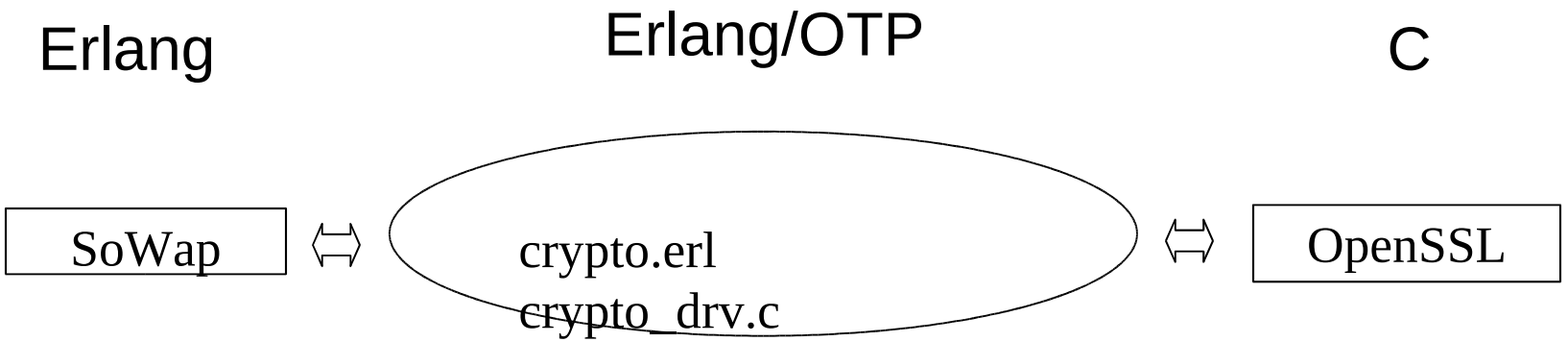
Erlang Crypto Library

- Supports
  - Bulk ciphers
    - DES, 3DES
  - Keyed hash algorithms
    - SHA, MD5
- WTLS also specifies
  - Bulk ciphers
    - RC5, IDEA
  - Key exchange algorithms
    - RSA, Diffe-Hellman, ECDH

Erlang Crypto Library

- Extensions needed
  - RC5
  - RSA, Diffie-Hellman
- Overlooked algorithms
  - IDEA
  - ECDH

Erlang Crypto Library



OpenSSL

- Open Source Toolkit for SSL/TLS
  - Command line tool
  - SSL/TLS API
  - Crypto library
- OpenSSL Crypto Library
  - Blowfish, **DES**, IDEA, CAST, RC2, RC4, **RC5**
  - DSA, **RSA**, **DH**
  - MD2, MD4, **MD5**, MDC-2, RIPE-MD, **SHA**

Future

- To do:
  - Certificate support
  - Extensive testing with mobile devices
  - Installation at TS Lab

- Further academic lab use?

Conclusion

- SoWap now supports WTLS
- Erlang crypto library extended