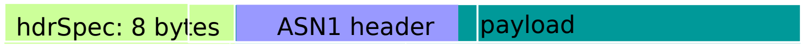
ParrotTalk Frame Design

Version 3.6 proposed

Homeless Council
Callisto House Limited
Callisto Enterprises

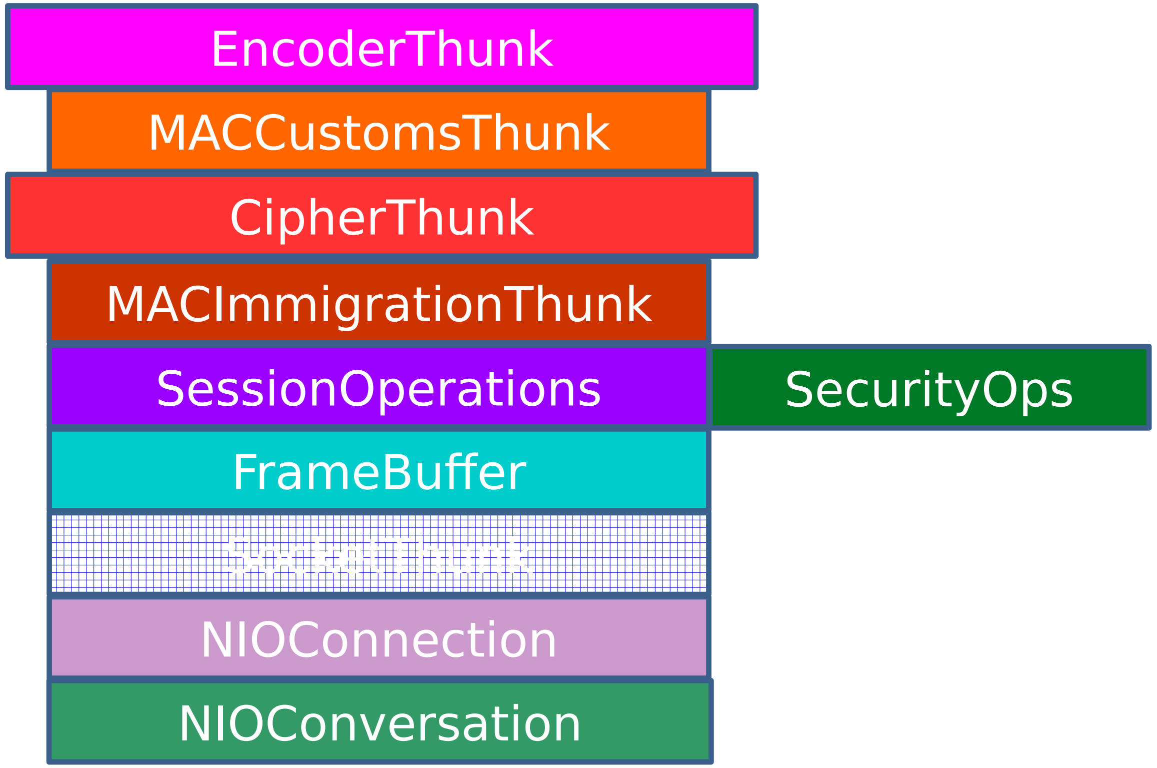
Frame



hdrSpec: 8 bytes

ASN1 header

payload



EncoderThunk

MACCustomsThunk

CipherThunk

MACImmigrationThunk

SessionOperations

SecurityOps

FrameBuffer

SocketThunk

NIOConnection

NIOConversation

ParrotTalk Frame Design

- Frames are used in message pipeline, consisting of
  - an 8 byte message specification,
  - a msgType ASN1Choice Encoded header
  - a possible data payload.
- Frames are exchanged between layers, up & down the stack.
- Each protocol frame transforms session state through the SessionOperations layer.
- Each data layer transforms each frame by established session protocol.
- As payload is transformed, header is transformed and re-encoded ASN1Der.
- MsgSpec knows header & frame encoding specification.
- Natural nested wrapping of data msgs, where an inner frame's messageSize removes down stack padding.
- Protocol stack is established during session rendezvous with these data wrapping specifications:
  - Encoded – Primary payload
  - Encrypted – AES-256/CBC/PKCS7Padding with 128-bitblockSize & IV and a 256-bit key
  - MAC – 160-bit hmac hash

ParrotTalk Protocol

- 3-way rendezvous handshake protocol with Protocol pre-exchange
- Protocol pre-exchange (ProtocolOffered/ProtocolAccepted)
- VatId/Domain agreement (IWant/IAm)
- 2048-bit RSA PublicKey exchange (Iam/GiveInfo)
- CryptoProtocol negotiation (ReplyInfo/Go/GoToo)
- DataEncoder negotiation (ReplyInfo/Go/GoToo)
- 2048-bit prime/secret Diffie-Hellman parameter exchange (Go/GoToo)
- Prior protocol traffic 2048-bit RSA Signature authentication (Go/GoToo)
- DoubleBakedKeyExchangeProtocol: low route; high session.
- QuadScopeInfrastrucure 4,5,6, , ,9:
  - 4: Goose – routing
  - 5: Parrot – session
  - 6: Raven – presentation
  - 7: Pidgeon - App DSL
  - 8: Vulture - Container DSL
  - 9: Eagle - meta
- Diffie-Hellman prime is the 2048-bit https://tools.ietf.org/html/rfc3526#page-3
- Diffie-Hellman generator is 2 from the same source

ParrotTalk Protocol Headers

- Layer 4: Goose – routing
  - <1> ProtocolOffered {offered, preferred}
  - <3> ProtocolAccepted {accepted}

- Layer 5: Parrot – session
  - <5> Encoded
  - <6> Encrypted {ivSequence}
  - <7> MAC {mac}
  - <8> Iwant {vatId, domain}
  - <9> Iam {vatId, domain, publicKey}
  - <10> GiveInfo {vatId, domain, publicKey}
  - <11> ReplyInfo {cryptoProtocols, dataEncoders}
  - <12> GO {cryptoProtocol, dataEncoder, dhParam, signature}
  - <13> GOToo {cryptoProtocol, dataEncoder, dhParam, signature}
  - <14> DuplicateConn
  - <15> NotMe

Generic Structure
8-byte MessageSpecification

- messageSpecification: 8 byte frame header, bit encoded
  - 1st word, 4 bytes
    - 4 bits : tags
    - 10 bits : multicast
    - 10 bits : hash
    - 1 bits : frameVersion = 1
    - 2 bits : priority
    - 5 bits : headerType {headerTypes unspecified: 0, 2, 4, 21-31}
  - 2nd word, 4 bytes
    - 32 bits : messageSize <payload bytes = (messageSize - headerSize – 8 bytes)>

- messageHeader: headerType::size byte ASN1.Der encoded

- payload: (Z bytes)

ProtocolOffered Message

- messageSpecification: 8 bytes frame header, bit encoded
  - headerType = <1>
- ProtocolOffered Header: ASN1.Der encoded explicitTag: 1
  - offered – ASN1UTF8StringType
  - preferred - ASN1UTF8StringType
- payload – zero bytes

ProtocolAccepted Message

- messageSpecification: 8 bytes frame header, bit encoded
    - headerType = <3>
- ProtocolAccepted Header: ASN1.Der encoded explicitTag: 3
    - accepted – ASN1UTF8StringType
- payload – zero bytes

Encoded Message

- messageSpecification: 8 bytes frame header, bit encoded
  - HeaderType = <5>
- Encoded Header: ASN1.Der encoded explicitTag: 5
- payload – data bytes

Encrypted Message

- messageSpecification: 8 bytes frame header, bit encoded
    - headerType = <6>
- Encrypted Header: ASN1.Der encoded explicitTag: 6
    - ivSequence - ASN1ByteArrayType
- payload – data bytes

MAC Message

- messageSpecification: 8 bytes frame header, bit encoded
    - headerType = <7>
- MAC Header: ASN1.Der encoded explicitTag: 7
    - – MAC: ASN1ByteArrayType
- payload: Data bytes

IWant Message

- messageSpecification: 8 bytes frame header, bit encoded
  - headerType = <8>
- IWant Header: ASN1.Der encoded explicitTag: 8
  - vatID – ASN1UTF8StringType
  - domain - ASN1UTF8StringType
- payload – zero bytes

IAm Message

- messageSpecification: 8 bytes frame header, bit encoded
  - headerType = <9>
- IAm Header: ASN1.Der encoded explicitTag: 9
  - vatID – ASN1UTF8StringType
  - domain – ASN1UTF8StringType
  - publicKey – RSAPublicKey
- payload – zero bytes

GiveInfo Message

- messageSpecification: 8 bytes frame header, bit encoded
  - headerType = <10>
- GiveInfo Header: ASN1.Der encoded explicitTag: 10
  - vatID – ASN1UTF8StringType
  - domain – ASN1UTF8StringType
  - publicKey – RSAPublicKey
- payload – zero bytes

ReplyInfo Message

- messageSpecification: 8 bytes frame header, bit encoded
  - headerType = <11>
- ReplyInfo Header: ASN1.Der encoded explicitTag: 11
  - cryptoProtocols - ASN1SequenceOfType(ASN1UTF8StringType)
  - dataEncoders - ASN1SequenceOfType(ASN1UTF8StringType)
- payload – zero bytes

GO Message

- messageSpecification: 8 bytes frame header, bit encoded
  - headerType = <12>
- GO Header: ASN1.Der encoded explicitTag: 12
  - cryptoProtocol – ASN1UTF8StringType
  - dataEncoder – ASN1UTF8StringType
  - diffieHellmanParam – ASN1ByteArrayType
  - signature – ASN1ByteArrayType
- payload – zero bytes

GOToo Message

- messageSpecification: 8 bytes frame header, bit encoded
  - headerType = <13>
- GOToo Header: ASN1.Der encoded explicitTag: 13
  - cryptoProtocol – ASN1UTF8StringType
  - dataEncoder – AN1UTF8StringType
  - diffieHellmanParam - ASN1ByteArrayType
  - signature – ASN1ByteArrayType
- payload – zero bytes

DuplicateConn Message

- messageSpecification: 8 bytes frame header, bit encoded
  - headerType = <14>
- DuplicateConn Header: ASN1.Der encoded explicitTag: 14
- payload – zero bytes

NotMe Message

- messageSpecification: 8 bytes frame header, bit encoded
    - headerType = <15>
- NotMe Header: ASN1.Der encoded explicitTag: 15
- payload – zero bytes