

北京郵電大學

基于TTCN-3的CoAP协议 一致性测试

作者：杜泓庆 黄小红 何嘉杰

报告人：杜泓庆

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Outline

- Backgrounds
 - Conformance Testing & TTCN-3
 - Introduction to CoAP
- Test System Design & Implementation
- Test Execution & Conclusion

Conformance Testing

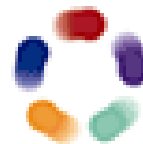
- Definition
 - Protocols
 - Implementations
- Standards
 - ITU-T X290 – X296
- Blackbox



TTCN-3

(Testing and Test Control Notation Version 3)

- Global Standard
- Easy to Learn
- High Flexibility
- Widely Used

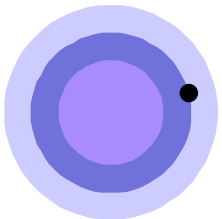
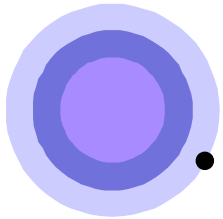




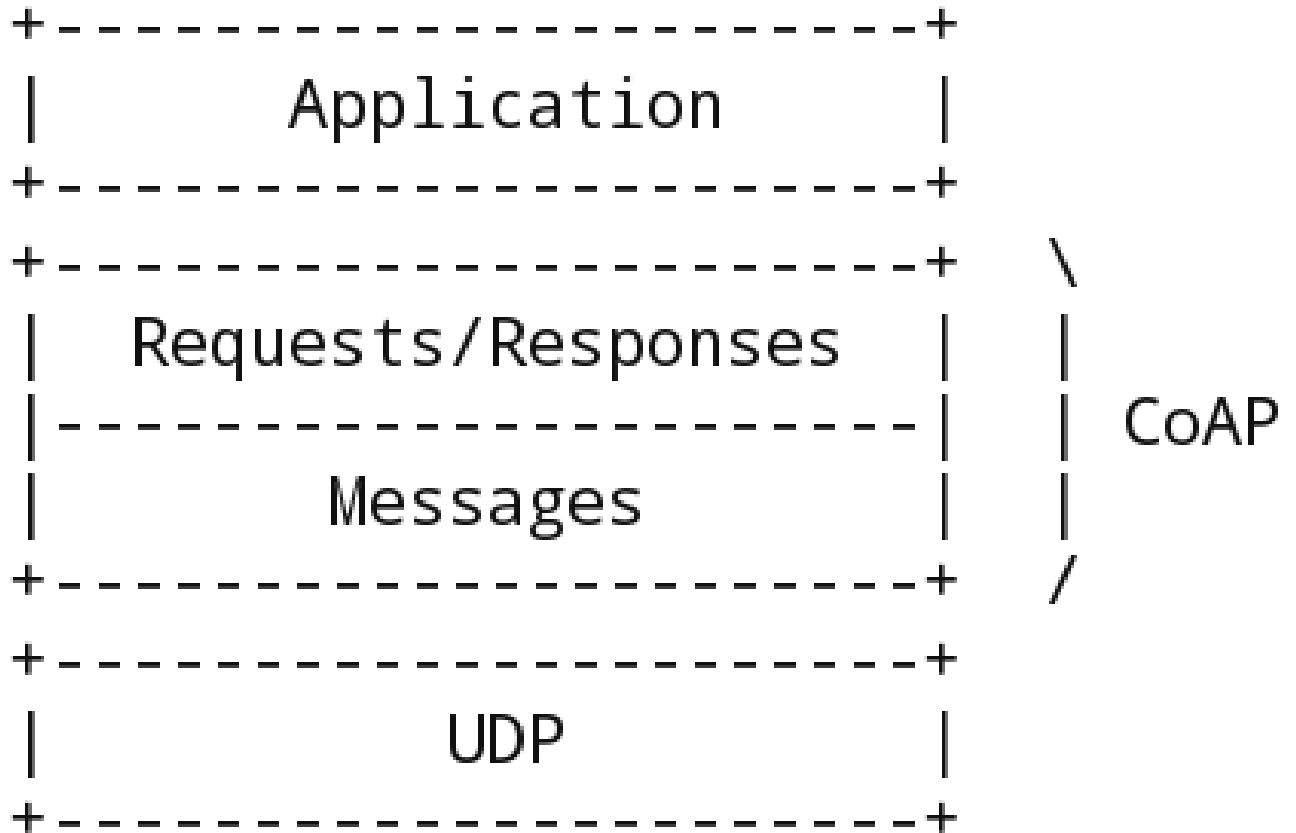
CoAP

(**C**onstrained **A**pplication **P**rotocol)

- Constrained Environment
 - Nodes & Networks
- REST Architecture
- Low header overhead and parsing complexity
-

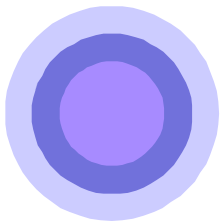
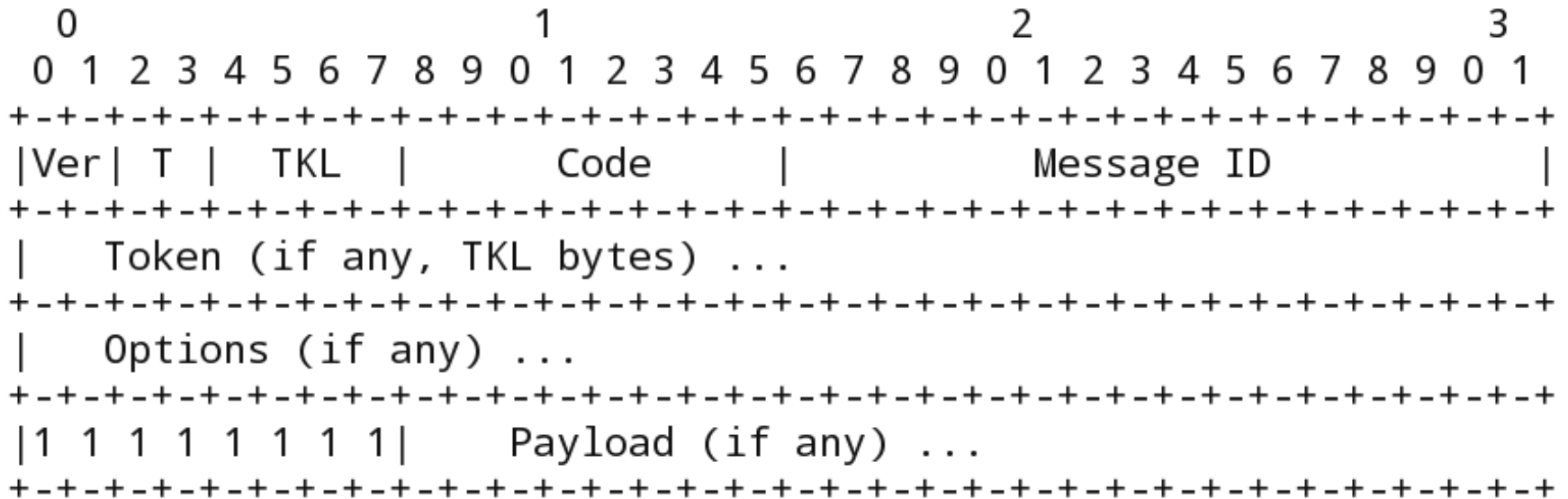


Abstract Layering of CoAP

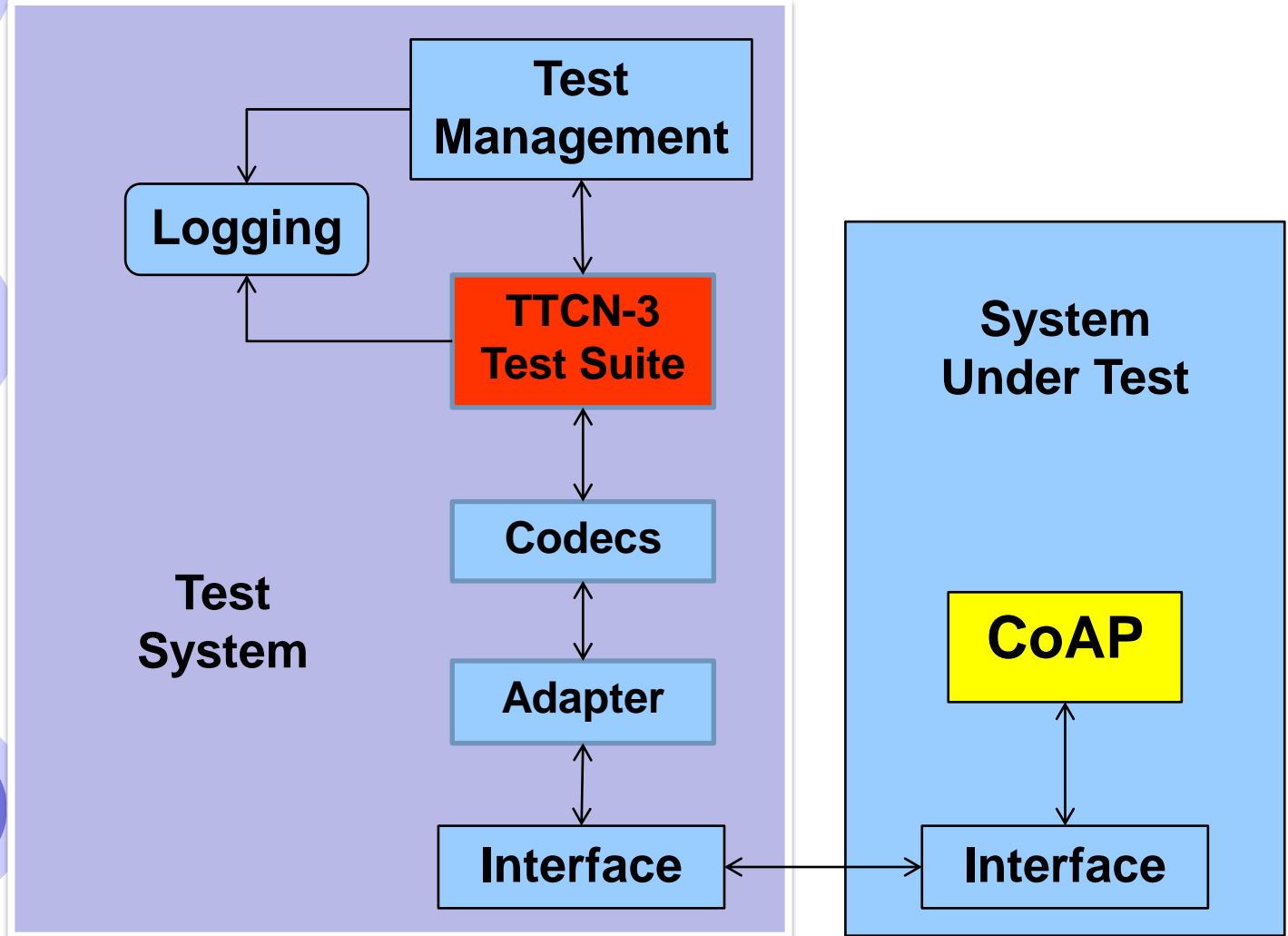




Message Format



Test System Architecture





Test Suite Design

- Test Purpose



- Request/Response Model

- Message Format



- Message Processing

- Test Structure



- Entities, Functionalities



Test Suite Implementation

- Type definitions:

```
type record CoAPMessage {  
    CoAPHeader header,  
    CoAPToken token,  
    CoAPOption option,  
    Payload payload optional  
}
```



Test Suite Implementation

- Using Templates:

```
template CoAPHeader
RequestHeader := {
    CoAPVersion := '01'B,
    CoAPType := '01'B,
    CoAPTokenLength := '0001'B,
    CoAPCode := '01'0,
    CoAPMessageID := '7d34'0
}
```


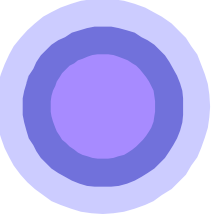
Codecs Module



- Encoder

- 
- bitstring, octectring, charstring

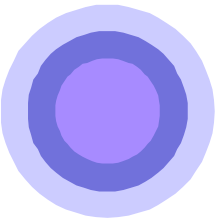
- Decoder

- 
- decode_header, decode_token,
decode_option
- 

Adapter Module

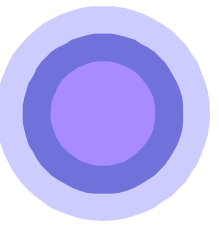


- System Adapter

- 
- Communication between ETS and SUT
 - UDP Socket

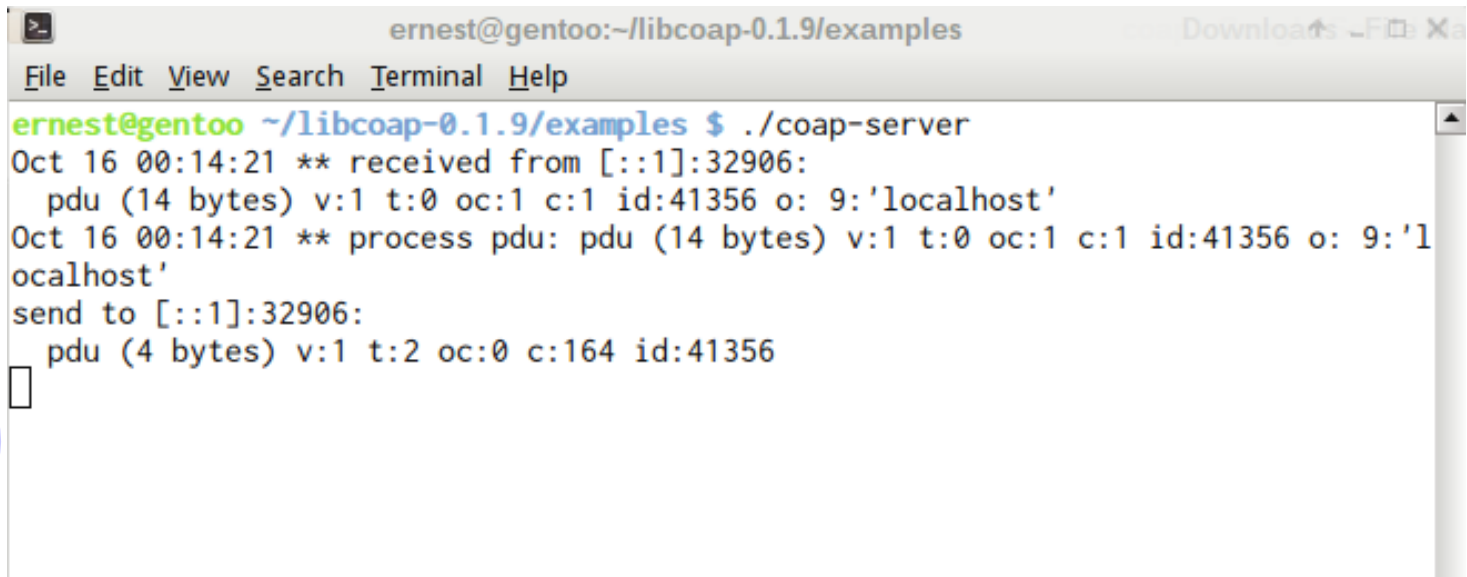


- Platform Adapter

- 
- Timers
 - External functions

Test Execution

- IBM Rational System Tester
- LibCoAP (<http://libcoap.sf.net>)
- Test Configurations



```
ernest@gentoo:~/libcoap-0.1.9/examples
File Edit View Search Terminal Help
ernest@gentoo ~/libcoap-0.1.9/examples $ ./coap-server
Oct 16 00:14:21 ** received from [::1]:32906:
  pdu (14 bytes) v:1 t:0 oc:1 c:1 id:41356 o: 9:'localhost'
Oct 16 00:14:21 ** process pdu: pdu (14 bytes) v:1 t:0 oc:1 c:1 id:41356 o: 9:'localhost'
send to [::1]:32906:
  pdu (4 bytes) v:1 t:2 oc:0 c:164 id:41356
```



Test Results & Conclusions

- Test Results
 - Pass
 - Fail
 - ...
- Conclusions
 - Future plans

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Thank you!

hongqingdu@bupt.edu.cn