

# Common TTCN-3 Codec to Reduce Test Engineering Cost

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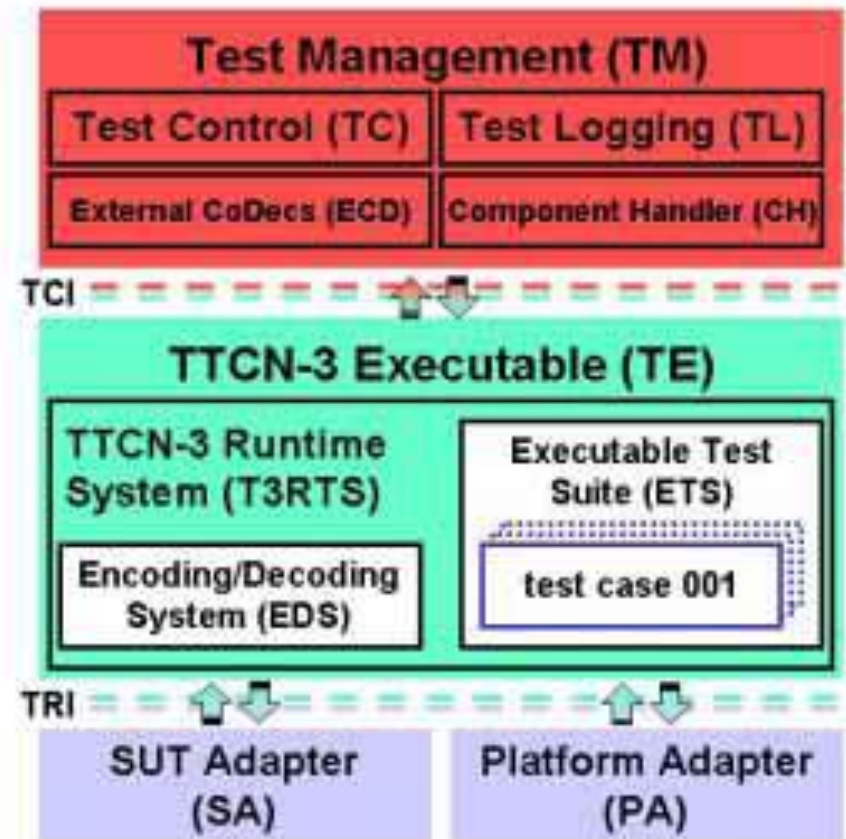
BUPT

# Outline

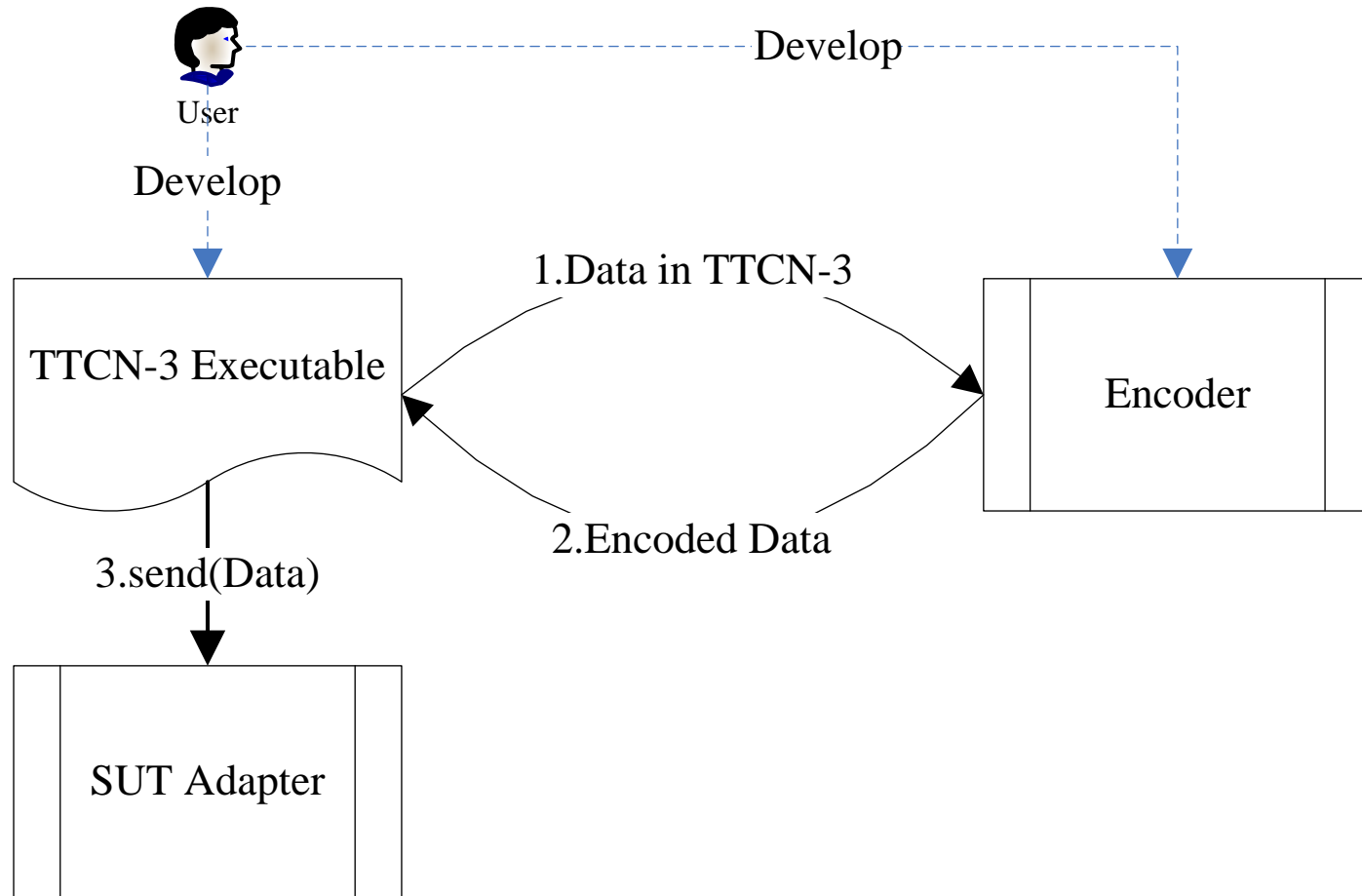
- Object: develop a common codec module that can be used in diverse protocol
- Function: encoding and decoding data according to user's definition
- Advantage: Need little developing new program for encoding and decoding, just need a format definition file
- Used Mode: As part of ttcn-3 test tools

# Codec in TTCN-3 Test System

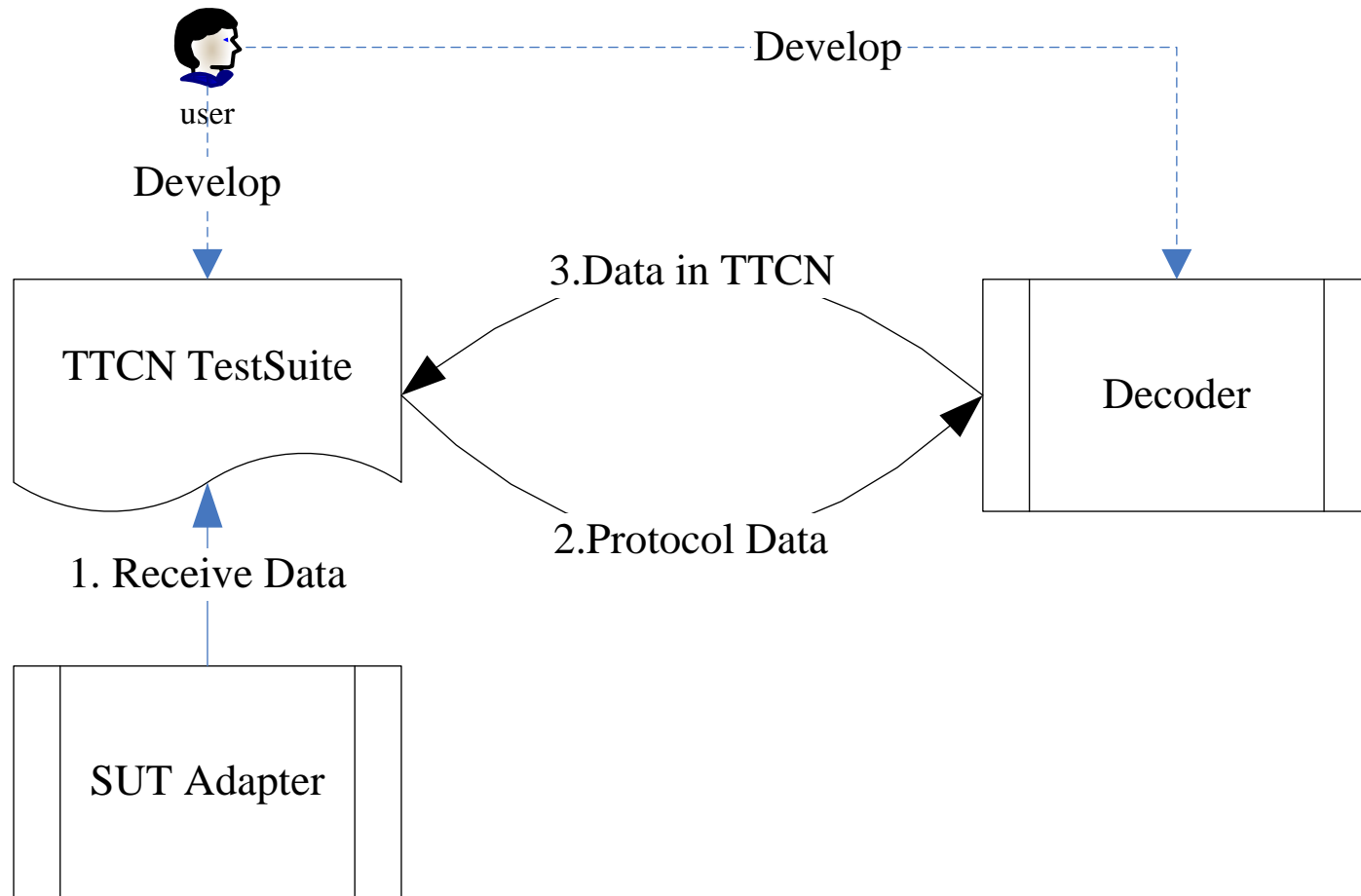
- CoDec development, either implicitly or explicitly, is a must in any TTCN-3 testing activity.
- There is a high cost associated with CoDec development and maintenance.



# Encoding Workflow



# Decoding Workflow



# Shortage of current Codec mode

- Different codec module for different protocol

```
template Rlp rlp_hdr:={
    id:="100876",
    pwd:="21"
}
```

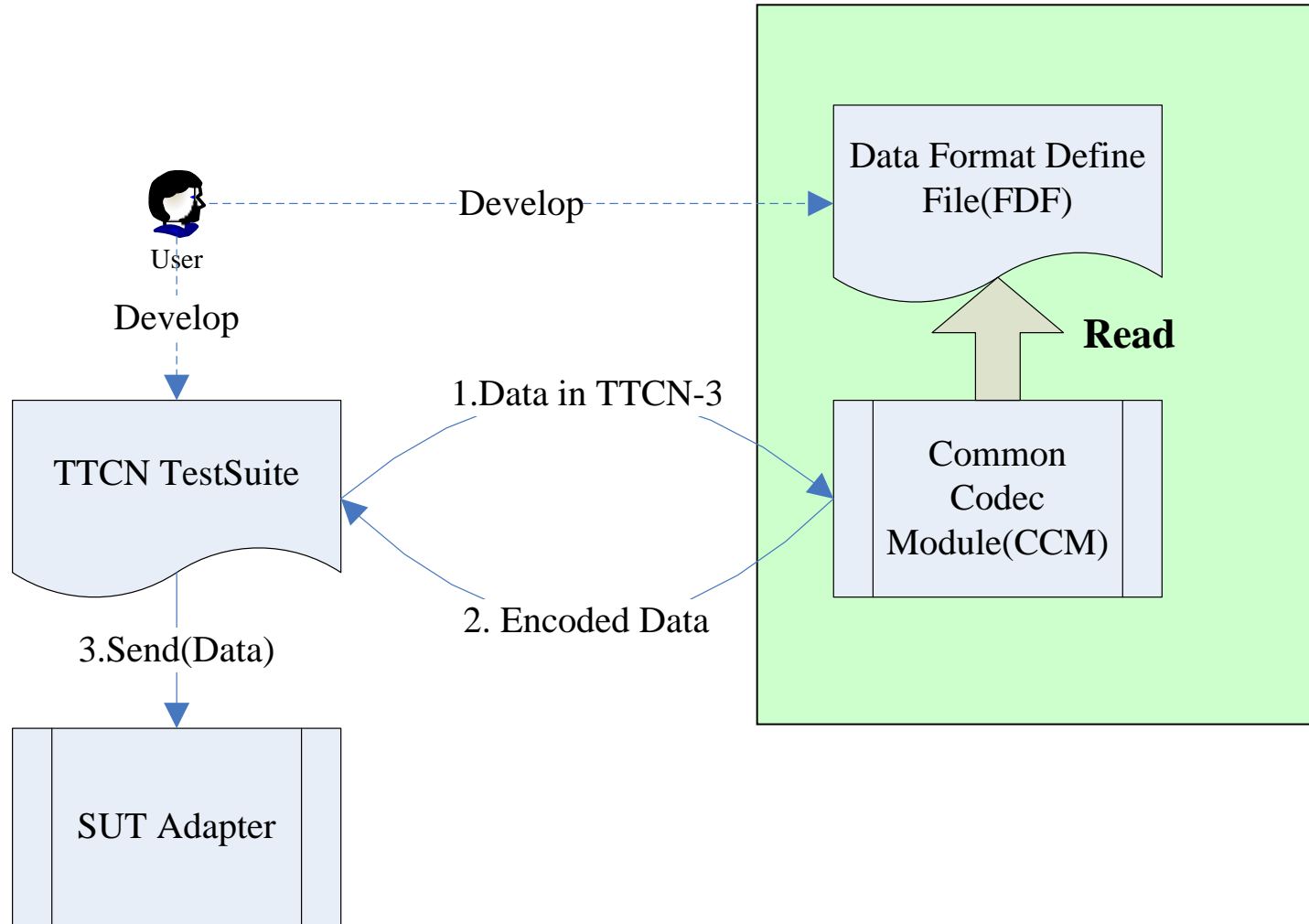
May be encode as

<Rlp\_hdr><Id>100876</Id><Pwd>21</Pwd></Rlp\_hdr >

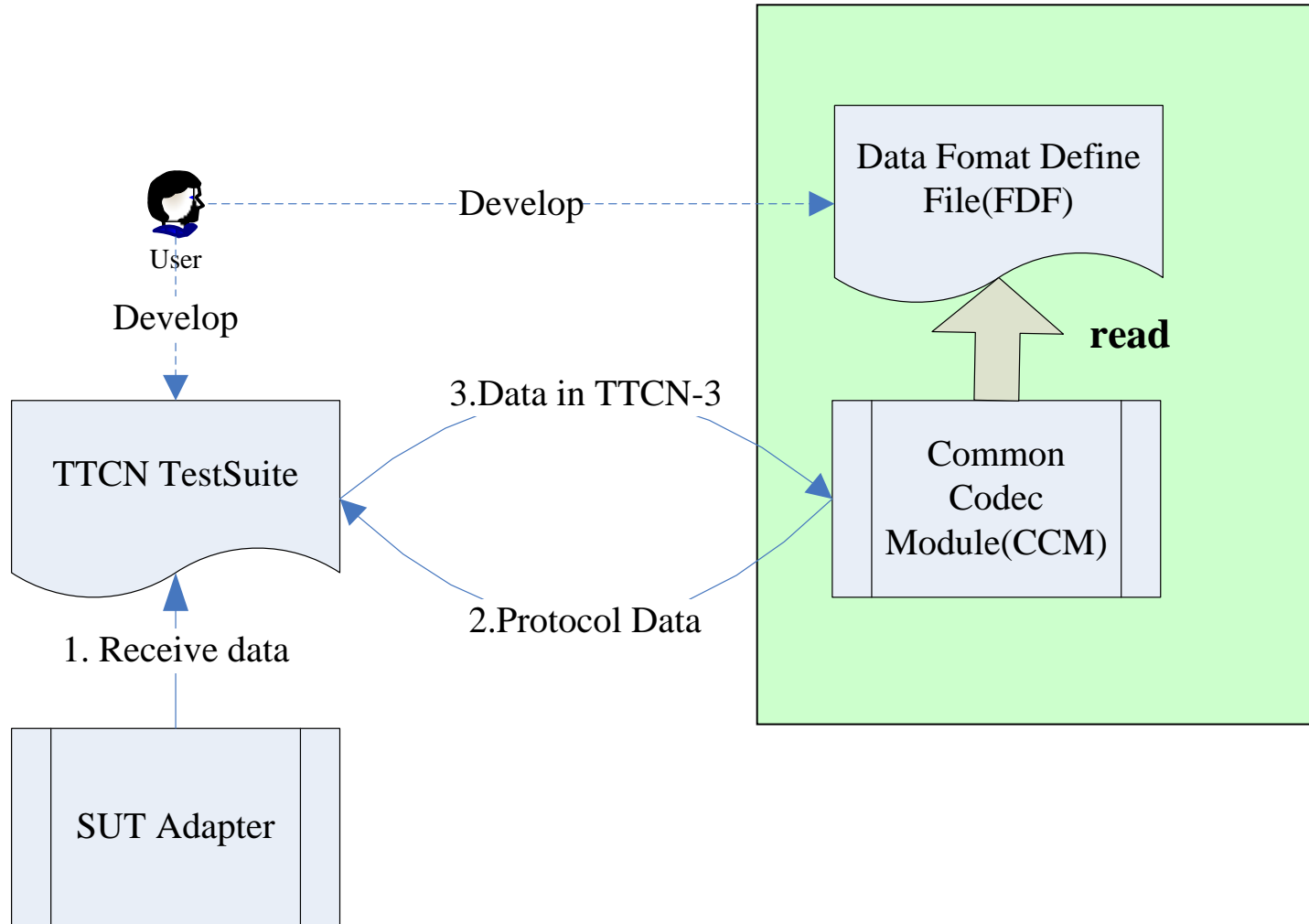
Also may be encode as

0x04 0x10 0x08 0x76 0x21 //04 of first byte is length of data

# Encoding workflow with common codec



# Encoding workflow with common codec





# Format Definition File(FDF)

- It's own format is XML
- Each type of data should has it format define in FDF
- Format define should explain the rule to encode and decode the data.

# Format of XML

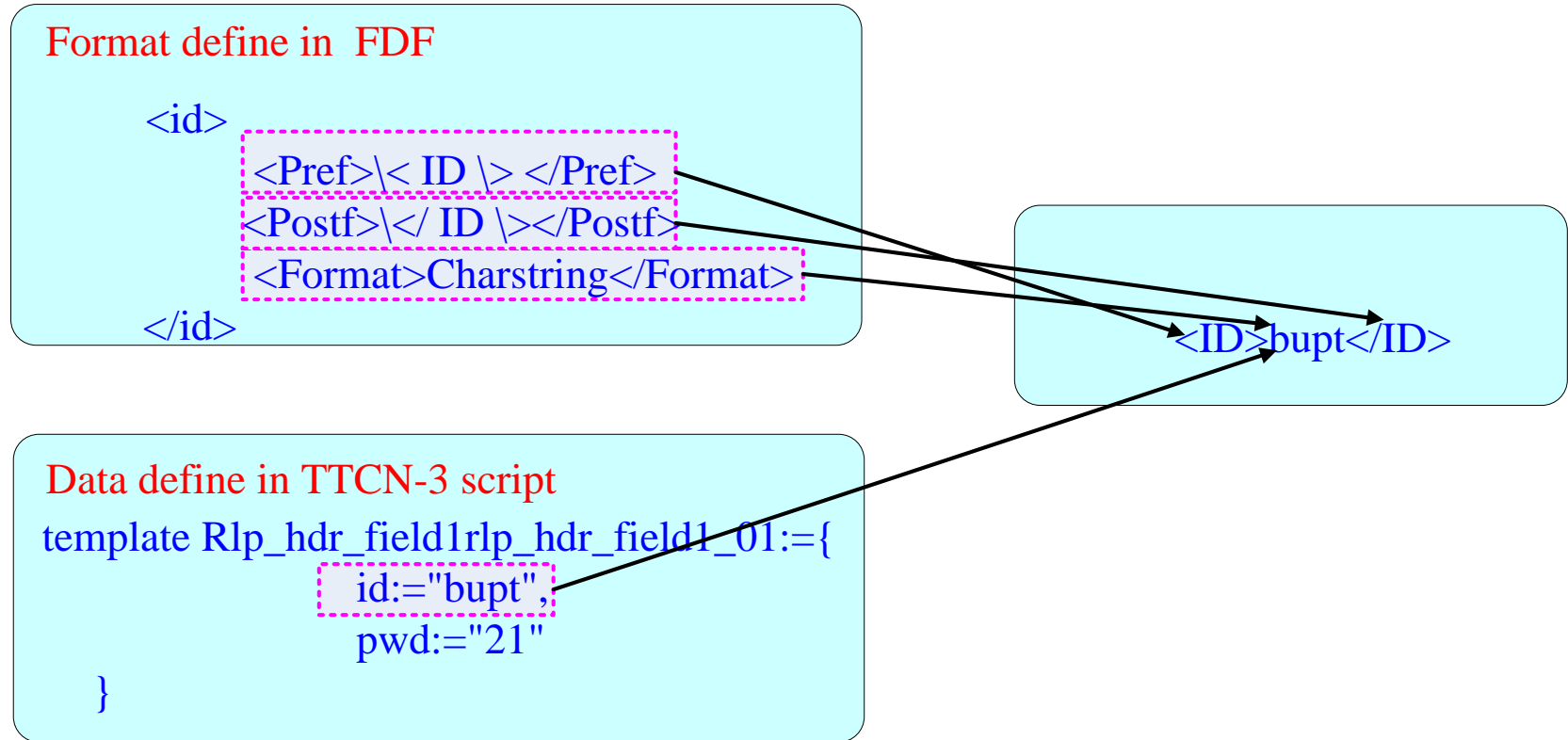
## Format define in FDF

```
<id>  
  <Pref>\< ID \> </Pref>  
  <Postf>\</ ID \></Postf>  
  <Format>Charstring</Format>  
</id>
```

```
<ID>bupt</ID>
```

## Data define in TTCN-3 script

```
template Rlp_hdr_field1rlp_hdr_field1_01:={  
  id:="bupt",  
  pwd:="21"  
}
```



# Format of TLV(Tag Length Value)

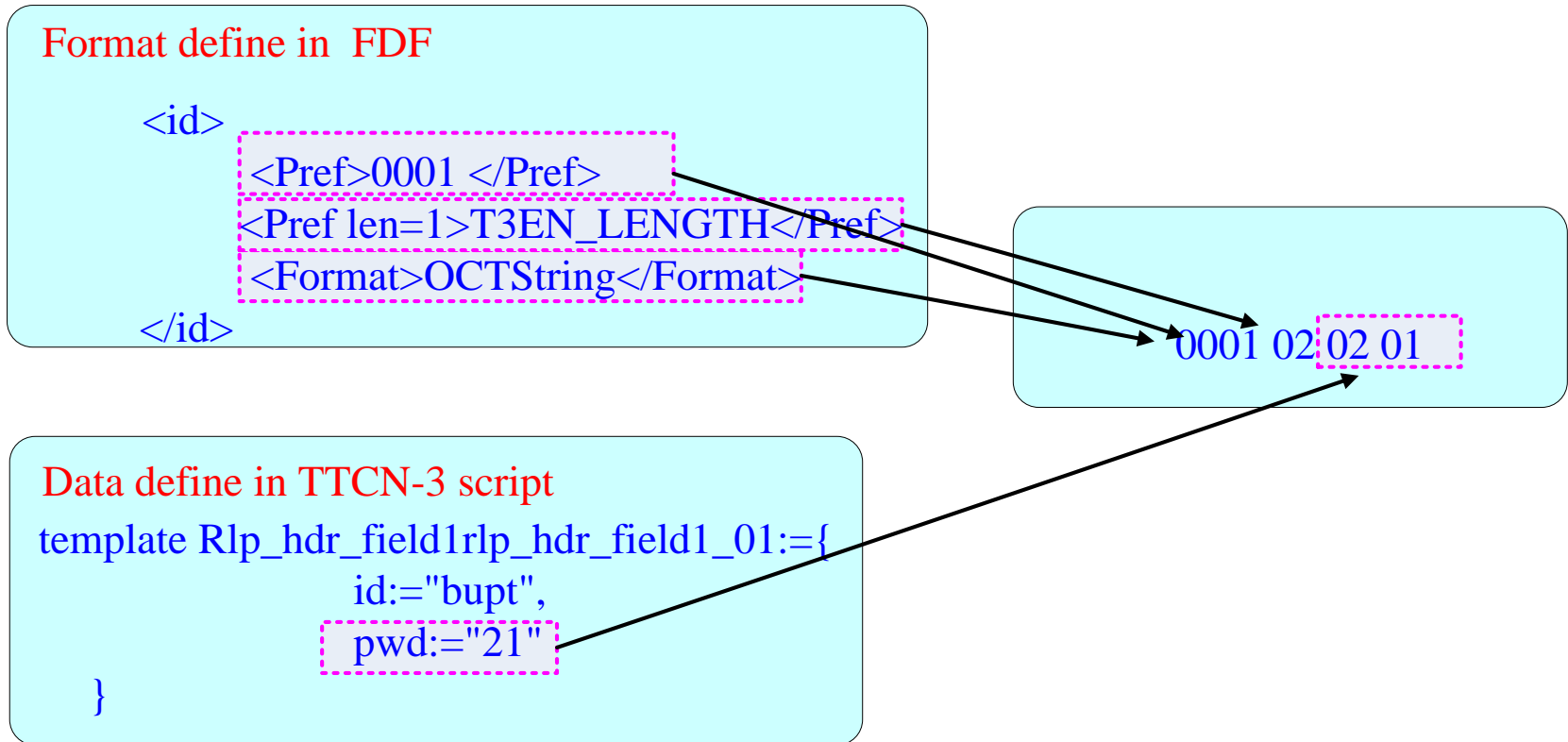
## Format define in FDF

```
<id>  
  <Pref>0001 </Pref>  
  <Pref len=1>T3EN_LENGTH</Pref>  
  <Format>OCTString</Format>  
</id>
```

0001 02 02 01

## Data define in TTCN-3 script

```
template Rlp_hdr_field1rlp_hdr_field1_01:={  
  id:="bupt",  
  pwd:="21"  
}
```



# About Format Define File

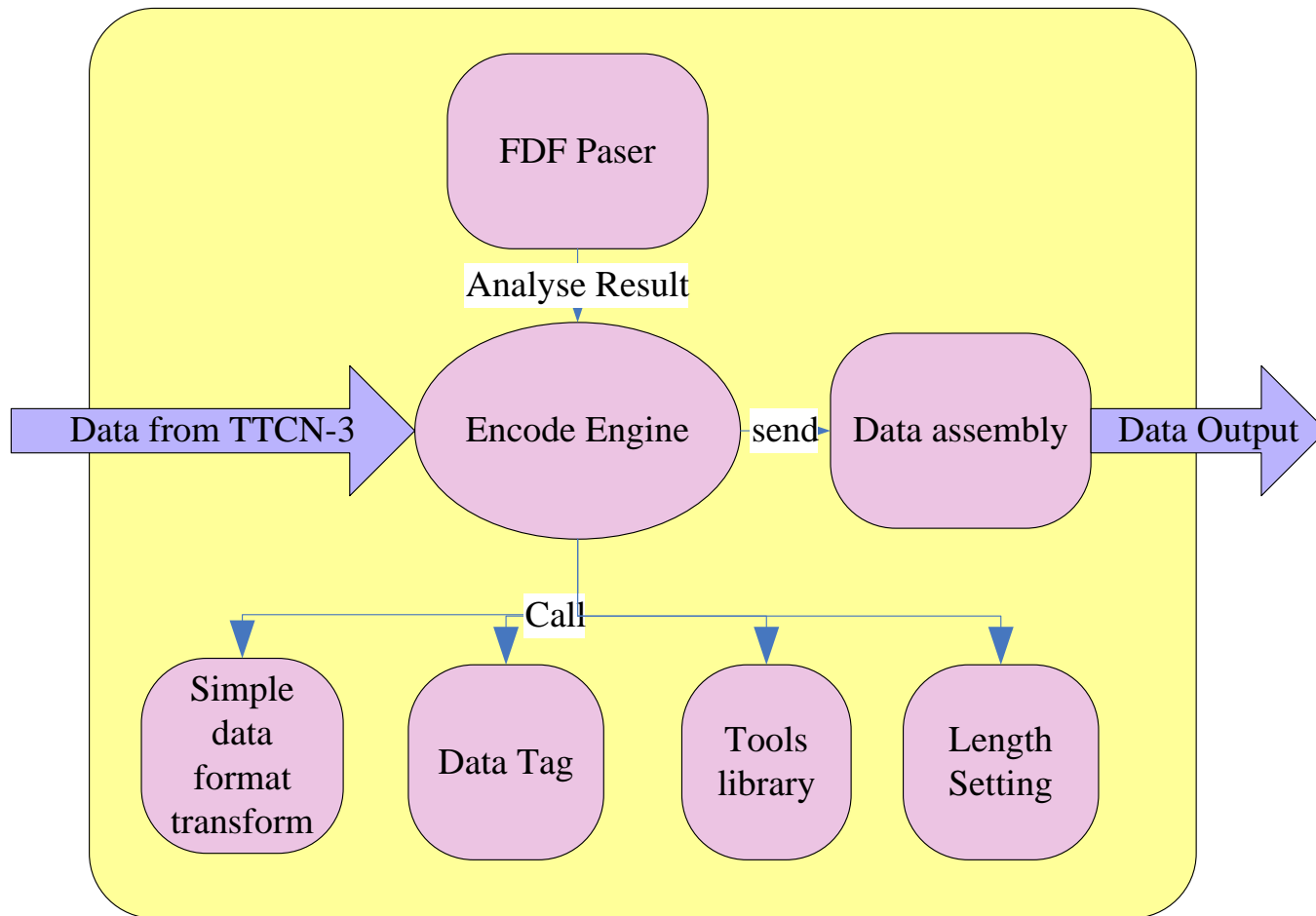
- Two type of format now

```
<?xml version="1.0" encoding="UTF-8" ?>
- <UniformCodec>
  <!-- Protocol Type:Binary Protocol -->
+ <Binary_Protocol>
  <!-- Protocol Type:ASCII Protocol -->
+ <ASCII_Protocol>
</UniformCodec>
```

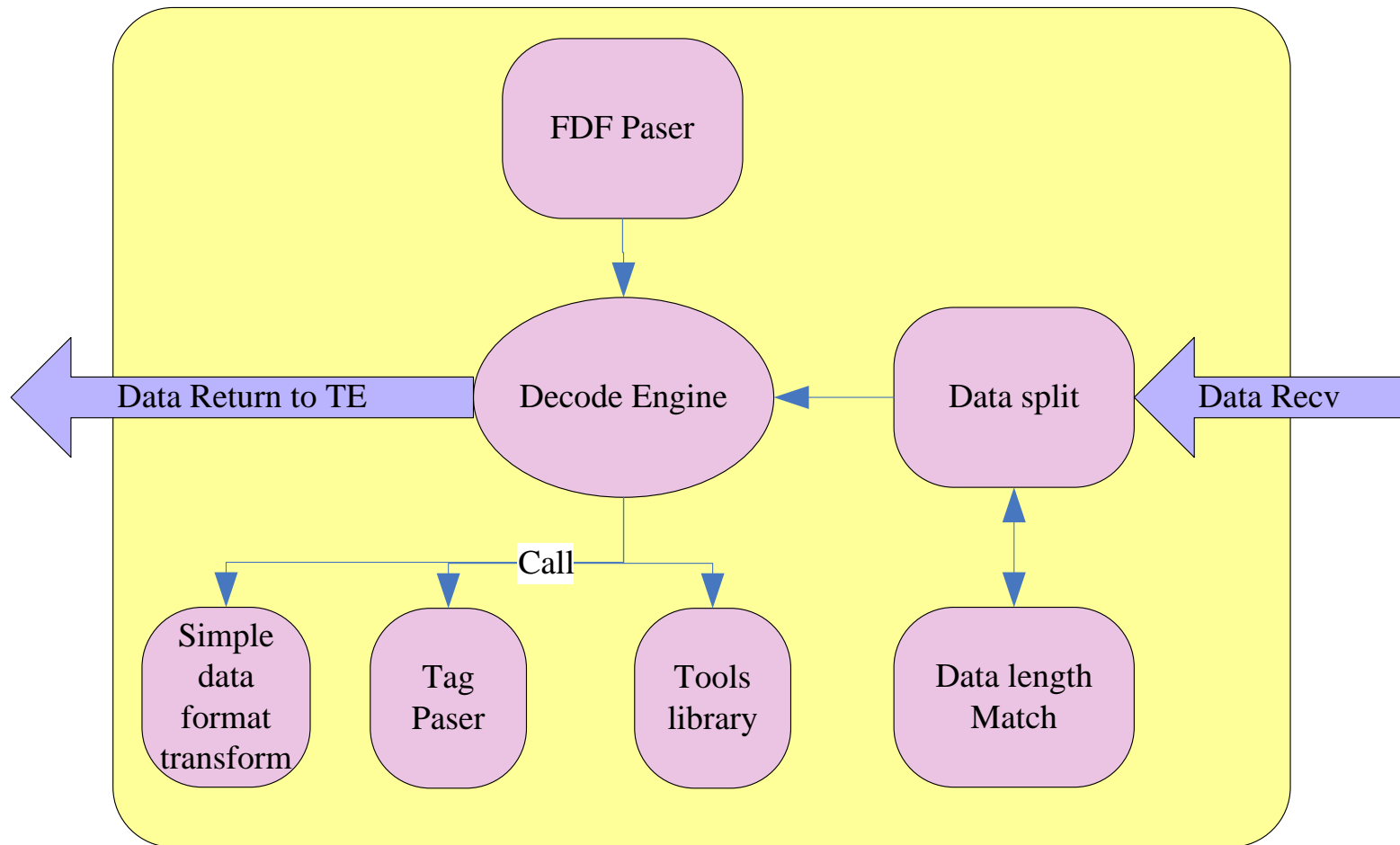
# Some Tag of FDF

- <TypeFormat> : octetstring,Integer,Record
- < Length >
- <Prefix>、 <Postfix>

# Encode Workflow in Common Codec Module(CCM)

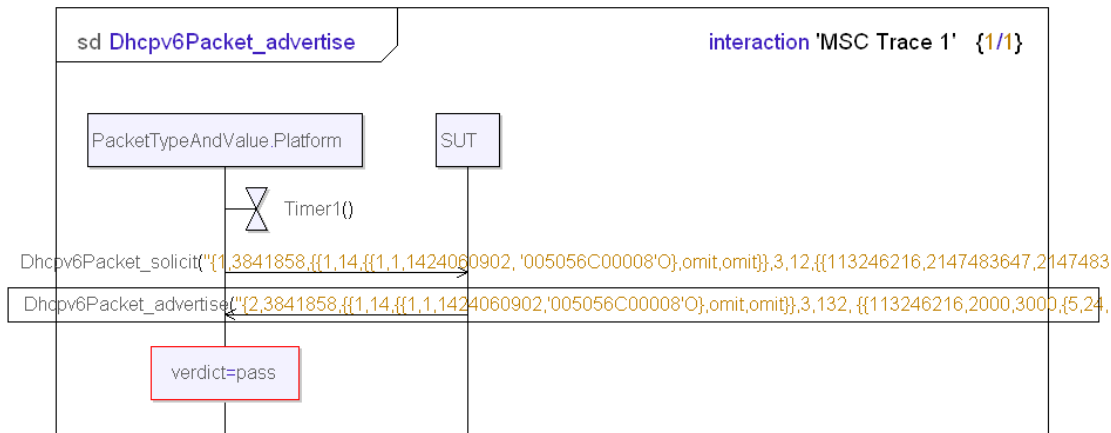
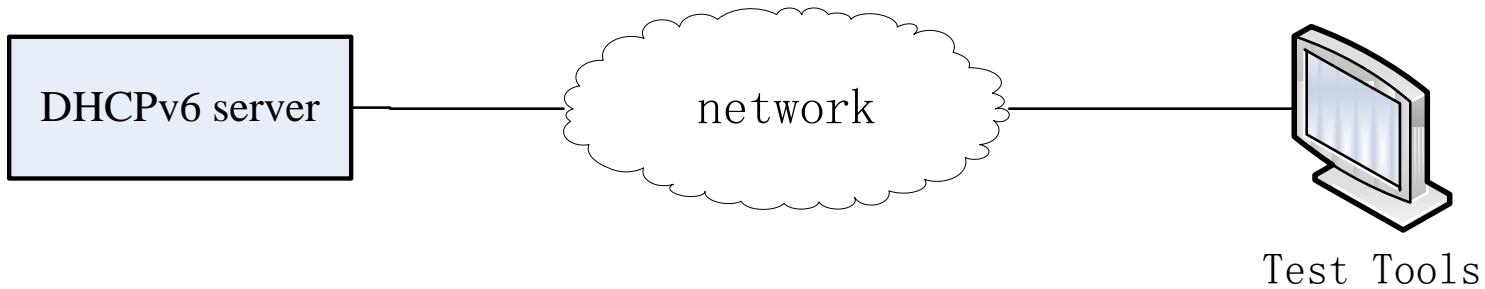


# Encode Workflow in Common Codec Module(CCM)



# Example of Common Codec

- Realize part of common codec module and used in DHCPv6





# Example of FDF in Testing of DHCPv6

```
<?xml version="1.0" encoding="UTF-8" ?>
- <UniformCodec>
  <!-- Protocol Type:Binary Protocol -->
- <Binary_Protocol>
  - <RecordNameA total_length="">
    - <FieldNameA1>
      <TypeFormat>ChildRecordNameA</TypeFormat>
    </FieldNameA1>
    - <FieldNameA2 cur_pos="">
      <TypeFormat>ChildRecordNameB</TypeFormat>
      <OptionalRule />
      <OptionalFormat>false</OptionalFormat>
    </FieldNameA2>
    - <FieldNameA3>
      <TypeFormat>string</TypeFormat>
      <LengthRule />
      <LengthFormat>6</LengthFormat>
      <OptionalRule />
      <OptionalFormat>false</OptionalFormat>
    </FieldNameA3>
  </RecordNameA>
  + <RecordNameB total_length="">
  + <ChildRecordNameA>
  + <ChildRecordNameB>
  + <ChildRecordNameC>
  </Binary_Protocol>
  <!-- Protocol Type:ASCII Protocol -->
+ <ASCII_Protocol>
</UniformCodec>
```

# We are developing codec of XML

```
- <ASCII_Protocol>
- <RecordNameA>
- <FieldName>
  <PrefixFormat><RecordNameA_Pref></PrefixFormat>
  <TypeFormat>RecordNameA_Decode</TypeFormat>
  <PostfixFormat></RecordNameA_Postf></PostfixFormat>
</FieldName>
</RecordNameA>
- <RecordNameA_Decode>
- <FieldNameA1>
  <AttributeFormat>AttributeNameA</AttributeFormat>
  <TypeFormat>integer</TypeFormat>
</FieldNameA1>
- <FieldNameA2>
  <PrefixFormat><FieldNameA2_Pref></PrefixFormat>
  <OptionalRule />
  <OptionalFormat>false</OptionalFormat>
  <TypeFormat>ChildRecordNameA</TypeFormat>
  <PostfixFormat></FieldNameA2_Postf></PostfixFormat>
</FieldNameA2>
- <FieldNameA3>
  <PrefixFormat><FieldNameA3_Pref></PrefixFormat>
  <OptionalRule />
  <OptionalFormat>false</OptionalFormat>
  <TypeFormat>ChildRecordNameC</TypeFormat>
  <PostfixFormat></FieldNameA3_Postf></PostfixFormat>
</FieldNameA3>
</RecordNameA_Decode>
+ <RecordNameB>
+ <RecordNameB_Decode>
+ <ChildRecordNameA>
</ASCII_Protocol>
```

# Future Work

- Common API for use of multi TTCN platform
- Design a pattern to add new data format and user's own source code or tools

Q&A