00A0 $\exists$ $\forall$ $\subseteq$ 2713x 27FA$\Longleftrightarrow$ $\surd$ $\sqrt[3]{}$ $\oplus$ $\otimes$

Weldentity Documentation

Junqi Zhang

2022 11 30

Contents:

CHAPTER 1

WeIdentity

1.1 WeIdentity

WeIdentity WeIdentity

1.1.1 1.

WeIdentity WeIdentity DID WeIdentity Credential

(WeIdentity DID)

WeIdentity DID FISCO-BCOS W3C DID WeIdentity DID Entity ID

WeIdentity DID

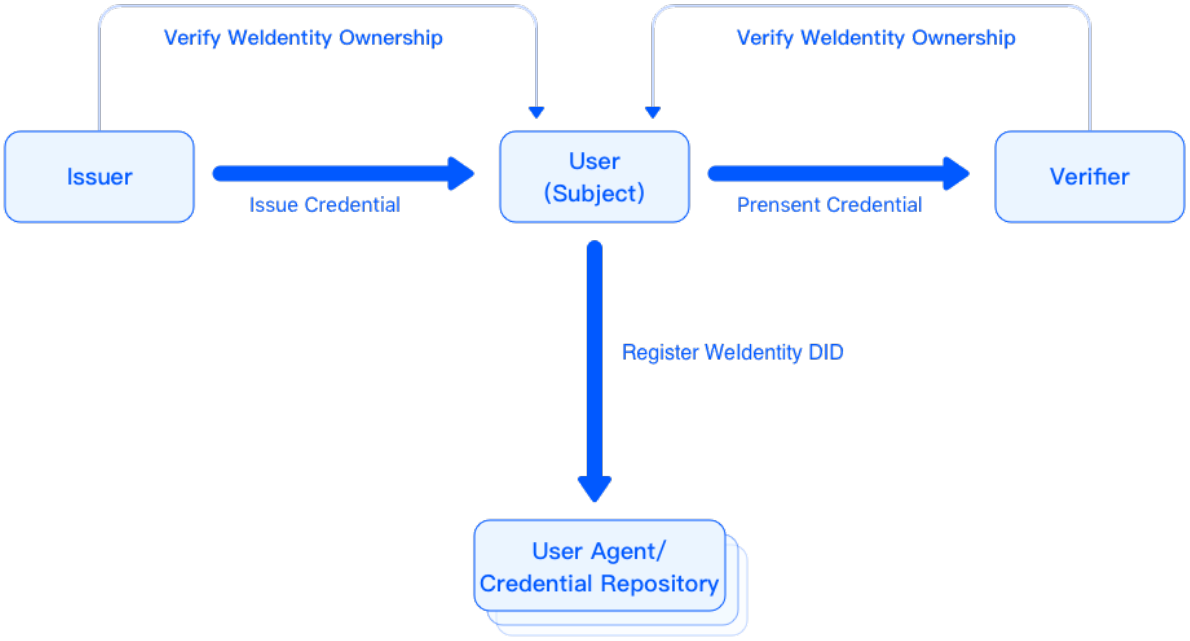
(WeIdentity Credential)

WeIdentity Credential W3C VC Credential

WeIdentity

WeIdentity WeIdentity Demo WeIdentity WeIdentity SDK

1.1.2 2. WeIdentity



WeIdentity

User (Entity)	WeIdentity DID Issuer Credential Verifier
Issuer	Credential WeIdentity DID Credential
Verifier	Credential WeIdentity DID Credential
User Agent / Credential Repository	WeIdentity DID Credential

WeIdentity User Agent DID Issuer DID Credential Credenti
+ Verifier

1.1.3 3. Demo

WeIdentity Demo

		WeID ID Hash

1.1.4 4.

WeIdentity FISCO-BCOS Java SDK RestService

1.1.5 5. Getting Started

WeIdentity

1.1.6

weidentity@webank.com

1.1.7

-

WeIdentity

WeIdentity WeIdentity

1.

WeIdentity WeIdentity DID WeIdentity Credential

(WeIdentity DID)

WeIdentity DID FISCO-BCOS W3C DID WeIdentity DID Entity ID

WeIdentity DID

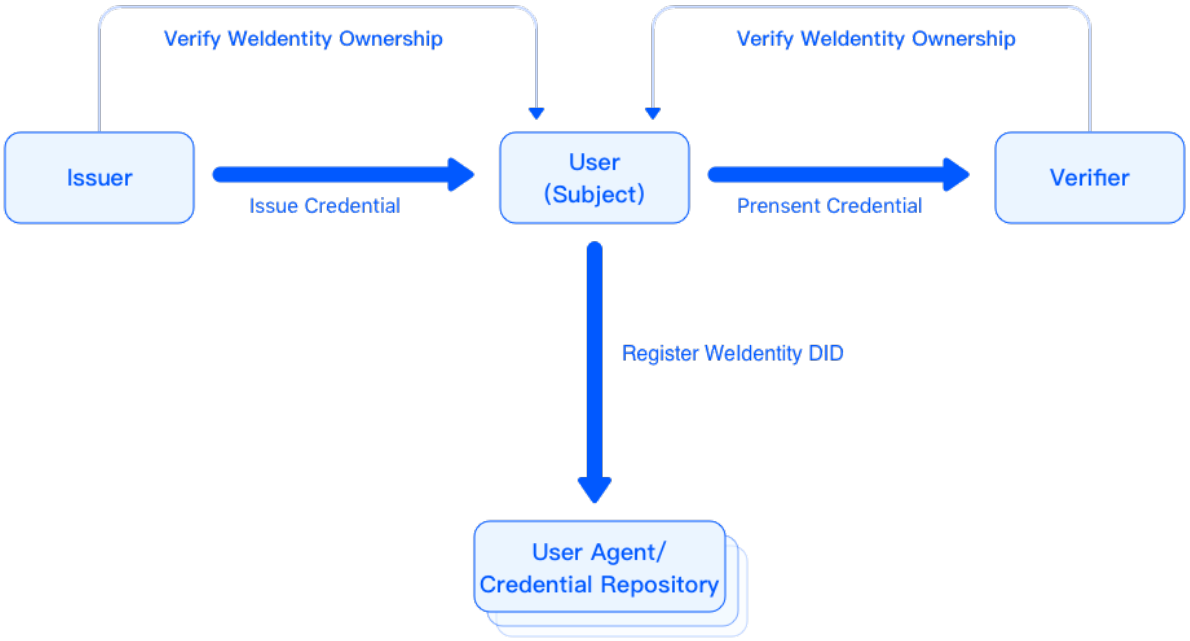
(WeIdentity Credential)

WeIdentity Credential W3C VC Credential

WeIdentity

WeIdentity WeIdentity Demo WeIdentity WeIdentity SDK

2. WeIdentity



WeIdentity

User (Entity)	WeIdentity DID Issuer Credential Verifier
Issuer	Credential WeIdentity DID Credential
Verifier	Credential WeIdentity DID Credential
User Agent / Credential Repository	WeIdentity DID Credential

WeIdentity User Agent DID Issuer DID Credential Credenti
+ Verifier

3. Demo

WeIdentity Demo

		WeID ID Hash

4.

WeIdentity FISCO-BCOS Java SDK RestService

5. Getting Started

WeIdentity

weidentity@webank.com

-

WeIdentity

	CentOS 7.2.* 64 Ubuntu 16.04 64
FISCO-BCOS	FISCO-BCOS FISCO-BCOS 2.0
JDK	Oracle JDK1.8+ WeIdentity JDK jdk8u141 jdk8u212 jdk8u231 JDK WeID
	WeIdentity JAVA SDK telnet FISCO BCOS channel channel telnet

1 WeIdentity

“ WeIdentity ” WeIdentity WeIdentity

2 WeIdentity

“ ”

3 Sample

: Sample

“ ” WeIdentity

4 Java Service WeIdentity Java SDK

“ WeIdentity Java SDK”

: Java RestService WeIdentity Rest Service

WeIdentity Java SDK

“Java SDK ” WeIdentity

WeIdentity

“WeIdentity ”

WeIdentity

weid-java-sdk “WeIdentity JAVA SDK ”

JSON-LD		JSON-LD JSON-LD Wiki
Authorization		Authorization vs Authentication
Authentication		Authorization vs Authentication
Public Key		Public Key Wiki
Private Key		Private Key Public Key Wiki
Signature		Digital Signature Wiki
DID		W3C DID ID W3C DID
WeIdentity DID		WeID WeIdentity ID ID W3C DID
WeIdentity Document		DID 3 Authentication Authenticate Service Endpoint
Claim		Credential Claim
WeIdentity Credential		“ ” W3C Verifiable Credential Credential Claim
Verifiable Credential		
Credential		
Notification		WeIdentity
CPT		Claim Protocol Type, Issuer Claim Claim CPT
chain-id	ID	WeIdentity owner WeIdentity
Service Endpoint		Entity Credential
publish		Issuer Authority Issuer CPT publish
issue		Issuer Authority Issuer CPT Credential issue
payload		Notification
Trusted Data		
Issuer		WeIdentity DID Entity Issuer Credential
Authority Issuer		Claim WeID
Entity		WeIdentity Document Credential WeIdentity DID
Verifier		Verifier
Data Repository		Credential APP
User Agent		APP
Publisher	CPT	CPT Publisher
Committee Member		Authority Issuer
Specific Issuer		Authority Issuer
Verifiable Presentation		W3C Verifiable Presentation Presentation Credential
Policy		Verifiable Presentation Credential Credential Claim

WeIdentity

WeIdentity DID Credential

WeIdentity

1.

2. KYC WeIdentity DID

3. Credential

-
-
  –
  –
  –
  –

- WeIdentity

1. WeIdentity DID KYC
2. Credential Credential
3. Credential Credential
4. Credential
5. Verify Credential
6. offer

-
-
  –
  –
  –
  –

- WeIdentity

1. WeIdentity DID KYC
2. Credential Credential
3.
4. Credential
5. Verify
6. Credential Verify
7.
8. Verify

Claim

name		gender	
department		drugs	
syndrome		diagnosis	
doctor	DID	hospital	DID

- 18
- –
  –
- WeIdentity

1. WeIdentity DID KYC
2. KYC Credential DID
3. Verify
4.

- A B WeIdentity
- –
  –
  –
  –
- WeIdentity

1. WeIdentity DID KYC
2. Credential WeIdentity DID
3. Credential
4. Verify
5.

- WeIdentity
-

  –
  –
  –
  –

- WeIdentity

1. WeIdentity DID
2. KYC WeIdentity DID
3. WeIdentity DID
4. KYC
5.
6.

- WeIdentity

-
  –
  –
  –
  –

- WeIdentity

1. WeIdentity DID
2. KYC WeIdentity DID
3.
4. Credential
5.
6. Verify
7.

WeIdentity

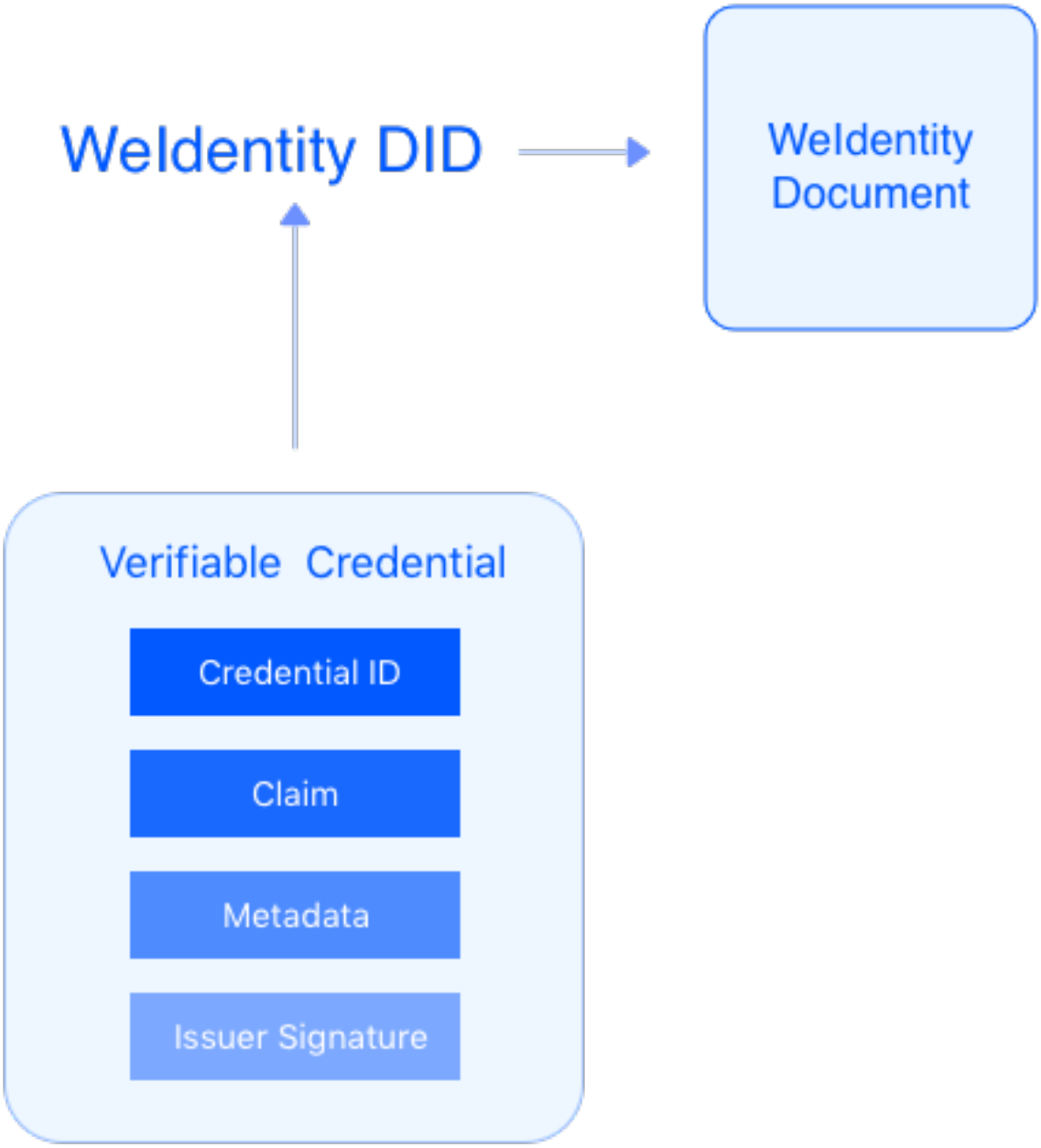
V0.1.0		
V0.2.0	ER	
V0.3.0	Notification	
V0.3.1	WeIdentity Document CPT	
V0.3.2		
V0.3.3		

1.

2.

3. WeIdentity DID

WeIdentity DID WeIdentity Credential



WeIdentity DID WeIdentity Credential WeIdentity DID WeIdentity Credential WeIdentity DID WeIdentity Credential WeIdentity Credential WeIden-

tity DID WeIdentity DID WeIdentity Document DID WeIdentity Credential

WeIdentity

1. KYC
2. WeIdentity DID
3. Credential
4. Issuer Credential
5. Credential Holder
6. Credential
7. Verifier Credential

WeIdentity DID

WeIdentity DID = did:weid:chain-id:bs-specific-string

did	DID “did”
weid	WeIdentity DID method name “weid”
chain-id	ID WeIdentity owner WeIdentity
bs-specific-string	Entity

bsSpecificString

(chain-id “101“: `"did:weid:101:0x0086eb1f712ebc6f1c276e12ec21"`

WeIdentity Document

@context	WeIdentity Document
id	WeIdentity DID Document Entity
created	Document
updated	Document
publicKey	
publicKey.id	ID
publicKey.type	signature suite
publicKey.owner	Entity WeIdentity owner Document id Credential Entity owner
authentication	Entity Document
authentication.type	signature suite
authentication.publicKey	publicKey
service	service DID
service.id	service endpoint ID
service.type	service endpoint
service.serviceEndpoint	serviceEndpoint URI JSON-LD
service.	
recovery	WeIdentity DID WeIdentity

- WeIdentity DID Authorization Recovery

```
{
  "@context": "https://weidentity.webank.com/did/v1",
  "id": "did:weid:1:123456789abcdefghi",
  "created": "2017-09-24T17:00:00Z",
  "updated": "2018-09-24T02:41:00Z",
  "publicKey": [{
    "id": "did:example:123456789abcdefghi#keys-1",
    "type": "RsaVerificationKey2018",
    "owner": "did:example:123456789abcdefghi",
    "publicKeyPem": "-----BEGIN PUBLIC KEY...END PUBLIC KEY-----\r\n"
  }, {
    "id": "did:example:123456789abcdefghi#keys-2",
    "type": "Secp256k1VerificationKey2018",
    "owner": "did:example:123456789abcdefghi",
    "publicKeyHex": "02b97c30de767f084ce3080168ee293053ba33b235d7116a3263d29f1450936b71"
  }],
  "authentication": [{
    // this key can be used to authenticate as DID ...9938
    "type": "RsaSignatureAuthentication2018",
    "publicKey": "did:weid:1:123456789abcdefghi#keys-1"
    }
  ],
  "service": [{
    "type": "drivingCardService",
    "serviceEndpoint": "https://weidentity.webank.com/endpoint/8377464"
    }, {
    "type": "padiCertificateService",
    "serviceEndpoint": "https://weidentity.webank.com/endpoint/8377465"
  }],
  "recovery": ["did:weid:1:2323e3e3dweweewew2","did:weid:1:2323e3e3dweweewew3"],
}
```

WeIdentity DID

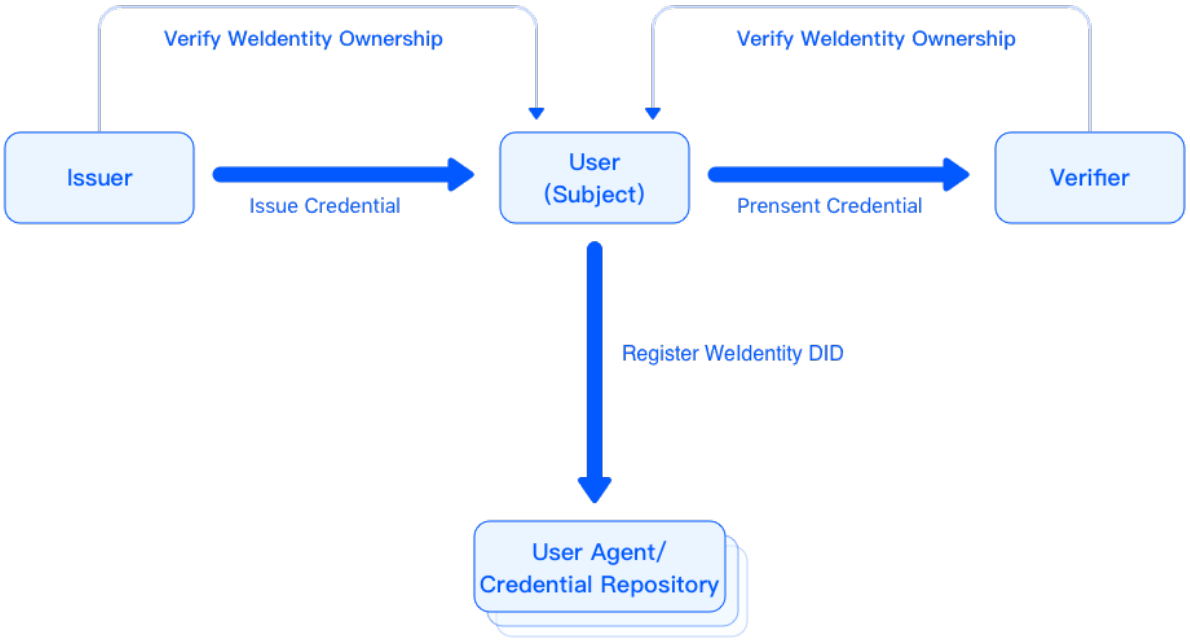
WeIdentity DID WeIdentity Document

/

WeIdentity DID WeIdentity Document

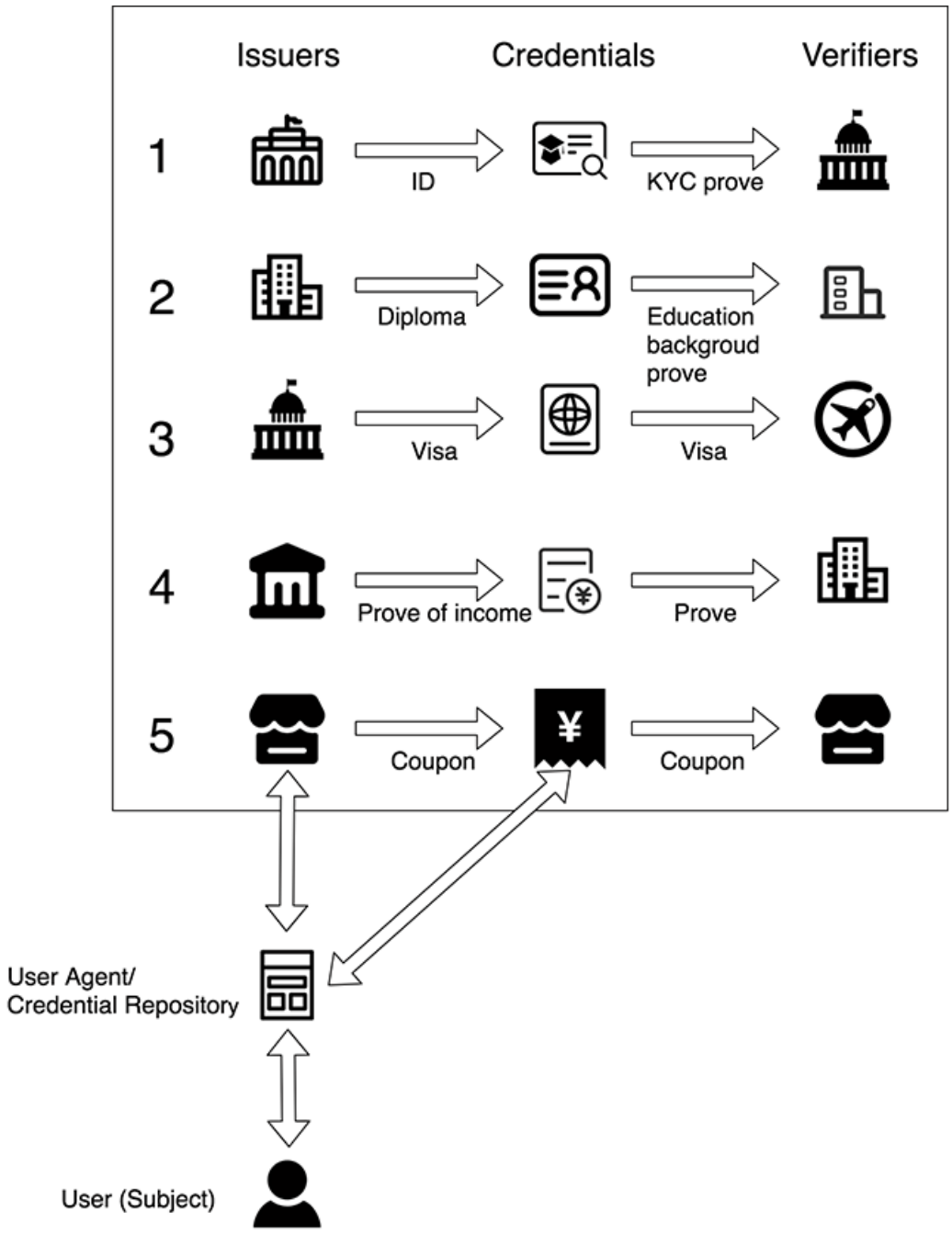
WeIdentity Document

4. WeIdentity Credential



WeIdentity

User (Entity)	WeIdentity DID Credential
Issuer	Credential WeIdentity DID Credential
Verifier	Credential WeIdentity DID Credential
User Agent / Credential Repository	WeIdentity DID Credential



WeIdentity Credential

1. Issuer Credential Verifier
2. Issuer Credential Verifier
3. Issuer Credential Verifier
4. Issuer Credential Verifier
5. Issuer Credential Verifier

Credential

@context	Credential
id	Credential ID UUID
issuer	Issuer DID WeIdentity
issued	issue
claim	Claim CPT CPT
claim.primeNumberIdx	index
claim.type	Claim Protocol Type ID CPT100
revocation	
proof	Issuer holder issuer
proof.type	
proof.created	
proof.creator	WeIdentity DID
proof.salt	hash
proof.signatureValue	value Credential signature

Credential

id	
type	
issued	
claimHash	Claim hash
revocation	
signature	


```
{
  "claim": {
     "age": 1,
     "gender": "F",
     "id": "did:weid:101:0xd6f4d1215c52ee7e7975ac946a0e094040aa5eeb",
     "name": "1"
  },
  "context": "https://github.com/WeBankBlockchain/WeIdentity/blob/master/context/v1",
  "cptId": 2000006,
  "expirationDate": "2020-09-24T14:34:44Z",
  "id": "f894d33d-88c3-4122-afb6-87e21d2ae656",
  "issuanceDate": "2020-09-23T14:34:44Z",
  "issuer": "did:weid:101:0xd6f4d1215c52ee7e7975ac946a0e094040aa5eeb",
  "proof": {
     "created": "2020-09-23T14:34:44Z",
     "creator": "did:weid:101:0xd6f4d1215c52ee7e7975ac946a0e094040aa5eeb#keys-0",
     "salt": {
        "age": "IObiF",
        "gender": "GdzQs",
        "id": "dDIIt",
        "name": "PecuG"
     },
     "signatureValue": "/
↪T21Vb5aw2dyB5kgh5LQmMHCQcx7MLJvFLf0g+EPkJVwoFH7+tPwokNBBHjQWn3BWLORDHJcbsUo+6OrRgTp8wA=",
     "type": "Secp256k1"
   },
  "type": [
```


(continues on next page)

( )

```
    "VerifiableCredential",
    "original"
 ],
 "$from": "toJson"
}
```

Claim Protocol Type CPT

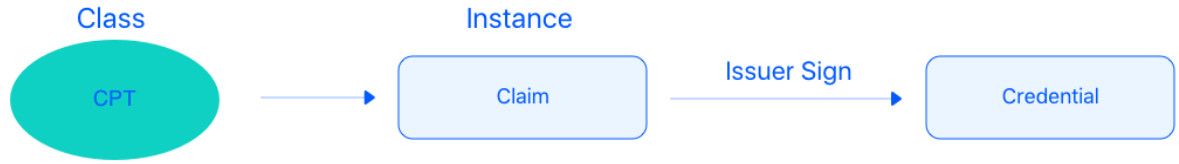
Issuer Claim Claim CPT CPT JSON-LD CPT

- CPT

@context	CPT
id	CPT
cptType	Credential lite1 original zkp
title	CPT “FISCO BCOS ” “ ”
description	CPT
properties	Claim
created	
updated	
version	CPT
publisher	CPT WeIdentity DID
proof	CPT

- CPT

```
{
   "$context" : "http://json-schema.org/draft-04/schema#",
   "cptType" : "original",
   "description" : "    ",
   "title" : "  ",
   "type" : "object",
   "properties" : {
     "id" : {
       "description" : "  id",
       "type" : "string"
     },
     "name" : {
       "description" : " ",
       "type" : "string"
     }
   }
}
```



CPT Claim Claim CPT Issuer Claim Credential

Claim

Claim

Credential

Credential

issue Credential

Credential

Entity Credential

/ Credential

Credential holder Credential Credential

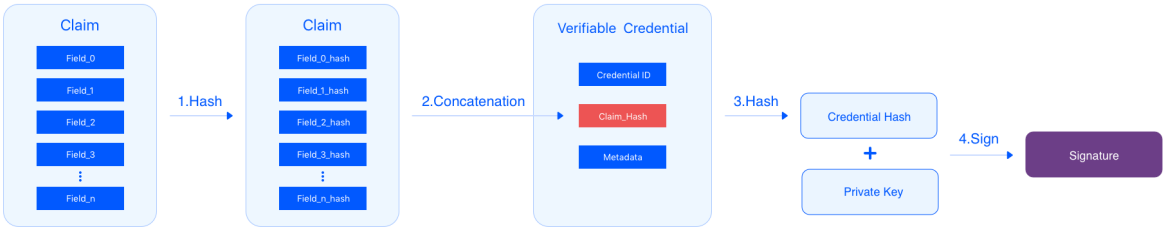
Credential

Credential Issuer Credential

Credential

Issuer Credential

1. Claim hash
2. Claim hash Claim_Hash Credential hash Credential
3. Claim_Hash Credential hash Credential Hash
4. Private Key Credential Hash Signature



Credential

Field_1 hash Claim Credential Verifier Verifier

1. Verifier Credential Claim
2. Verifier hash Field_1, Field_1_hash , hash Claim
3. Claim hash Claim_Hash Credential hash Credential
4. Claim_Hash Credential hash Credential Hash
5. Credential Signature Issuer public key decrypt
6. Credential Signature Credential

Credential

Credential

1. 1 a a a
2. semiprime

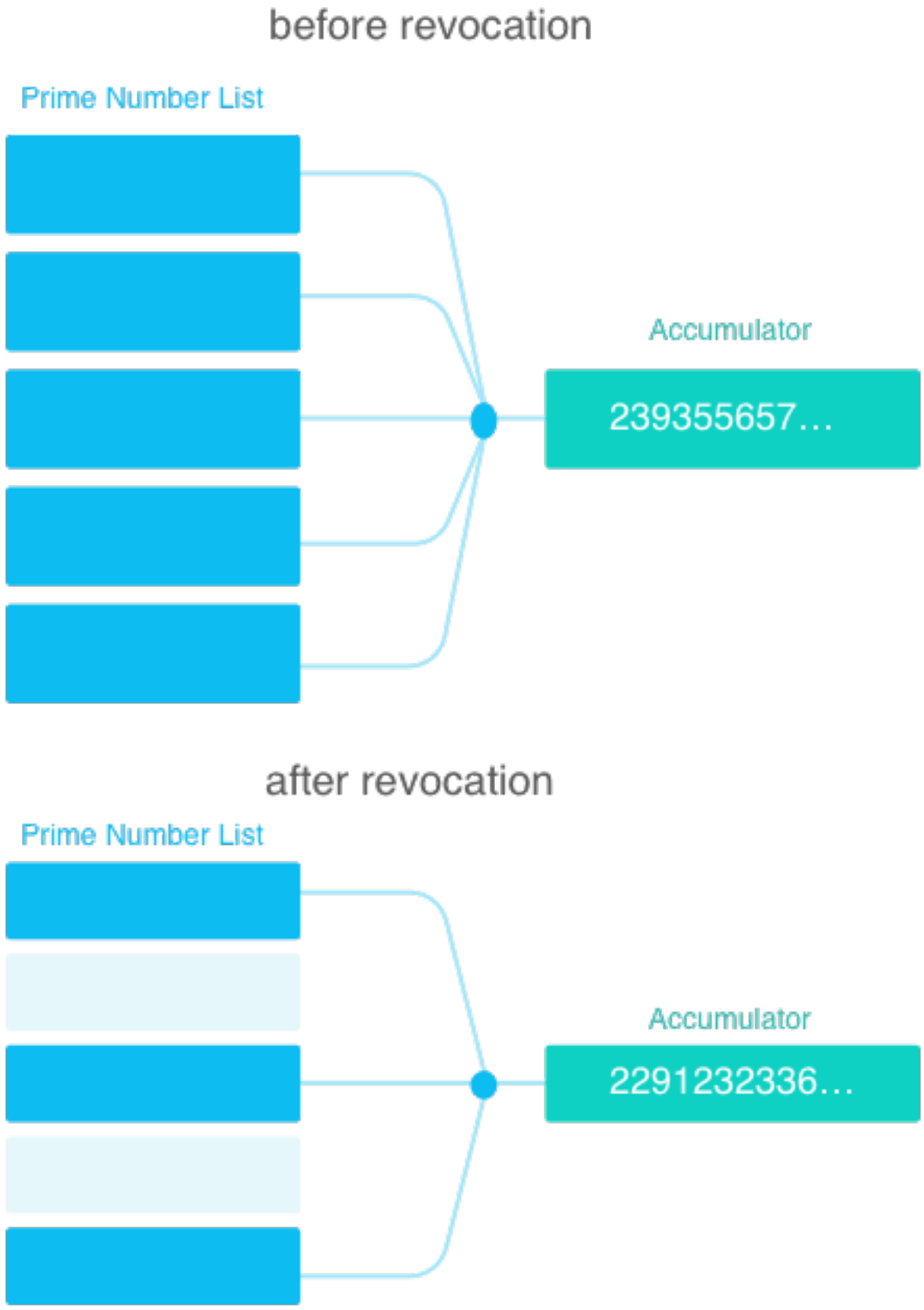
WeIdentity index Issuer Issuer Credential index Credential Credential Accumulator Issuer Accumulator Accumulator

Issuer Credential

Credential Issuer Accumulator Accumulator

Verifier Credential

Credential Credential Issuer Accumulator Credential


before revocation
Prime Number List
Accumulator
239355657…
after revocation
Prime Number List
Accumulator
2291232336…

5. Authority Issuer

WeIdentity DID issue Claim Authority Issuer Authority Issuer

version	version
id	Authority Issuer WeIdentity DID WeIdentity ID
name	Authority Issuer
created	
updated	
publicKey	Authority Issuer
validCrenRef	Authority Issuer credential primeNumber

6. Notification

type notification payload

type	register, update
weid	notification WeIdentity DID
payload	Notification

WeIdentity DID

WeIdentity DID notification WeIdentity DID

type	register

- payload

NULL

WeIdentity DID

WeIdentity DID notification public key meta data

type	document_mod WeIdentity Document

- payload payload

operation	add, update remove
field	key
original	
new	

Notification

Credential payload

type	transportation

Notification

7.

- W3C DID Spec
- W3C Verifiable Credentials
- Linked Data Signatures 1.0 Draft
- RSA Signature Suite 2018

WeIdentity Sample

weid-sample WeIdentity Java WeIdentity Java

WeIdentity

weid-sample

- WdIdentity Sample

WeIdentity Sample

WeIdentity-Sample WeIdentity WeIdentity JAVA SDK Java weid-sample

1.

1.1 WeIdentity-Sample

```
git clone https://github.com/WeBankBlockchain/WeIdentity-Sample
```

```
:                    git clone https://gitee.com/WeBank/WeIdentity-Sample
```

1.2

WeIdentity Sample WeIdentity Build Tool weid-sample Build Tool

WeIdentity Sample, weid-java-sdk

- WeIdentity-Sample

WeIdentity-Sample

```
chmod +x build.sh
./build.sh
```

2. Swagger

spring-boot weid-sample swagger

2.1

```
chmod +x build.sh start.sh stop.sh
./start.sh
```

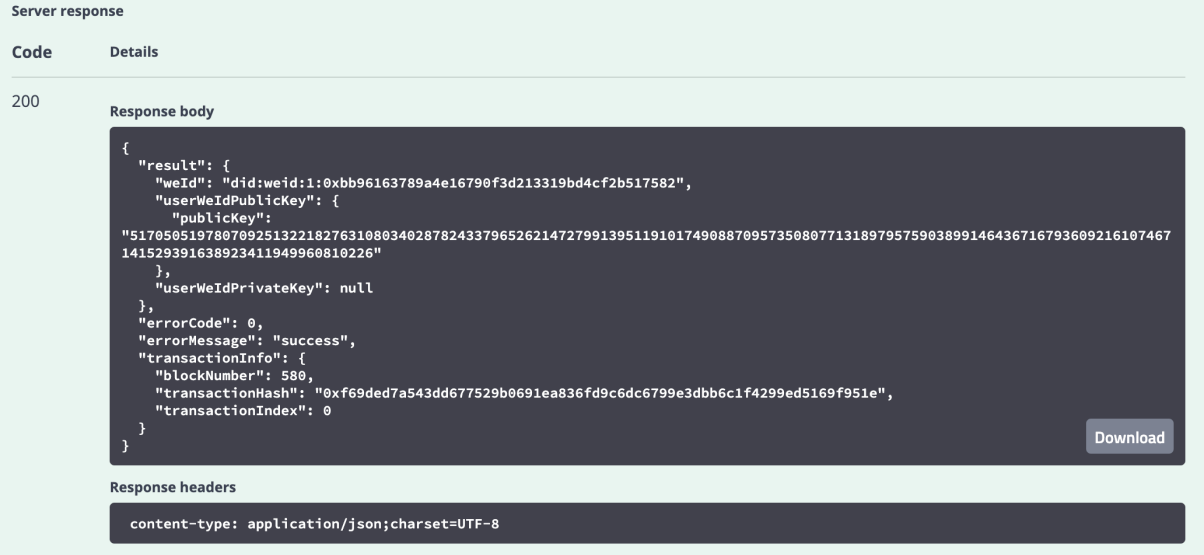
```
[main] INFO  AnnotationMBeanExporter() - Registering beans for JMX exposure on startup
[main] INFO  Http11NioProtocol() - Initializing ProtocolHandler ["https-jsse-nio-6101"]
[main] INFO  Http11NioProtocol() - Starting ProtocolHandler ["https-jsse-nio-6100"]
[main] INFO  NioSelectorPool() - Using a shared selector for servlet write/read
[main] INFO  Http11NioProtocol() - Initializing ProtocolHandler ["http-nio-6101"]
[main] INFO  NioSelectorPool() - Using a shared selector for servlet write/read
[main] INFO  Http11NioProtocol() - Starting ProtocolHandler ["http-nio-6101"]
[main] INFO  TomcatEmbeddedServletContainer() - Tomcat started on port(s): 6100 (https) 6101␣
↪(http)
[main] INFO  SampleApp() - Started SampleApp in 3.588 seconds (JVM running for 4.294)
```

2.2

127.0.0.1 6101 resources/ http://127.0.0.1:6101/swagger-ui.html WeIdentity

- WeID

‘‘/step1/issuer/createWeId‘‘ WeID



WeID did:weid:1:0xbb96163789a4e16790f3d213319bd4cf2b517582

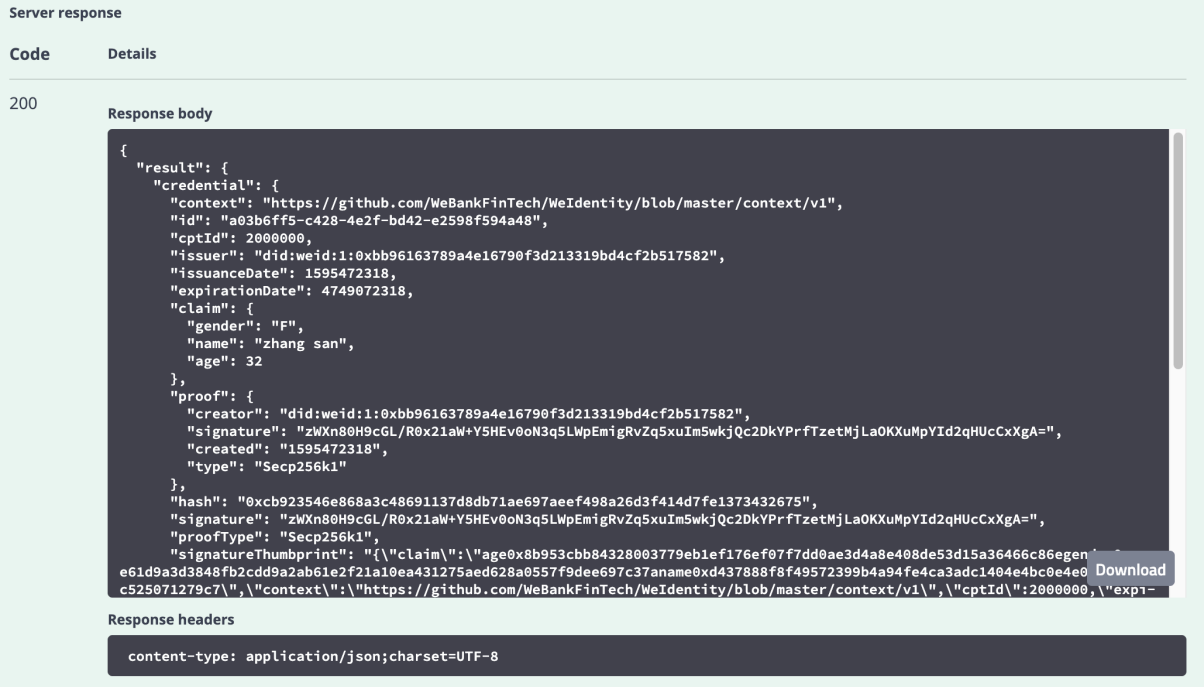
- Cpt

‘‘/step2/registCpt‘‘ publisher step1 WeID

CPT CPT ID 2000000

- Credential

‘‘/step3/createCredential‘‘ ‘‘claimData‘‘ issuer step1 WeID cptId step2 Cpt ID



Credential Credential credential

- Credential

‘‘/step1/verifyCredential‘‘ ‘‘credential‘‘

Credential

weid-sample weid-sample `com.webank.weid.demo.server.SampleApp` Java

3.

WeIdentity WeIdentity

- Issuer

  WeID
  Authority Issuer
  CPT
  Credential

- User Agent

  WeID

Presentation
Presentation QRcode Json Verifier

- Verifier

  User Agent Presentation
  Presentation

3.1

- Issuer

```
chmod +x command.sh
./command.sh issuer
```

WeID Authority Issuer CPT Credential

```
--------- start issuer ----------
issuer() init...

begin to createWeId...

createWeId result:

result:(com.webank.weid.protocol.response.CreateWeIdDataResult)
weId: did:weid:1:0x7a276b294ecf0eb7b917765f308f024af2c99a38
userWeIdPublicKey:(com.webank.weid.protocol.base.WeIdPublicKey)
    publicKey:␣
↪1443108387689714733821851716463554592846955595194902087319775398382966796515741745
    951182105547115313067791999154982272567881519406873966935891855085705784
userWeIdPrivateKey:(com.webank.weid.protocol.base.WeIdPrivateKey)
    privateKey: 466868658599491480451255075148159989204671471780976859580288169033324300300 79
errorCode: 0
errorMessage: success
transactionInfo:(com.webank.weid.protocol.response.TransactionInfo)
blockNumber: 2098
transactionHash: 0x20fc5c2730e4636248b121d31ffdbf7fa12e95185068fc1dea060d1afa9d554e
transactionIndex: 0

begin to setPublicKey...

setPublicKey result:

result: true
errorCode: 0
errorMessage: success
transactionInfo:(com.webank.weid.protocol.response.TransactionInfo)
blockNumber: 2099
transactionHash: 0x498d2bfd2d8ffa297af699c788e80de1bd51c255a7365307624637ae5a42f3a1
transactionIndex: 0
```

- User Agent

```
./command.sh user_agent
```

WeID Presentation Presentation QRcode Json

```
--------- start User Agent ----------
userAgent() init...
```

(continues on next page)

( )

```
begin to create weId for useragent...

createWeId result:

result:(com.webank.weid.protocol.response.CreateWeIdDataResult)
weId: did:weid:1:0x38198689923961e8ecd6d57d88d027b1a6d1daf2
userWeIdPublicKey:(com.webank.weid.protocol.base.WeIdPublicKey)
    publicKey:␣
↪12409513077193959265896252693672990701614851618753940603742819290794422690048786166
    77748624449230242365328258533877448834753636236821653645295685212386945 6
userWeIdPrivateKey:(com.webank.weid.protocol.base.WeIdPrivateKey)
    privateKey: 11700070604387246310492373601720779844791990854359896181912833510050901695117
errorCode: 0
errorMessage: success
transactionInfo:(com.webank.weid.protocol.response.TransactionInfo)
blockNumber: 2107
transactionHash: 0x2474141b82c367d8d5770a7f4d124aeaf985e7fa3e3e2f7f98eeed3d38d862f5
transactionIndex: 0
```

- Verifier

```
./command.sh verifier
```

Verifier Presentation Presentation

```
--------- start verifier ----------
verifier() init...

------------------------------

begin create weid for verifier...

createWeId result:

result:(com.webank.weid.protocol.response.CreateWeIdDataResult)
    weId: did:weid:1:0xc43f2c19d118069334465203caec2f172b309c58
    userWeIdPublicKey:(com.webank.weid.protocol.base.WeIdPublicKey)
        publicKey:␣
↪1802001392887294114478621319460626832326728735808626637646481738691052543569123247811055025421632020659858167
    userWeIdPrivateKey:(com.webank.weid.protocol.base.WeIdPrivateKey)
        privateKey:␣
↪18729487184487047589926382583327624427891635082897243001876050275017499781990
errorCode: 0
errorMessage: success
transactionInfo:(com.webank.weid.protocol.response.TransactionInfo)
    blockNumber: 63
    transactionHash: 0xe76321d5778ed627f2dd051eb327e7dc5190180013691ef73b21b5c264fffad8
    transactionIndex: 0

------------------------------

begin get the presentation json...
```

WeIdentity-Sample WeIdentity-Sample `com.webank.weid.demo.command.DemoCommand` Java

weid-java-sdk

Committee Member

:	Authority Issuer	Committee Member

WeIdentity `weid-sample/keys/priv/` Authority Issuer weid-sample

weidentity.properties

```
cd weid-sample
vim resources/weidentity.properties
```

`blockchain.orgid` organizationA organizationA
`nodes`

```
blockchain.orgid=organizationA
nodes=10.10.10.10:20200
```

```
cd resources/
```

FISCO BCOS 2.0 2.0 web3sdk `ca.crt node.crt node.key`

- CPT
- WeIdentity
-
- WeIdentity
- WeIdentity
-
- WeIdentity
- WeIdentity Java SDK JDK
- WeIdentity

FAQ

- JAVA SDK FAQ

- “ ”

1.

2.

3.

4.

- **KYC**

WeIdentity KYC

1.

2. WeIdentity DID WeIdentity DID 1

WeIdentity KYC WeIdentity

- **WeIdentity**

WeIdentity WeIdentity

1. WeIdentity

2.

WeIdentity

- **WeIdentity “ / / / / ”**

WeIdentity

-

1. User Agent
2. User Agent

- /

User Agent

1.

2.

- “ ”

WeIdentity “ ” WeIdentity

-

- **WeIdentity DID**

1. WeIdentity SDK json WeIdentity Document User Agent ;
2. WeIdentity SDK WeIdentity WeIdentity Document WeIdentity Document WeIdentity A B A B A B

- **Credential**

WeIdentity Credential W3C Verifiable Credential WeIdentity “Credential ” “Credential ”

- **WeIdentity DID DID**

WeIdentity DID W3C DID WeIdentity W3C DID WeIdentity DID

- **CPT CPT**

CPT Claim Protocol Type Credential Credential Credential Credential CPT

- A X B M A Credential CPT101 CPT
  B A B Credential B Credential

- WeIdentity DID Recovery WeIdentity Recovery WeIdentity DID N

- **Credential**

WeIdentity Credential Credential Credential Credential ID Credential Credential

- **Credential**

Credential ECDSA RSA ECDSA RSA

  - how-big-an-rsa-key-is-considered-secure-today
  - how-much-stronger-is-rsa-2048-compared-to-rsa-1024
  - 2048-bit RSA , 2030 Asymmetric_algorithm_key_lengths
  - RSA 768 bit
  - ECDSA vs RSA (Conclusion)

  - ECDSA RSA Shor RSA key length vs. Shor’s algorithm Quantum_computing_attacks

- **FISCO-BCOS WeIdentity**

WeIdentity

- **PDF**

NotoSansCJKtc-Regular.ttf

CentOS

1.

```
sudo mkdir -p /usr/share/fonts/chinese
sudo cp ./NotoSansCJKtc-Regular.ttf  /usr/share/fonts/chinese
```

2.

```
sudo yum -y install fontconfig ttmkfdir mkfontscale
```

3.

```
sudo mkfontscale&&
sudo mkfontdir&&
sudo fc-cache -fv
```

4.

```
fc-list
```

Ubuntu

1.

```
sudo mkdir -p /usr/share/fonts/chinese
sudo cp ./NotoSansCJKtc-Regular.ttf  /usr/share/fonts/chinese
```

2.

```
sudo apt install xfonts-utils -y
```

3.

```
sudo mkfontscale
sudo mkfontdir
sudo fc-cache -fv
```

4.

```
fc-list
```

Window

1. window10

-

:

```
Exception in thread "main" java.lang.IncompatibleClassChangeError: class com.github.fge.
↪jackson.JsonNumEquals has interface com.google.common.base.Equivalence as super class
at java.lang.ClassLoader.defineClass1(Native Method)
at java.lang.ClassLoader.defineClass(ClassLoader.java:763)
at java.security.SecureClassLoader.defineClass(SecureClassLoader.java:142)
at java.net.URLClassLoader.defineClass(URLClassLoader.java:467)
at java.net.URLClassLoader.access$100(URLClassLoader.java:73)
at java.net.URLClassLoader$1.run(URLClassLoader.java:368)
at java.net.URLClassLoader$1.run(URLClassLoader.java:362)
at java.security.AccessController.doPrivileged(Native Method)
at java.net.URLClassLoader.findClass(URLClassLoader.java:361)
at java.lang.ClassLoader.loadClass(ClassLoader.java:424)
at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:331)
at java.lang.ClassLoader.loadClass(ClassLoader.java:357)
at com.github.fge.jsonschema.core.keyword.syntax.checkers.common.EnumSyntaxChecker.<clinit>
↪(EnumSyntaxChecker.java:46)
at com.github.fge.jsonschema.core.keyword.syntax.dictionaries.CommonSyntaxCheckerDictionary.
↪<clinit>(CommonSyntaxCheckerDictionary.java:152)
at com.github.fge.jsonschema.core.keyword.syntax.dictionaries.DraftV3SyntaxCheckerDictionary.
↪<clinit>(DraftV3SyntaxCheckerDictionary.java:55)
at com.github.fge.jsonschema.library.DraftV3Library.<clinit>(DraftV3Library.java:32)
at com.github.fge.jsonschema.cfg.ValidationConfigurationBuilder.<clinit>
↪(ValidationConfigurationBuilder.java:63)
at com.github.fge.jsonschema.cfg.ValidationConfiguration.newBuilder(ValidationConfiguration.
↪java:92)
at com.github.fge.jsonschema.cfg.ValidationConfiguration.byDefault(ValidationConfiguration.
↪java:102)
at com.github.fge.jsonschema.main.JsonSchemaFactoryBuilder.<init>(JsonSchemaFactoryBuilder.
↪java:68)
at com.github.fge.jsonschema.main.JsonSchemaFactory.newBuilder(JsonSchemaFactory.java:123)
at com.github.fge.jsonschema.main.JsonSchemaFactory.byDefault(JsonSchemaFactory.java:113)
at com.webank.weid.util.DataToolUtils.isValidJsonSchema(DataToolUtils.java:451)
at com.webank.weid.util.DataToolUtils.isCptJsonSchemaValid(DataToolUtils.java:465)
at com.webank.weid.service.impl.CptServiceImpl.validateCptJsonSchemaMap(CptServiceImpl.
↪java:358)
at com.webank.weid.service.impl.CptServiceImpl.validateCptArgs(CptServiceImpl.java:325)
at com.webank.weid.service.impl.CptServiceImpl.registerCpt(CptServiceImpl.java:167)
at Issuer.main(Issuer.java:49)
```

```
IDE      Equivalence  Idea   Ctrl+N,  Equivalence
           guava jar   pom.xml
   maven  pom.xml
```

:

```
2020-09-24 15:27:47.275 [http-nio-6021-exec-10] ERROR DeployContractV2() - RoleController␣
↪deploy exception
org.fisco.bcos.web3j.protocol.exceptions.TransactionException: Transaction receipt timeout.
at org.fisco.bcos.web3j.tx.Contract.executeTransaction(Contract.java:420) ~[web3sdk-2.4.1.jar:?
↪]
at org.fisco.bcos.web3j.tx.Contract.create(Contract.java:498) ~[web3sdk-2.4.1.jar:?]
at org.fisco.bcos.web3j.tx.Contract.deploy(Contract.java:533) ~[web3sdk-2.4.1.jar:?]
at org.fisco.bcos.web3j.tx.Contract.lambda$deployRemoteCall$6(Contract.java:687) ~[web3sdk-2.4.
↪1.jar:?]
at org.fisco.bcos.web3j.protocol.core.RemoteCall.send(RemoteCall.java:28) ~[web3sdk-2.4.1.jar:?
↪]
at com.webank.weid.contract.deploy.v2.DeployContractV2.
↪deployRoleControllerContracts(DeployContractV2.java:167) [weid-java-sdk-1.6.6.jar:?]
```

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```
at com.webank.weid.contract.deploy.v2.DeployContractV2.deployContract(DeployContractV2.
↪java:129) [weid-java-sdk-1.6.6.jar:?]
at com.webank.weid.service.DeployService.deploy(DeployService.java:110) [weid-build-tools-1.0.
↪19.jar:?]
at com.webank.weid.controller.BuildToolController.deploy(BuildToolController.java:223) [weid-
↪build-tools-1.0.19.jar:?]
at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method) ~[?:1.8.0_161]
at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62) ~[?:1.8.0_161]
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43) ~[?:1.
↪8.0_161]
at java.lang.reflect.Method.invoke(Method.java:498) ~[?:1.8.0_161]
at org.springframework.web.method.support.InvocableHandlerMethod.
↪doInvoke(InvocableHandlerMethod.java:190) [spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.method.support.InvocableHandlerMethod.
↪invokeForRequest(InvocableHandlerMethod.java:138) [spring-web-5.2.2.RELEASE.jar:5.2.2.
↪RELEASE]
at org.springframework.web.servlet.mvc.method.annotation.ServletInvocableHandlerMethod.
↪invokeAndHandle(ServletInvocableHandlerMethod.java:106) [spring-webmvc-5.2.2.RELEASE.jar:5.2.
↪2.RELEASE]
at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.
↪invokeHandlerMethod(RequestMappingHandlerAdapter.java:888) [spring-webmvc-5.2.2.RELEASE.
↪jar:5.2.2.RELEASE]
at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.
↪handleInternal(RequestMappingHandlerAdapter.java:793) [spring-webmvc-5.2.2.RELEASE.jar:5.2.2.
↪RELEASE]
at org.springframework.web.servlet.mvc.method.AbstractHandlerMethodAdapter.
↪handle(AbstractHandlerMethodAdapter.java:87) [spring-webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.servlet.DispatcherServlet.doDispatch(DispatcherServlet.java:1040)␣
↪[spring-webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.servlet.DispatcherServlet.doService(DispatcherServlet.java:943)␣
↪[spring-webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.servlet.FrameworkServlet.processRequest(FrameworkServlet.java:1006)␣
↪[spring-webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.servlet.FrameworkServlet.doGet(FrameworkServlet.java:898) [spring-
↪webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at javax.servlet.http.HttpServlet.service(HttpServlet.java:634) [tomcat-embed-core-9.0.29.
↪jar:9.0.29]
at org.springframework.web.servlet.FrameworkServlet.service(FrameworkServlet.java:883) [spring-
↪webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at javax.servlet.http.HttpServlet.service(HttpServlet.java:741) [tomcat-embed-core-9.0.29.
↪jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:231) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.tomcat.websocket.server.WsFilter.doFilter(WsFilter.java:53) [tomcat-embed-
↪websocket-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at com.webank.weid.filter.XssFilter.doFilter(XssFilter.java:46) [weid-build-tools-1.0.19.jar:?]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at com.webank.weid.filter.BuildToolFilter.doFilter(BuildToolFilter.java:85) [weid-build-tools-
↪1.0.19.jar:?]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
```

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```
at org.springframework.web.filter.RequestContextFilter.doFilterInternal(RequestContextFilter.
↪java:100) [spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:119)␣
↪[spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.springframework.web.filter.FormContentFilter.doFilterInternal(FormContentFilter.
↪java:93) [spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:119)␣
↪[spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.springframework.web.filter.CharacterEncodingFilter.
↪doFilterInternal(CharacterEncodingFilter.java:201) [spring-web-5.2.2.RELEASE.jar:5.2.2.
↪RELEASE]
at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:119)␣
↪[spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.StandardWrapperValve.invoke(StandardWrapperValve.java:202) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.StandardContextValve.invoke(StandardContextValve.java:96) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.authenticator.AuthenticatorBase.invoke(AuthenticatorBase.java:526)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.StandardHostValve.invoke(StandardHostValve.java:139) [tomcat-embed-
↪core-9.0.29.jar:9.0.29]
at org.apache.catalina.valves.ErrorReportValve.invoke(ErrorReportValve.java:92) [tomcat-embed-
↪core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.StandardEngineValve.invoke(StandardEngineValve.java:74) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.connector.CoyoteAdapter.service(CoyoteAdapter.java:343) [tomcat-embed-
↪core-9.0.29.jar:9.0.29]
at org.apache.coyote.http11.Http11Processor.service(Http11Processor.java:367) [tomcat-embed-
↪core-9.0.29.jar:9.0.29]
at org.apache.coyote.AbstractProcessorLight.process(AbstractProcessorLight.java:65) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.coyote.AbstractProtocol$ConnectionHandler.process(AbstractProtocol.java:860)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.tomcat.util.net.NioEndpoint$SocketProcessor.doRun(NioEndpoint.java:1591) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.tomcat.util.net.SocketProcessorBase.run(SocketProcessorBase.java:49) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1149) [?:1.8.0_
↪161]
at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:624) [?:1.8.0_
↪161]
at org.apache.tomcat.util.threads.TaskThread$WrappingRunnable.run(TaskThread.java:61) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at java.lang.Thread.run(Thread.java:748) [?:1.8.0_161]
2020-09-24 15:27:47.346 [http-nio-6021-exec-10] ERROR DeployContractV2() - WeIdContract deploy␣
↪error.
java.lang.NumberFormatException: Zero length BigInteger
at java.math.BigInteger.<init>(BigInteger.java:420) ~[?:1.8.0_161]
at org.fisco.bcos.web3j.utils.Numeric.toBigIntNoPrefix(Numeric.java:105) ~[web3sdk-2.4.1.jar:?]
```

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```
at org.fisco.bcos.web3j.utils.Numeric.toBigInt(Numeric.java:101) ~[web3sdk-2.4.1.jar:?]
at org.fisco.bcos.web3j.abi.datatypes.Address.<init>(Address.java:26) ~[web3sdk-2.4.1.jar:?]
at com.webank.weid.contract.v2.WeIdContract.deploy(WeIdContract.java:399) ~[weid-contract-java-
↪1.2.24.jar:?]
at com.webank.weid.contract.deploy.v2.DeployContractV2.deployWeIdContract(DeployContractV2.
↪java:182) [weid-java-sdk-1.6.6.jar:?]
at com.webank.weid.contract.deploy.v2.DeployContractV2.deployContract(DeployContractV2.
↪java:130) [weid-java-sdk-1.6.6.jar:?]
at com.webank.weid.service.DeployService.deploy(DeployService.java:110) [weid-build-tools-1.0.
↪19.jar:?]
at com.webank.weid.controller.BuildToolController.deploy(BuildToolController.java:223) [weid-
↪build-tools-1.0.19.jar:?]
at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method) ~[?:1.8.0_161]
at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62) ~[?:1.8.0_161]
at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43) ~[?:1.
↪8.0_161]
at java.lang.reflect.Method.invoke(Method.java:498) ~[?:1.8.0_161]
at org.springframework.web.method.support.InvocableHandlerMethod.
↪doInvoke(InvocableHandlerMethod.java:190) [spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.method.support.InvocableHandlerMethod.
↪invokeForRequest(InvocableHandlerMethod.java:138) [spring-web-5.2.2.RELEASE.jar:5.2.2.
↪RELEASE]
at org.springframework.web.servlet.mvc.method.annotation.ServletInvocableHandlerMethod.
↪invokeAndHandle(ServletInvocableHandlerMethod.java:106) [spring-webmvc-5.2.2.RELEASE.jar:5.2.
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at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.
↪invokeHandlerMethod(RequestMappingHandlerAdapter.java:888) [spring-webmvc-5.2.2.RELEASE.
↪jar:5.2.2.RELEASE]
at org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandlerAdapter.
↪handleInternal(RequestMappingHandlerAdapter.java:793) [spring-webmvc-5.2.2.RELEASE.jar:5.2.2.
↪RELEASE]
at org.springframework.web.servlet.mvc.method.AbstractHandlerMethodAdapter.
↪handle(AbstractHandlerMethodAdapter.java:87) [spring-webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.servlet.DispatcherServlet.doDispatch(DispatcherServlet.java:1040)␣
↪[spring-webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.servlet.DispatcherServlet.doService(DispatcherServlet.java:943)␣
↪[spring-webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.servlet.FrameworkServlet.processRequest(FrameworkServlet.java:1006)␣
↪[spring-webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.servlet.FrameworkServlet.doGet(FrameworkServlet.java:898) [spring-
↪webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at javax.servlet.http.HttpServlet.service(HttpServlet.java:634) [tomcat-embed-core-9.0.29.
↪jar:9.0.29]
at org.springframework.web.servlet.FrameworkServlet.service(FrameworkServlet.java:883) [spring-
↪webmvc-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at javax.servlet.http.HttpServlet.service(HttpServlet.java:741) [tomcat-embed-core-9.0.29.
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↪java:231) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.tomcat.websocket.server.WsFilter.doFilter(WsFilter.java:53) [tomcat-embed-
↪websocket-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at com.webank.weid.filter.XssFilter.doFilter(XssFilter.java:46) [weid-build-tools-1.0.19.jar:?]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
```

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```
at com.webank.weid.filter.BuildToolFilter.doFilter(BuildToolFilter.java:85) [weid-build-tools-
↪1.0.19.jar:?]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.springframework.web.filter.RequestContextFilter.doFilterInternal(RequestContextFilter.
↪java:100) [spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:119)␣
↪[spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.
↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.springframework.web.filter.FormContentFilter.doFilterInternal(FormContentFilter.
↪java:93) [spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:119)␣
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↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.springframework.web.filter.CharacterEncodingFilter.
↪doFilterInternal(CharacterEncodingFilter.java:201) [spring-web-5.2.2.RELEASE.jar:5.2.2.
↪RELEASE]
at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:119)␣
↪[spring-web-5.2.2.RELEASE.jar:5.2.2.RELEASE]
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↪java:193) [tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:166)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.StandardWrapperValve.invoke(StandardWrapperValve.java:202) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.StandardContextValve.invoke(StandardContextValve.java:96) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.authenticator.AuthenticatorBase.invoke(AuthenticatorBase.java:526)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.StandardHostValve.invoke(StandardHostValve.java:139) [tomcat-embed-
↪core-9.0.29.jar:9.0.29]
at org.apache.catalina.valves.ErrorReportValve.invoke(ErrorReportValve.java:92) [tomcat-embed-
↪core-9.0.29.jar:9.0.29]
at org.apache.catalina.core.StandardEngineValve.invoke(StandardEngineValve.java:74) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.catalina.connector.CoyoteAdapter.service(CoyoteAdapter.java:343) [tomcat-embed-
↪core-9.0.29.jar:9.0.29]
at org.apache.coyote.http11.Http11Processor.service(Http11Processor.java:367) [tomcat-embed-
↪core-9.0.29.jar:9.0.29]
at org.apache.coyote.AbstractProcessorLight.process(AbstractProcessorLight.java:65) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.coyote.AbstractProtocol$ConnectionHandler.process(AbstractProtocol.java:860)␣
↪[tomcat-embed-core-9.0.29.jar:9.0.29]
at org.apache.tomcat.util.net.NioEndpoint$SocketProcessor.doRun(NioEndpoint.java:1591) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at org.apache.tomcat.util.net.SocketProcessorBase.run(SocketProcessorBase.java:49) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:1149) [?:1.8.0_
↪161]
at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:624) [?:1.8.0_
↪161]
at org.apache.tomcat.util.threads.TaskThread$WrappingRunnable.run(TaskThread.java:61) [tomcat-
↪embed-core-9.0.29.jar:9.0.29]
```

(continues on next page)

( )

```
at java.lang.Thread.run(Thread.java:748) [?:1.8.0_161]
```

```
,
```

- **FISCO-BCOS WeIdentity WeIdentity**

WeIdentity

- **Evidence**

Evidence key hash WeIdentity SDK sha3

-

```
"hash": "0x64e604787cbf194841e7b68d7cd28786f6c9a0a3ab9f8b0a0e87cb4387ab0107"

//hash extraKey Evidence key Evidence value

{
"signer": ["did:weid:1000:0x4d3091830e74235a9c2e2041700c162ff75cc13d"],
"logs": [
    "tempLog",
    "tempLog",
    "tempLog",
    "tempLog",
    "tempLog",
    "tempLog"
],
"signature": ["AELc1QRvC+OEwwIjzZ6KrffiHpTFoxanq29H6KO3juV1NKg5Ip59/c/
↪8pgwISVNEV8mXaqhYVf2o\b0JuyZCc0f5Q="],
"updated": "1590136873"
}
```

- **CredentialService CredentialPojoService**

1. CredentialService CredentialPojoService CredentialPojoService CredentialService CredentialPojoSe
2. CredentialPojo Lite Presentation PDF/
3. AmopService requestIssueCredential Credential CredentialPojoService

---

- **MYSQL**

MYSQL maxActive + SDK maxActive

-

:

`output/admin` 'WeIdentity '

1.

'WeIdentity ' `tools/`

- CNS CNS

```
cd tools
chmod u+x upgrade_databucket.sh
./upgrade_databucket.sh
```

1. `weid-build-tools`

```
cd ..
rm -r output/other/guide
```

1.

```
./stop.sh
./start.sh
```

1. 0

WeIdentity RestService

WeIdentity RestService WeIdentity RestService Java FISCO-BCOS HTTP/HTTPS WeIdentity

RestService

RestService Server

WeIdentity RestService

1. Server

1.1

Server WeIdentity-Java-SDK fisco-solc

CentOS/Ubuntu	7.2 / 16.04 64	RestServer
JDK	1.8+	1.8u141
FISCO-BCOS	1.3.8 1.2.5 2.x	Server telnet channelPort
Gradle	4.6+	4.x 5.x Gradle
MySQL	5 +	MySQL

1.2

GitHub RestService `/dist`

```
$ git clone https://github.com/WeBankBlockchain/WeIdentity-Rest-Service.git
$ cd WeIdentity-Rest-Service
$ gradle build -x test
$ cd dist
```

develop

```
dist
  app:  jar
  lib:
  conf:
  keys/priv:
  server_status.sh
  start.sh  RestServer
  stop.sh  RestServer
```

1.3

- WeIdentity FISCO-BCOS 2.x FISCO-BCOS
- ca.crt SDK node.crt node.key dist/conf
- WeIdentity fisco.properties weidentity.properties dist/conf dist/conf/fisco.properties.tpl dist/conf/weidentity.properties.tpl .tpl

  dist/conf/fisco.properties cns.contract.follow

```
cns.contract.follow=0x161bcbd5afbdd2bb2c7f6cc31ed5897f041271c8c984284239370c1572e8545d
```

dist/conf/weidentity.properties nodes IP channel ","

```
nodes=127.0.0.1:8812,127.0.0.1:8900
```

- WeIdentity keys/priv ecdsa_key WeIdentity output/admin/
- dist/conf/application.properties RestServer HTTP/HTTPS RESTful 6001

```
#   HTTP/HTTPS
server.port=6001
#   HTTPS  HTTP
server.http.port=6000
```

- HTTPS dist/conf/application.properties SSL Rest Service Self-Signed keystore

```
#   HTTPS      true
server.ssl.enabled=true
#   keystore
server.ssl.key-store=classpath:tomcat.keystore
# keystore         123456
server.ssl.key-store-password=
# keystore   JKS PKCS12
server.ssl.keyStoreType=JKS
# key
server.ssl.keyAlias=tomcat
```

: Rest Service HTTP/HTTPS IP 6001 HTTPS HTTP

: Postman HTTPS Postman File -> Setting -> General SSL certificate verification CA Postman File -> Setting -> Certificates

: https://hutter.io/2016/02/09/java-create-self-signed-ssl-certificates-for-tomcat/ CA

- `dist/conf/application.properties` WeIdentity RestService API

```
#       admin
default.passphrase=admin
```

- MySQL "dist/conf/weidentity.properties" datasource MySQL

2. Server

2.1 Server /

dist Rest Server

```
#
$ chmod +x start.sh server_status.sh stop.sh
#
$ ./start.sh
#
$ ./server_status.sh
#
$ ./stop.sh
```

`./start.sh` RestServer

```
============================================================
Starting com.webank.weid.http.Application ... [SUCCESS]
============================================================
```

`./server_status.sh` RestServer

```
============================================================
com.webank.weid.http.Application is running(PID=100891)
============================================================
```

`./stop.sh` RestServer

```
============================================================
Stopping com.webank.weid.http.Application ... [SUCCESS]
============================================================
```

3. Postman RestServer API

RestServer HTTP/HTTPS RESTful API API Postman

- Postman Import `weidentity-restservice.postman_environment.json` `invoke.postman_collection.json` GitHub
- **`weidentity-restservice` `host` `httpport`**
  - `host` RestServer
  - `httpport` Server
- Invoke
- Invoke API CreateWeId API WeIdentity DID

RestService

API HTTP/HTTPS WeIdentity

WeIdentity RestService API

RestService API

1.

API json

```
{
    "functionArg": SDK json {
        ...
    },
    "transactionArg": json {
        "invokerWeId": WeIdentity DID
    }
    "functionName": SDK
    "v": API
}
```

- functionArg SDK SDK
- **transactionArg invokerWeId WeIdentity DID**
  – CreateAuthorityIssuer
- functionName SDK WeIdentity Java SDK
- v API

API json

```
{
    "respBody": SDK json {
    }
    "ErrorCode":
    "ErrorMessage": "success"
}
```

result SDK

2. WeIdentity DID

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	createWeId	Y
functionArg		Y
transactionArg		Y
v		Y

:	RestService	WeID	WeID	RestService	WeID

```
{
    "functionArg": {
    },
    "transactionArg": {
    },
    "functionName": "createWeId",
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	WeIdentity DID

```
{
    "ErrorCode": 0,
    "ErrorMessage": "success",
    "respBody": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
}
```

3. WeIdentity DID Document

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	getWeIdDocument	Y
functionArg		Y
functionArg.weId	WeIdentity DID SDK	Y
transactionArg		N
v		Y

```
{
    "functionArg": {
        "weId": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
    },
    "transactionArg": {
    },
    "functionName": "getWeIdDocument",
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	WeIdentity DID Document

```
{
    "respBody": {
        "@context" : "https://w3id.org/did/v1",
        "id" : "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
        "created" : 1553224394993,
        "updated" : 1553224394993,
        "publicKey" : [ ],
        "authentication" : [ ],
        "service" : [ ]
    },
    "ErrorCode": 0,
    "ErrorMessage": "success"
}
```

4. AuthorityIssuer

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	registerAuthorityIssuer	Y
functionArg		Y
functionArg.weId	WeIdentity DID SDK	Y
functionArg.name		Y
transactionArg		Y
transactionArg.invokerWeId	WeIdentity DID application.properties	Y
v		Y

```
{
    "functionArg": {
        "weid": "did:weid:0x1Ae5b88d37327830307ab8da0ec5D8E8692A35D3",
        "name": "Sample College"
    },
    "transactionArg": {
        "invokerWeId": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
    },
    "functionName": "registerAuthorityIssuer",
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	True/False

```
{
    "ErrorCode": 0,
    "ErrorMessage": "success",
    "respBody": True
}
```

5. AuthorityIssuer

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	queryAuthorityIssuer	Y
functionArg		Y
functionArg.weId	WeIdentity DID SDK	Y
transactionArg		N
v		Y

```
{
    "functionArg": {
        "weId": "did:weid:0x1ae5b88d37327830307ab8da0ec5d8e8692a35d3"
    },
    "transactionArg": {
    },
    "functionName": "queryAuthorityIssuer",
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	Authority Issuer

```
{
    "respBody": {
        "accValue": ,
        "created": 16845611984115,
        "name": "Sample College",
        "weid": "did:weid:0x1ae5b88d37327830307ab8da0ec5d8e8692a35d3"
    }
    "ErrorCode": 0
    "ErrorMessage": "success"
}
```

6. CPT

	weid/api/invoke
Method	POST
Content-Type	application/json

:

Key	Value	Required
functionName	registerCpt	Y
functionArg		Y
functionArg.cptJsonSchema	CPT Json Schema SDK	Y
functionArg.weId	CPT	Y
transactionArg		Y
transactionArg.invokerWeId	WeIdentity DID	Y
v		Y

```
CPT Json Schema

 Json Schema    Json    Json     CPT
WeIdentity   http://json-schema.org/draft-04/schema#
```

```
{
  "functionArg": {
      "weId": "did:weid:0x1ae5b88d37327830307ab8da0ec5d8e8692a35d3",
      "cptJsonSchema":{
          "title": "cpt",
          "description": "this is cpt",
          "properties": {
              "name": {
                  "type": "string",
                  "description": "the name of certificate owner"
```

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```
            },
            "gender": {
                "enum": [
                    "F",
                    "M"
                ],
                "type": "string",
                "description": "the gender of certificate owner"
            },
            "age": {
                "type": "number",
                "description": "the age of certificate owner"
            }
        },
        "required": [
            "name",
            "age"
        ]
    }
  },
  "transactionArg": {
      "invokerWeId": "did:weid:0x1ae5b88d37327830307ab8da0ec5d8e8692a35d3"
  }
  "functionName": "registerCpt"
  "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	cptBaseInfo

```
{
    "respBody": {
        "cptId": 2000001,
        "cptVersion": 1
    },
    "ErrorCode": 0,
    "ErrorMessage": "success"
}
```

7. CPT

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	queryCpt	Y
functionArg		Y
functionArg.cptId	CPT ID SDK	Y
transactionArg		N
v		Y

```
{
    "functionArg": {
        "cptId": 10,
    },
    "transactionArg": {
    },
    "functionName": "queryCpt",
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	CPT

```
{
    "respBody": {
        "cptBaseInfo" : {
            "cptId" : 10,
            "cptVersion" : 1
        },
        "cptId" : 10,
        "cptJsonSchema" : {
            "$schema" : "http://json-schema.org/draft-04/schema#",
            "title" : "a CPT schema",
            "type" : "object"
        },
        "cptPublisher" : "did:weid:0x104a58c272e8ebde0c29083552ebe78581322908",
        "cptSignature" : "HJPbDmoi39xgZBGi/
↪aj1zB6VQL5QLyt4qTV6GOvQwzfgUJEZTazKZXe1dRg5aCt8Q44GwNF2k+l1rfhpY1hc/ls=",
        "cptVersion" : 1,
        "created" : 1553503354555,
        "metaData" : {
            "cptPublisher" : "did:weid:0x104a58c272e8ebde0c29083552ebe78581322908",
            "cptSignature" : "HJPbDmoi39xgZBGi/
↪aj1zB6VQL5QLyt4qTV6GOvQwzfgUJEZTazKZXe1dRg5aCt8Q44GwNF2k+l1rfhpY1hc/ls=",
            "created" : 1553503354555,
            "updated" : 0
        },
        "updated" : 0
    },
    "ErrorCode": 0,
    "ErrorMessage": "success"
}
```

8. Credential

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	createCredential	Y
functionArg		Y
functionArg.claim	claim Json SDK	Y
functionArg.cptId	CPT ID	Y
functionArg.issuer	issuer WeIdentity DID	Y
functionArg.expirationDate	UTC	Y
transactionArg		Y
transactionArg.invokerWeId	WeIdentity DID	Y
v		Y

Json signature

```
{
    "functionArg": {
        "cptId": 10,
        "issuer": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
        "expirationDate": "2019-04-18T21:12:33Z",
        "claim": {
            "name": "zhang san",
            "gender": "F",
            "age": 18
        },
    },
    "transactionArg": {
        "invokerWeId": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
    },
    "functionName": "createCredential",
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	Credential

:

```
{
  "respBody": {
      "@context": "https://github.com/WeBankBlockchain/WeIdentity/blob/master/context/v1",
      "claim": {
          "content": "b1016358-cf72-42be-9f4b-a18fca610fca",
          "receiver": "did:weid:101:0x7ed16eca3b0737227bc986dd0f2851f644cf4754",
```

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```
            "weid": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
        },
        "cptId": 2000156,
        "expirationDate": "2100-04-18T21:12:33Z",
        "id": "da6fbdbb-b5fa-4fbe-8b0c-8659da2d181b",
        "issuanceDate": "2020-02-06T22:24:00Z",
        "issuer": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
        "proof": {
            "created": "1580999040000",
            "creator": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
            "signature":
↪"G0XzzLY+MqUAo3xXkS3lxVsgFLnTtvdXM24p+G5hSNNMSIa5vAXYXXKl+Y79CO2ho5DIGPPvSs2hvAixmfIJGbw=",
            "type": "Secp256k1"
        }
    },
    "errorCode": 0,
    "errorMessage": "success"
}
```


9. Credential

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	verifyCredential	Y
functionArg		Y
functionArg.claim	claim Json SDK	Y
functionArg.cptId	CPT ID	Y
functionArg.context	context	Y
functionArg.uuid	Credential UUID	Y
functionArg.issuer	issuer WeIdentity DID	Y
functionArg.issuranceDate		Y
functionArg.expirationDate		Y
functionArg.proof	Credential	Y
transactionArg		N
v		Y


```
{
    "functionArg": {
      "@context": "https://github.com/WeBankBlockchain/WeIdentity/blob/master/context/v1",
      "claim": {
          "content": "b1016358-cf72-42be-9f4b-a18fca610fca",
          "receiver": "did:weid:101:0x7ed16eca3b0737227bc986dd0f2851f644cf4754",
          "weid": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
      },
      "cptId": 2000156,
```


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```
      "expirationDate": "2100-04-18T21:12:33Z",
      "id": "da6fbdbb-b5fa-4fbe-8b0c-8659da2d181b",
      "issuanceDate": "2020-02-06T22:24:00Z",
      "issuer": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
      "proof": {
          "created": "1580999040000",
          "creator": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
          "signature":
↪"G0XzzLY+MqUAo3xXkS3lxVsgFLnTtvdXM24p+G5hSNNMSIa5vAXYXXKl+Y79CO2ho5DIGPPvSs2hvAixmfIJGbw=",
          "type": "Secp256k1"
      }
    },
    "transactionArg": {
    },
    "functionName": "verifyCredential"
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	True/False

```
{
    "respBody": true,
    "ErrorCode": 0,
    "ErrorMessage": "success"
}
```

10. CredentialPojo

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	createCredentialPojo	Y
functionArg		Y
functionArg.claim	claim Json SDK	Y
functionArg.cptId	CPT ID	Y
functionArg.issuer	issuer WeIdentity DID	Y
functionArg.expirationDate	UTC	Y
transactionArg		Y
transactionArg.invokerWeId	WeIdentity DID	Y
v		Y

Json signature

```
{
    "functionArg": {
        "cptId": 10,
        "issuer": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
        "expirationDate": "2019-04-18T21:12:33Z",
        "claim": {
            "name": "zhang san",
            "gender": "F",
            "age": 18
        },
    },
    "transactionArg": {
        "invokerWeId": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
    },
    "functionName": "createCredentialPojo",
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	CredentialPojo

:

```
{
  "respBody": {
      "cptId": 2000156,
      "issuanceDate": 1580996777,
      "context": "https://github.com/WeBankBlockchain/WeIdentity/blob/master/context/v1",
      "claim": {
          "content": "b1016358-cf72-42be-9f4b-a18fca610fca",
          "receiver": "did:weid:101:0x7ed16eca3b0737227bc986dd0f2851f644cf4754",
          "weid": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
      },
      "id": "21d10ab1-75fe-4733-9f1d-f0bad71b5922",
      "proof": {
          "created": 1580996777,
          "creator": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa#keys-0",
          "salt": {
              "content": "ncZ5F",
              "receiver": "L0c40",
              "weid": "I4aop"
          },
          "signatureValue":
↪"HEugP13uDVBg2G0kmmwbTkQXobsrWNqtGQJW6BoHU2Q2VQpwVhK382dArRMFN6BDq7ogozYBRC15QR8ueX5G3t8=",
          "type": "Secp256k1"
      },
      "type": [
          "VerifiableCredential",
          "hashTree"
      ],
      "issuer": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
      "expirationDate": 4111737153
  },
  "errorCode": 0,
  "errorMessage": "success"
}
```

11. CredentialPojo

	weid/api/invoke
Method	POST
Content-Type	application/json

Key	Value	Required
functionName	verifyCredentialPojo	Y
functionArg		Y
functionArg.claim	claim Json SDK	Y
functionArg.cptId	CPT ID	Y
functionArg.context	context	Y
functionArg.uuid	CredentialPojo UUID	Y
functionArg.issuer	issuer WeIdentity DID	Y
functionArg.issuranceDate		Y
functionArg.expirationDate		Y
functionArg.proof	Credential	Y
transactionArg		N
v		Y


```
{
    "functionArg": {
      "cptId": 2000156,
      "issuanceDate": 1580996777,
      "context": "https://github.com/WeBankBlockchain/WeIdentity/blob/master/context/v1",
      "claim": {
          "content": "b1016358-cf72-42be-9f4b-a18fca610fca",
          "receiver": "did:weid:101:0x7ed16eca3b0737227bc986dd0f2851f644cf4754",
          "weid": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
      },
      "id": "21d10ab1-75fe-4733-9f1d-f0bad71b5922",
      "proof": {
          "created": 1580996777,
          "creator": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa#keys-0",
          "salt": {
              "content": "ncZ5F",
              "receiver": "L0c40",
              "weid": "I4aop"
          },
          "signatureValue":
↪"HEugP13uDVBg2G0kmmwbTkQXobsrWNqtGQJW6BoHU2Q2VQpwVhK382dArRMFN6BDq7ogozYBRC15QR8ueX5G3t8=",
          "type": "Secp256k1"
      },
      "type": [
          "VerifiableCredential",
          "hashTree"
      ],
      "issuer": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
      "expirationDate": 4111737153
    },
    "transactionArg": {
```


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( )

```
    },
    "functionName": "verifyCredentialPojo"
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	True/False

```
{
    "respBody": true,
    "ErrorCode": 0,
    "ErrorMessage": "success"
}
```

RestService API

1.

API API json RestService ECDSA sha3

-

	weid/api/encode
Method	POST
Content-Type	application/json

Body

```
{
    "functionArg":  SDK   json  {
        ...
    },
    "transactionArg":   json  {
        "nonce":
    }
    "functionName":  SDK
    "v": API
}
```

- functionArg SDK SDK
- **transactionArg nonce RestService jar getNonce()**
  - nonce
- functionName SDK WeIdentity Java SDK
- v API

json

```
{
    "respBody": {
        "encodedTransaction":  Base64
        "data":
    }
    "ErrorCode":
    "ErrorMessage":      "success"
}
```

encodedTransaction data encodeTransaction Base64 data nonce

:	ECDSA	WeID	Java	SDK	Secp256k1	WeID
Go	ECDSA	R S V	R S 32	V	Secp256k1	0 1

:	R S V	R S V	65	Base64	RestService	RestService	1.	R,	S,
V	65	Base64	WeID	Go	V	0 1	2.	V+27,	R, S	65	Base64	WeID	Java
SDK	V	27 28							

Java Secp256k1 Base64

```
//  web3sdk 2.2.2 weid-java-sdk 1.5
byte[] encodedTransaction = DataToolUtils
        .base64Decode("<encodedTransaction >".getBytes());
    SignatureData clientSignedData = Sign.getSignInterface().
↪signMessage(encodedTransactionClient, ecKeyPair);
    String base64SignedMsg = new String(
        DataToolUtils.base64Encode(TransactionEncoderUtilV2.
↪simpleSignatureSerialization(clientSignedData)));
```

-

	weid/api/transact
Method	POST
Content-Type	application/json

```
{
    "functionArg":  {
    },
    "transactionArg":   json   {
        "nonce":
        "data":
        "signedMessage":  Base64       encodedTransaction
    }
    "functionName":  SDK
    "v": API
}
```

RestService

- functionArg
- transactionArg nonce data Base64 encodedTransaction

- functionName SDK WeIdentity Java SDK
- v API

json

```
{
    "respBody":  SDK    json  {
    }
    "ErrorCode":
    "ErrorMessage":     "success"
}
```

result SDK API

2. WeIdentity DID

POST /weid/api/encode

Key	Value	Required
functionName	createWeId	Y
functionArg		Y
functionArg.publicKey	ECDSA 10	Y
transactionArg		Y
transactionArg.nonce		Y
v		Y

POST /weid/api/encode

```
{
    "functionArg": {
        "publicKey": "712679236821355231513532168231727831978932132185632517152735621683128"
    },
    "transactionArg": {
        "nonce": "14748006010113073655061213045763474795086534999894243464083438556158221460 39"
    },
    "functionName": "createWeId",
    "v": "1.0.0"
}
```

POST /weid/api/transact

```
{
    "functionArg": {},
    "transactionArg": {
        "nonce": "14748006010113073655061213045763474795086534999894243464083438556158221460 39
↪",
        "data": "809812638256c1235b1231000e000000001231287bacf213c",
        "signedMessage":
↪"HEugP13uDVBg2GOkmmwbTkQXobsrWNqtGQJW6BoHU2Q2VQpwVhK382dArRMFN6BDq7ogozYBRC15QR8ueX5G3t8="
    },
    "functionName": "createWeId",
    "v": "1.0.0"
}
```

Key	Value
ErrorCode	0
ErrorMessage	
respBody	WeIdentity DID

```
{
    "ErrorCode": 0,
    "ErrorMessage": "success",
    "respBody": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
}
```

3. Authority Issuer

POST /weid/api/encode

Key	Value	Required
functionName	registerAuthorityIssuer	Y
functionArg		Y
functionArg.name		Y
functionArg.weId	WeIdentity DID SDK	Y
transactionArg		Y
transactionArg.nonce		Y
v		Y

POST /weid/api/encode

```
{
    "functionArg": {
        "name": "BV-College",
        "weId": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
    },
    "transactionArg": {
        "nonce": "147480060101130736550612130457634747950865349998942434640834385561582214603 9"
    },
    "functionName": "registerAuthorityIssuer",
    "v": "1.0.0"
}
```

POST /weid/api/transact

```
{
    "functionArg": {},
    "transactionArg": {
        "nonce": "147480060101130736550612130457634747950865349998942434640834385561582214603
↪9",
        "data": "809812638256c1235b1231000e000000001231287bacf213c",
        "signedMessage":
↪"HEugP13uDVBg2GOkmmwbTkQXobsrWNqtGQJW6BoHU2Q2VQpwVhK382dArRMFN6BDq7ogozYBRC15QR8ueX5G3t8="
    },
    "functionName": "registerAuthorityIssuer",
    "v": "1.0.0"
}
```

Key	Value
ErrorCode	0
ErrorMessage	
respBody	Authority Isser


```
{
    "ErrorCode": 0,
    "ErrorMessage": "success",
    "respBody": {
        "accValue": ,
        "created": "1581420650",
        "name": "BV-College",
        "weId": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
    }
}
```


4. CPT

POST /weid/api/encode

Key	Value	Required
functionName	registerCpt	Y
functionArg		Y
functionArg.cptJsonSchema	CPT Json Schema SDK	Y
functionArg.weId	CPT	Y
functionArg.cptSignature	cptJsonSchema	Y
transactionArg		Y
transactionArg.nonce		Y
v		Y

POST /weid/api/encode


```
{
    "functionArg": {
        "weId": "did:weid:0x1ae5b88d37327830307ab8da0ec5d8e8692a35d3",
        "cptJsonSchema": {
            "title": "cpt",
            "description": "this is cpt",
            "properties": {
                "name": {
                    "type": "string",
                    "description": "the name of certificate owner"
                },
                "gender": {
                    "enum": [
                        "F",
                        "M"
                    ],
                    "type": "string",
                    "description": "the gender of certificate owner"
                },
                "age": {
                    "type": "number",
                    "description": "the age of certificate owner"
                }
```


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```
            },
            "required": [
                "name",
                "age"
            ]
        }
        "cptSignature":
↪"BaUeP13uDVBg2G0kmmwbTkQXobsrWNqtGQJW6BoHU2Q2VQpwVhK382dArRMFN6BDq7ogozYBRC15QR8ueX5G3t8="
    },
    "transactionArg": {
        "nonce": "14748006010113073655061213045763474795086534999894243464083438556158221460 39"
    },
    "functionName": "registerCpt",
    "v": "1.0.0"
}
```

POST /weid/api/transact

```
{
    "functionArg": {},
    "transactionArg": {
        "nonce": "14748006010113073655061213045763474795086534999894243464083438556158221460 39
↪",
        "data": "809812638256c1235b1231000e000000001231287bacf213c",
        "signedMessage":
↪"HEugP13uDVBg2G0kmmwbTkQXobsrWNqtGQJW6BoHU2Q2VQpwVhK382dArRMFN6BDq7ogozYBRC15QR8ueX5G3t8="
    },
    "functionName": "registerAuthorityIssuer",
    "v": "1.0.0"
}
```

Key	Value
ErrorCode	0
ErrorMessage	
respBody	Authority Isser

```
{
    "ErrorCode": 0,
    "ErrorMessage": "success",
    "respBody": {
        "cptId": 2000001,
        "cptVersion": 1
    }
}
```

5. CredentialPojo

CredentialPojo POST /weid/api/encode

POST /weid/api/encode

Key	Value	Required
functionName	createCredentialPojo	Y
functionArg		Y
functionArg.claim	claim Json SDK	Y
functionArg.cptId	CPT ID	Y
functionArg.issuer	issuer WeIdentity DID	Y
functionArg.expirationDate	UTC	Y
transactionArg		Y
v		Y

Json signature

```
{
    "functionArg": {
        "cptId": 10,
        "issuer": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
        "expirationDate": "2019-04-18T21:12:33Z",
        "claim": {
            "name": "zhang san",
            "gender": "F",
            "age": 18
        },
    },
    "transactionArg": {
    },
    "functionName": "createCredentialPojo",
    "v": "1.0.0"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	CredentialPojo

:

```
{
  "respBody": {
      "cptId": 2000156,
      "issuanceDate": 1580996777,
      "context": "https://github.com/WeBankBlockchain/WeIdentity/blob/master/context/v1",
      "claim": {
          "content": "b1016358-cf72-42be-9f4b-a18fca610fca",
          "receiver": "did:weid:101:0x7ed16eca3b0737227bc986dd0f2851f644cf4754",
          "weid": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa"
      },
      "id": "21d10ab1-75fe-4733-9f1d-f0bad71b5922",
      "proof": {
          "created": 1580996777,
          "creator": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa#keys-0",
          "salt": {
              "content": "ncZ5F",
              "receiver": "L0c40",
              "weid": "I4aop"
          },
          "signatureValue": "HJPbDmoi39xgZBGi/
↪aj1zB6VQL5QLyt4qTV6GOvQwzfgUJEZTazKZXe1dRg5aCt8Q44GwNF2k+l1rfhpY1hc/ls=",
```

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( )

```
            "type": "Secp256k1"
        },
        "type": [
            "VerifiableCredential",
            "hashTree"
        ],
        "issuer": "did:weid:101:0xfd28ad212a2de77fee518b4914b8579a40c601fa",
        "expirationDate": 4111737153
    },
    "errorCode": 0,
    "errorMessage": "success"
}
```

CredentialPojo proof signatureValue - base64 - byte[] secp256k1 hash - hash byte[] hash Java web3sdk SignMessage() - r s v - - byte base64 RestService

ECDSA Base64 Java Go

```
String signature = DataToolUtils.sign(new String(DataToolUtils.base64Decode(signatureValue)),␣
↪privateKey);
```

```
base64SignatureValue := credentialEncodeResponse.RespBody.Proof.SignatureValue
signatureValue, err3 := base64.StdEncoding.DecodeString(base64SignatureValue)
hashedMsg := Hash(signatureValue)
doubleHashedMsg := Hash(hashedMsg)
privateKeyBytes := ConvertPrivateKeyBigIntToPrivateKeyBytes(privateKeyBigInt)
signatureBytes, err4 := SignSignature(doubleHashedMsg, privateKeyBytes)
signatureBase64String := base64.StdEncoding.EncodeToString(signatureBytes)
```

Weldentity Endpoint Service API

1. Endpoint

	weid/api/endpoint
Method	GET
Content-Type	application/json

```
{
    "ErrorCode": 0,
    "ErrorMessage": "success",
    "respBody": [
        {
            "requestName": "create-passphrase",
            "inAddr": [
                "127.0.0.1:6010",
                "127.0.0.1:6011"
            ],
            "description": "Create a valid random passphrase"
        },
```

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```
        {
            "requestName": "verify-passphrase",
            "inAddr": [
                "127.0.0.1:6012",
                "127.0.0.1:6013"
            ],
            "description": "Verify a passphrase"
        }
    ]
}
```

2. Endpoint

	weid/api/endpoint/{endpoint}
Method	POST
Content-Type	application/json

Key	Value	Required
/{endpoint}	API API String	Y
body	“‘ API	Y

```
{
    "body": "did:weid:0xfd28ad212a2de77fee518b4914b8579a40c601fa```25"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	SDK String

```
{
    "ErrorCode": 0,
    "ErrorMessage": "success",
    "respBody": "did:weid:0x1Ae5b88d37327830307ab8da0ec5D8E8692A35D3",
}
```

Weldentity API

	weid/api/authorize/fetch-data
Method	POST
Content-Type	application/json

Key	Value	Required
authToken	CPT101 DataToolUtils.serialize()	Y
signedNonce	Nonce	Y

```
{
  "authToken": {
      "claim": {
          "duration": 360000,
          "fromWeId": "did:weid:101:0x69cd071e4be5fd878e1519ff476563dc2f4c6168",
          "resourceId": "4b077c17-9612-42ee-9e36-3a3d46b27e81",
          "serviceUrl": "http://127.0.0.1:6010/fetch-data",
          "toWeId": "did:weid:101:0x68bedb2cbe55b4c8e3473faa63f121c278f6dba9"
      },
      "context": "https://github.com/WeBankBlockchain/WeIdentity/blob/master/context/v1",
      "cptId": 101,
      "expirationDate": 1581347039,
      "id": "48b75424-9411-4d22-b925-4e730b445a31",
      "issuanceDate": 1580987039,
      "issuer": "did:weid:101:0x69cd071e4be5fd878e1519ff476563dc2f4c6168",
      "proof": {
          "created": 1580987039,
          "creator": "did:weid:101:0x69cd071e4be5fd878e1519ff476563dc2f4c6168#keys-0",
          "salt": {
              "duration": "fmk5A",
              "fromWeId": "DEvFy",
              "resourceId": "ugVeN",
              "serviceUrl": "nVdeE",
              "toWeId": "93Z1E"
          },
          "signatureValue":
↪"HCZwyTzGst87cjCDaUEzPrO8QRlsPvCYXvRTUVBUTDKRSoGDgu4h4HLrMZ+emDacRnmQ/yke38u1jBnilNnCh6c=",
          "type": "Secp256k1"
      },
      "type": ["VerifiableCredential", "hashTree"]
  },
  "signedNonce": "123123"
}
```

: application/json

Key	Value
ErrorCode	0
ErrorMessage	
respBody	SDK String

```
{
    "ErrorCode": 0,
```

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( )

```
    "ErrorMessage": "success",
    "respBody": "sample data",
}
```

RestService

RestService GitHub RestService

WeIdentity RestService

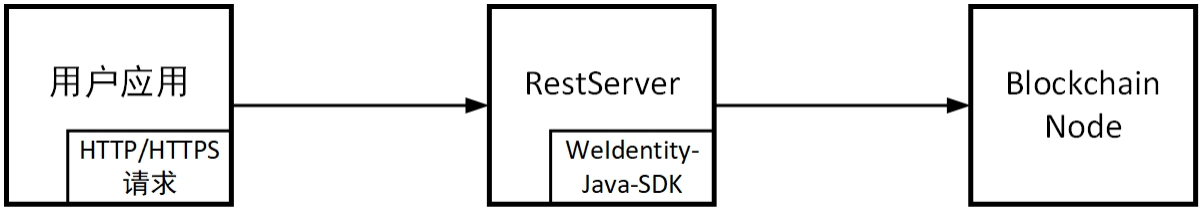
1.

RestService

- RestService WeIdentity “ ” RestService
- Java SDK HTTP RestService SDK HTTP WeIdentity
- RestService API

2. RestService

2.1



RestService

- app HTTP
- rest-server Server
- weid-java-sdk WeIdentity SDK jar

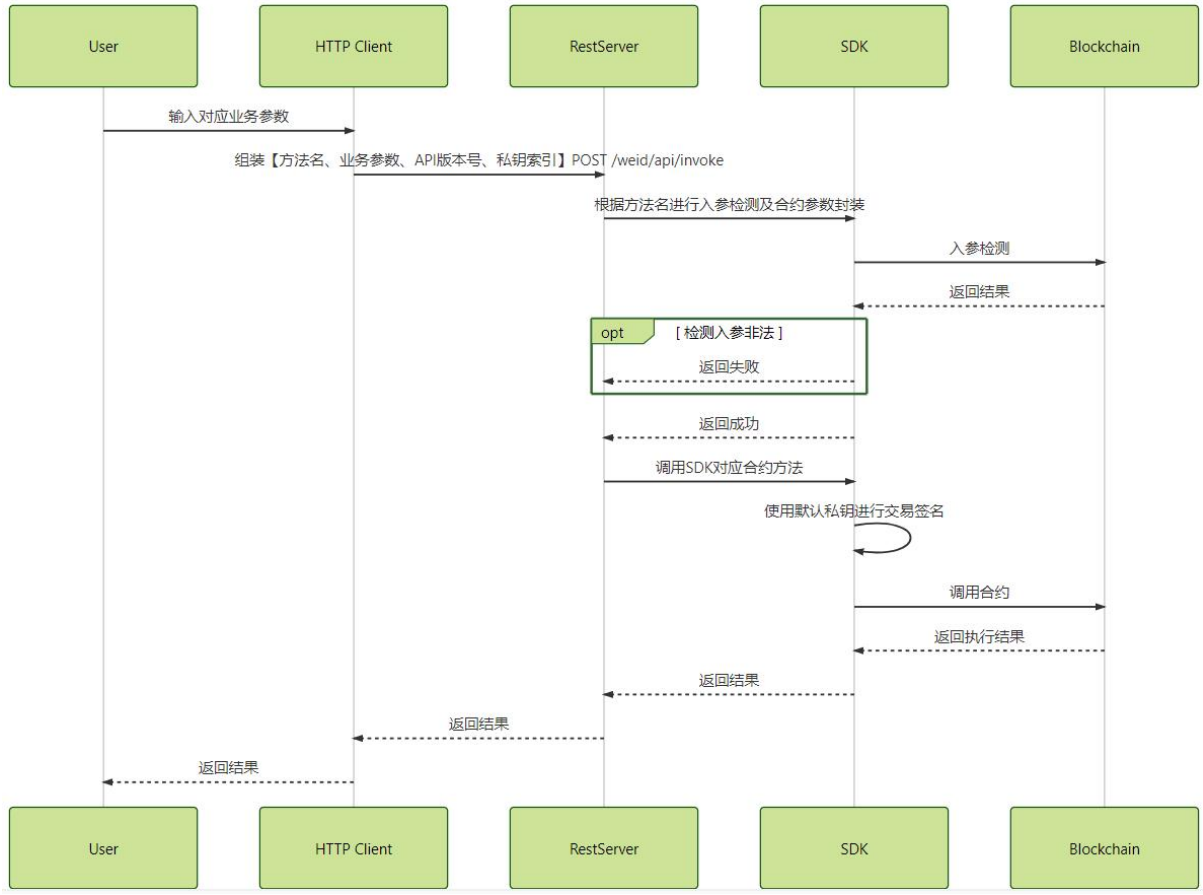
2.2

- RESTful RestService sdk

- POST /weid/api/encode RestService
- RestService
- ECDSA sha3 POST /weid/api/transact RestService
- RestService

- POST /weid/api/invoke RestService
- RestService weid-java-sdk

3.



- API POST /weid/api/invoke
- Server SDK Server SDK

WeIdentity Endpoint Service

Java HTTP/HTTPS RPC Endpoint

WeIdentity Endpoint WeIdentity RestService Java WeIdentity Java SDK Endpoint RestService API

Endpoint Service

Endpoint Service

WeIdentity Endpoint Service

RPC WeIdentity Endpoint Service RestService Java SDK

HTTP/HTTPS Endpoint Endpoint Endpoint Service

1. RestService

Endpoint Service Rest Service Rest Service

`dist/conf` `application.properties` `server.hostport.list` Rest Service IP Endpoint Service `fetch.period.seconds` Endpoint

```
#     Endpoint
fetch.period.seconds=60
#
server.hostport.list=127.0.0.1:6010,127.0.0.2:6011
```

2. Java SDK Endpoint

Rest Service Endpoint Java SDK Endpoint Java-SDK

- **Endpoint** `EndpointFunctor` `execute()` `getDescription()`
  - `execute()` RPC
  - `getDescription()`
- `registerEndpoint()` EndpointHandler Endpoint
- Endpoint Endpoint
- Endpoint
- Endpoint `RpcServer` `main()`

  EndpointSample.java

3.

Endpoint Service WeIdentity-Java-SDK Java-SDK

`src/main/resources` `weidentity.properties` `rpc.listener.port`

```
# RPC
rpc.listener.port=6010
```

Endpoint `EndpointSample.java`

```
java -cp <$your class path> com.webank.weid.suite.endpoint.EndpointSample
```

IDE RPC Server

```
Trying to receive incoming traffic at Port: 6010
```

4. Endpoint

Endpoint 60 Endpoint

REST API “WeIdentity Endpoint Service API” Endpoint

Endpoint Service

RestService API Endpoint Service API Endpoint

Endpoint Service

WeIdentity Endpoint Service Credential Endpoint Service

CPT ID 101 Claim

- fromWeId WeID Issuer
- toWeId WeID
- duration
- serviceUrl HTTP/HTTPS URL https://127.0.0.1:6010/data-auth/guest
- ID resourceId ID UUID

CPT101 ID Endpoint Service serviceUrl Endpoint Service RPC ID API

- **Endpoint Service RPC** **smart-socket 1.4.2** **Java AIO**
  - Endpoint Service RPC
  - Endpoint Service
- Endpoint Service 1:N Endpoint Endpoint

WeIdentity

WeIdentity

WeIdentity Solidity Solidity Booleans Integers Address Bytes Enum) Struct Mapping Array BCOS

WeIdentity

- **WeIdentity DID** ID DID Distributed IDentity DID Document DID
- **WeIdentity Authority** DID

WeIdentity DID

DID DID Document DID Document

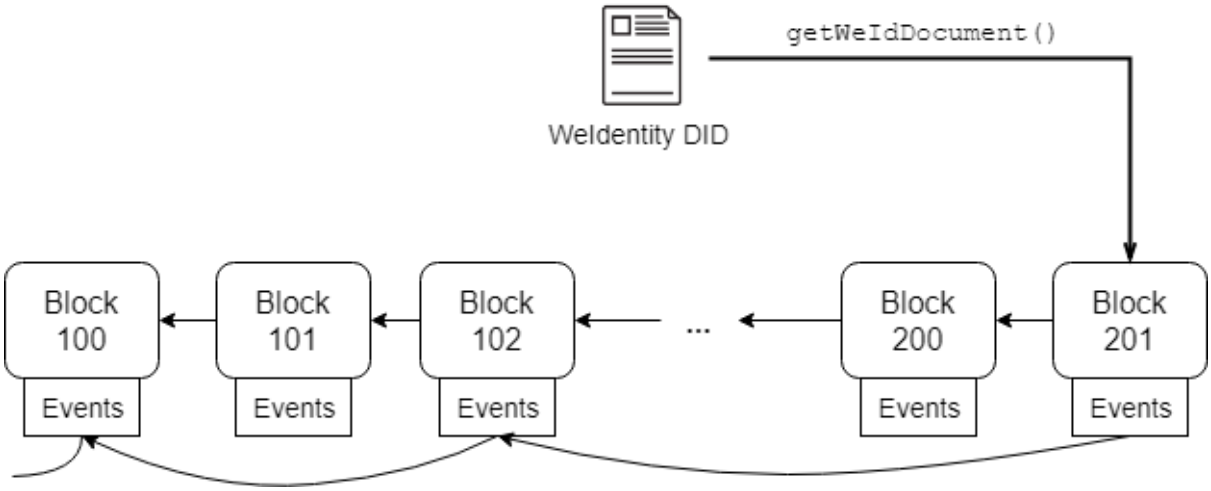
- DID
- DID Document

WeIdentity Linked Event

Linked Event Solidity Event DID Document Solidity Event Event log DID Event DID Document Event

- DID DID
- DID
- DID

- DID Document
- Event
- DID Document Event Document



Linked Event

- Solidity Event DID Document
-
- O(N) Document WeIdentity DID WeIdentity

WeIdentity Authority

Authority WeIdentity

- DID

Authority Issuer CPT DID Authority Issuer Committee Authority Issuer WeIdentity —

-

WeIdentity

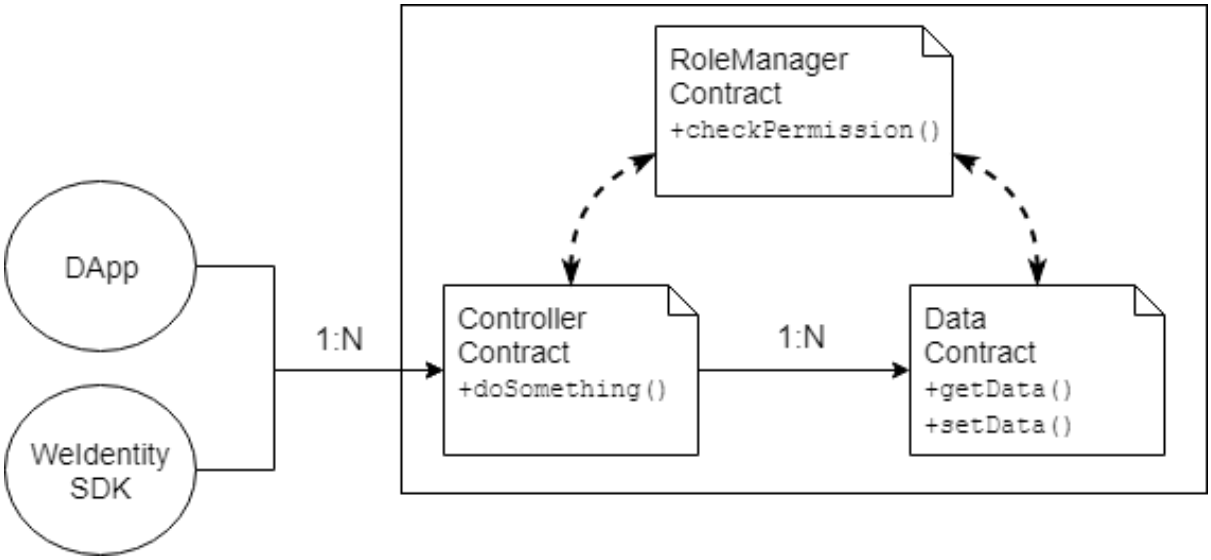
ds-auth OpenZepplin Role WeIdentity Authority

WeIdentity

- DID WeIdentity ID
- Authority Issuer CPT
- Committee Member Authority Issuer
- Administrator Committee Member Authority Issuer

WeIdentity

-
-
-



WeIdentity

- SDK DApp SDK
-

WeIdentity RoleManager WeIdentity

-
- checkPermission()
-
- WeIdentity checkPermission()

- WeIdentity

WeIdentity

- WeIdentity ds-auth OpenZepplin Role
- tx.origin msg.sender DID msg.sender WeIdentity DID DID

Specific Issuer Issuer

WeIdentity Authority Issuer Specific Issuer Authority Issuer

WeIdentity Evidence

WeIdentity DID + Evidence Hash

WeIdentity SDK 1.5.2+ Evidence WeID Linked-Event hash log log

- Hash
- createEvidence
- addLog
- log
-
-

WeIdentity CPT

WeIdentity CPT Claim Protocol Type Claim CPT - CPT jsonSchema jsonSchema Clai

CPT ID 1~1000 CPT 1000~2000000 CPT 2000000 CPT

CPT

CPT ID 1~1000 WeIdentity CPT WeIdentity WeIdentity CPT

CPT

CPT

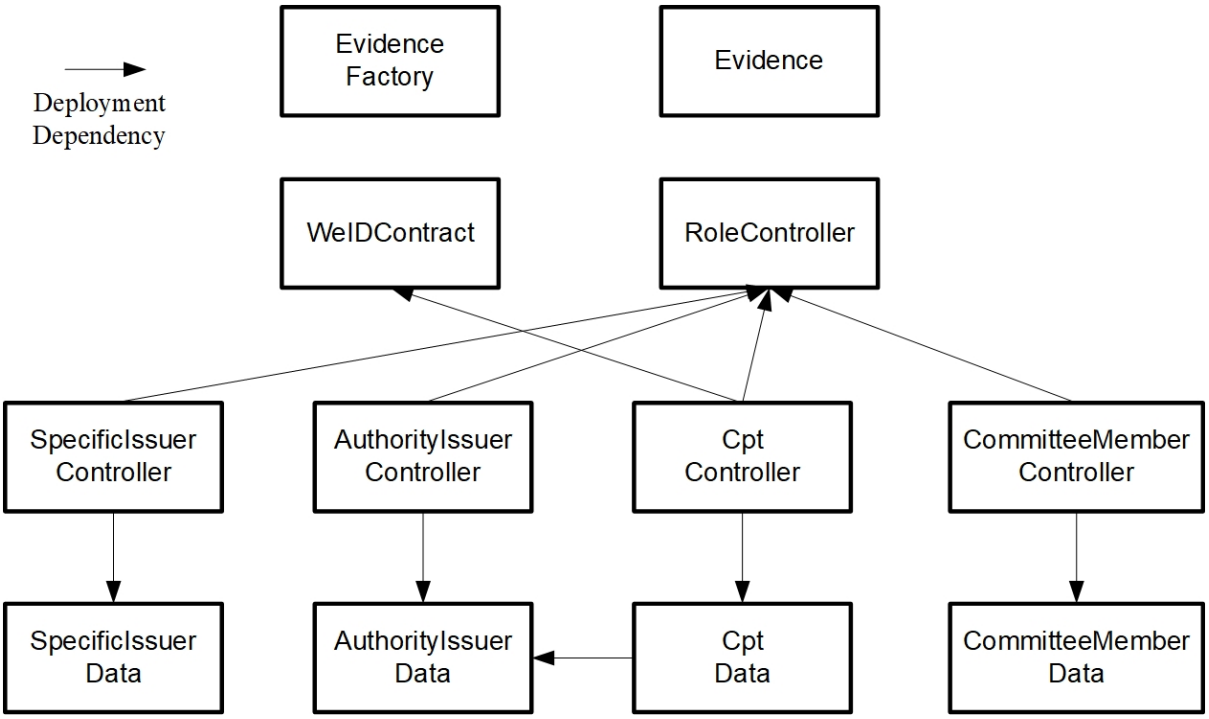
CPT

CPT ID 1000~2000000 Authority CPT Authority Issuer

CPT

CPT ID 2000000 WeID CPT

WeIdentity



-

WeIdentity Java SDK

- WeIdentity Java SDK : “ ”
-

WeIdentity

WeIdentity

- WeIdentity
- WeIdentity WeIdentity Java SDK

1.

```
cd weid-build-tools
vim run.config
```

- IP Channel

: Channel FISCO BCOS 2.0

```
blockchain_address=10.10.10.10:20200
```

-

```
blockchain_address=10.10.10.10:20200,10.10.10.11:20200
```

- AMOP test

```
org_id=test
```

- chain-id chain-id 1

```
chain_id=1
```

- SDK

```
mysql_address=0.0.0.0:3306
mysql_database=database
mysql_username=username
mysql_password=password
```

: FISCO-BCOS 2.x WeIdentity WeIdentity

2.

```
cd resources/
```

FISCO BCOS 2.0 2.0 web3sdk `ca.crt node.crt node.key`

3.

-

:

`run.config`

```
cd ..
chmod +x compile.sh
./compile.sh
```

- deploy.sh WeIdentity

```
chmod +x deploy.sh
./deploy.sh
```

```
contract is deployed with success.
=========================================.
weid contract address is 0x4ba81103afbd5fc203db14322c3a48cd1abb7770
cpt contract address is 0xb1f3f13f772f3fc04b27ad8c377def5bc0c94200
authority issuer contract address is 0xabb97b3042d0f50b87eef3c49ffc8447560faf76
evidence contract address is 0x8cc0de880394cbde18ca17f6ce2cf7af5c51891e
specificIssuer contract address is 0xca5fe4a67da7e25a24d76d24efbf955c475ab9ca
=========================================.
```

：

WeIdentity Committee Member

WeIdentity `weid-build-tools/output/admin` `ecdsa_key` `ecdsa_key.pub` hash

weid-java-sdk Java

： WeIdentity

WeIdentity JAVA SDK

	CentOS 7.2.* 64 Ubuntu 16.04 64
FISCO-BCOS	FISCO-BCOS FISCO-BCOS 2.0
JDK	JDK1.8+ jdk8u141 JDK WeID
	WeIdentity JAVA SDK telnet FISCO BCOS channel channel telnet

： oracle jdk1.8.0.231 SDK jvm -Djdk.tls.namedGroups="secp256k1" Oracle JDK 8u231 Release Notes https://www.oracle.com/technetwork/java/javase/8u231-relnotes-5592812.html

1.

： openjdk13 build.gradle spotbugs build.gradle spotbugs

-

```
git clone https://github.com/WeBankBlockchain/WeIdentity.git
```

```
git clone https://gitee.com/WeBank/WeIdentity.git
```

WeIdentity Java SDK WeIdentity JAVA SDK

- WeIdentity

```
cd WeIdentity
chmod u+x ./gradlew
./gradlew build -x test
```

: xx SpotBugs violations were found

-

```
cd src/main/resources/
```

FISCO BCOS 2.0, 2.0 web3sdk ca.crt node.crt node.key

-

```
cd ../../../build-tools/bin/
vim run.config
```

run.config .

-

blockchain_address IP channel channel FISCO BCOS 2.0
amop_id
org_id
chain_id , 101
persistence_type , mysql
mysql_address ip port 0.0.0.0:3306
mysql_database
mysql_username
mysql_password
cns_profile_active , WeIdentity

```
#     IP 10.10.10.10 channel  20200
blockchain_address=10.10.10.10:20200

#
amop_id=organizationA

#
org_id=organizationA

#
chain_id=101

#
persistence_type=mysql

#  ip port
mysql_address=0.0.0.0:3306

#
mysql_database=database

#
mysql_username=username

#
```

(continues on next page)

( )

```
mysql_password=password

#
cns_profile_active=prdA
```

: Gradle 6.0+ build.gradle spotbug Gradle 2.0.0+ WeIdentity/build.gradle “classpath “gradle.plugin.com.github.spotbugs:spotbugs-gradle-plugin:1.6.5”” 1.6.5 2.0.0

: FISCO-BCOS 2.x WeIdentity WeIdentity

2.

```
chmod +x run.sh
./run.sh
```

```
contract deployment done.
begin to modify sdk config...
modify sdk config finished...
begin to clean config...
clean finished...
```

weid-java-sdk WeIdentity Java

: 160016 - no premission for this cns. (run.config) cns_profile_active , cns_profile_active=test456

Have fun!!!

WeIdentity JAVA SDK

- dist

```
cd ../../dist/
ls
```

dist `app conf lib`

app	weid-java-sdk jar
conf	weid-java-sdk Java weid-java-sdk Java classpath
lib	jar

-

```
cd ../
ls
```

`ecdsa_key` weid-java-sdk Java weid-java-sdk

SDK SDK WeIdentity

WeIdentity JAVA SDK

WeIdentity JAVA SDK

WeIdentity JAVA SDK WeIdentity JAVA SDK WeIdentity JAVA SDK

WeIdentity DID Authority Issuer CPT CPT presentation policy

1 WeIdentity DID

WeIdentity DID

```
cd ../tools
chmod +x create_weid.sh
./create_weid.sh
```

```
New weid has been created ----> did:weid:1:0x405a7ae297fc6d6fb02fb548db64b29f08114ca1
The related private key and public key can be found at /home/app/tonychen/test_gradle/weid-
↪build-tools/output/create_weid/xxx/0x405a7ae297fc6d6fb02fb548db64b29f08114ca1.
```

`WeID` did:weid:1:0x405a7ae297fc6d6fb02fb548db64b29f08114ca1

`weid-build-tools/output/create_weid/xxx` 0x WeIdentity DID WeIdentity DID `ecdsa_key.pub` `ecdsa_key`

: xxx CNS

2 Authority Issuer ( )

: Committee Member Committee Member WeIdentity DID Committee Member Authority Issuer

- Authority Issuer

Authority Issuer WeIdentity DID did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb test

```
chmod +x register_authority_issuer.sh
./register_authority_issuer.sh --org-id test --weid␣
↪did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb
```

(continues on next page)

( )

```
Registering authorityissuer ---> did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb, name␣
↪is :test
Execute succeed.
```

- Authority Issuer

  Authority Issuer did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb

```
./register_authority_issuer.sh --remove-issuer␣
↪did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb
```

```
Removing authority issuer ---> did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb...
Execute succeed.
```

3 Specific Issuer( )

:	Committee Member	WeIdentity DID	Specific Issuer

-

  WeIdentity DID did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb college

```
chmod +x register_specific_issuer.sh
./register_specific_issuer.sh --type college --weid␣
↪did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb
```

```
[RegisterIssuer] Adding WeIdentity DID did:weid:1:0xe10e52f6b7c6751bd03afc023b8e617d7fd0429c␣
↪in type: college
Specific issuers and types have been successfully registered on blockchain.
```

WeIdentity DID

```
./register_specific_issuer.sh --type college --weid␣
↪did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb,
↪did:weid:0x6efd256d02c1a27675de085b86989fa2ac1baddb
```

-

  college WeID did:weid:1:0x6efd256d02c1a27675de085b86989fa2ac1baddb Specific Issuer

```
./register_specific_issuer.sh --type college --remove-issuer␣
↪did:weid:1:0x6efd256d02c1a27675de085b86989fa2ac1baddb
```

4 CPT

CPT

WeIdentity DID *1* CPT WeID

: test_data/single/ CPT CPT

```
chmod +x register_cpt.sh
./register_cpt.sh --cpt-dir test_data/single/ --weid␣
↪did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb
```

```
[RegisterCpt] register cpt file:JsonSchema.json result ---> success. cpt id ---> 1000
[RegisterCpt] register cpt file:JsonSchema.json with success.
Execute succeed.
```

WeIdentity DID WeID did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb /home/test/private_key/ecdsa_key

```
./register_cpt.sh --cpt-dir test_data/single/ --weid␣
↪did:weid:1:0x5efd256d02c1a27675de085b86989fa2ac1baddb --private-key /home/test/private_key/
↪ecdsa_key
```

```
[RegisterCpt] register cpt file:JsonSchema.json result ---> success. cpt id ---> 1000
[RegisterCpt] register cpt file:JsonSchema.json with success.
Execute succeed.
```

5 CPT presentation policy

: CPT POJO presentation policy

CPT id 1000 CPT CPT 1000 presentation policy

```
chmod +x cpt_to_pojo.sh
./cpt_to_pojo.sh --cpt-list 1000
```

```
Begin to generate pojo from cpt...
All cpt:[1000] are successfully transformed to pojo.

The weidentity-cpt.jar can be found in /home/app/tonychen/test_gradle/weid-build-tools/output/
↪pojo/0x8ce1fc7af86917b503d7d5aaa2987a33ccf97f767199a360712fee667a54ef80/
↪d8acebb597d0428fac682ad188e4312d/weidentity-cpt.jar
Begin to generate presentation policy ...
Presentation policy template is successfully generated, you can find it at /home/app/tonychen/
↪test_gradle/weid-build-tools/output/presentation_policy.
```

CPT POJO jar /home/app/tonychen/test_gradle/weid-build-tools/output/pojo/xxx/ presentation policy /home/app/tonychen/test_gradle/weid-build-tools/output/presentation_policy

: xxx CNS