IEDCS: Identity Enabled Distribution Control System

Security 2015/2016
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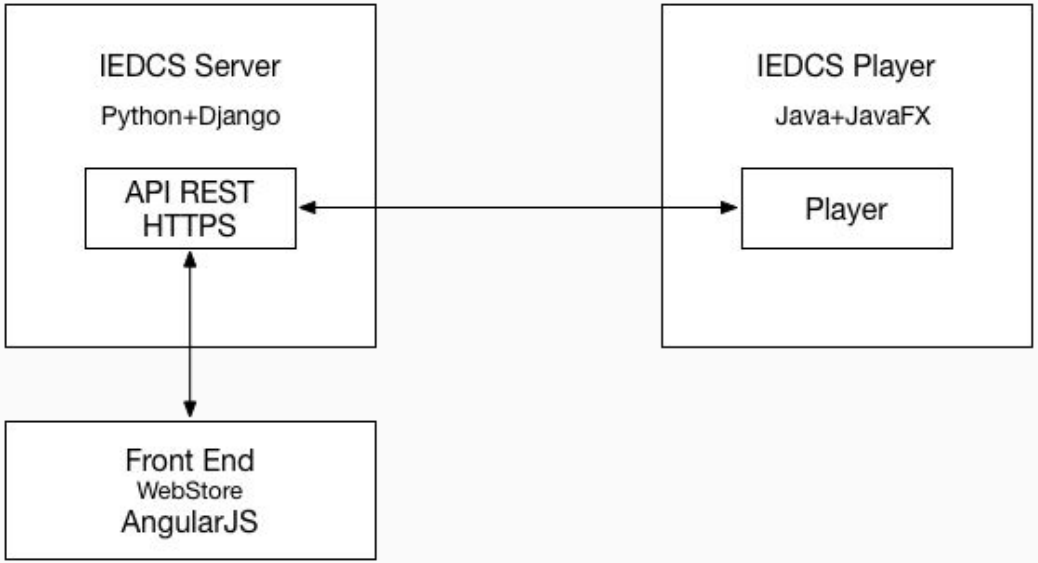
20/10/2015

System Arquitecture



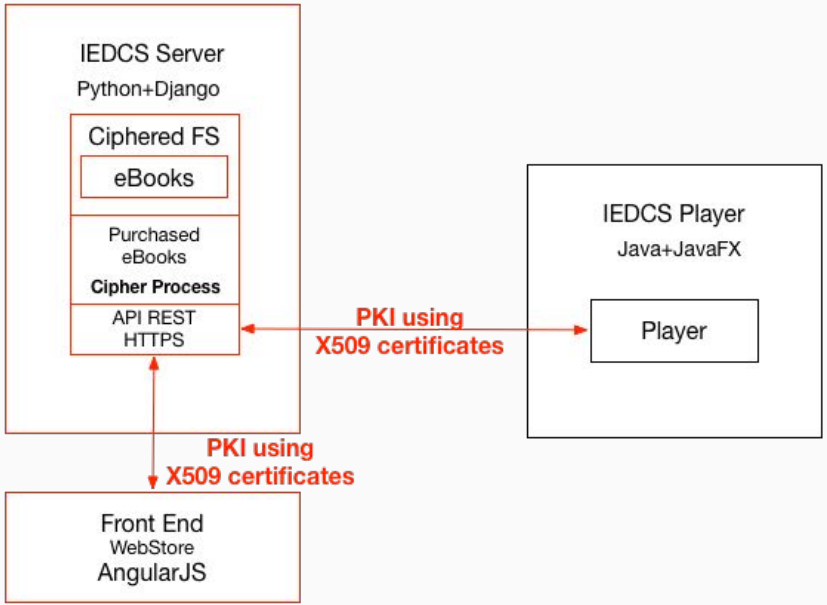
Technologies:

- **Python+Django**
- **Java+JavaFX**
- **AngularJS**

Communication channels:

- **API REST**
- **PKI with X509**
- **HTTPS**

IEDCS Server



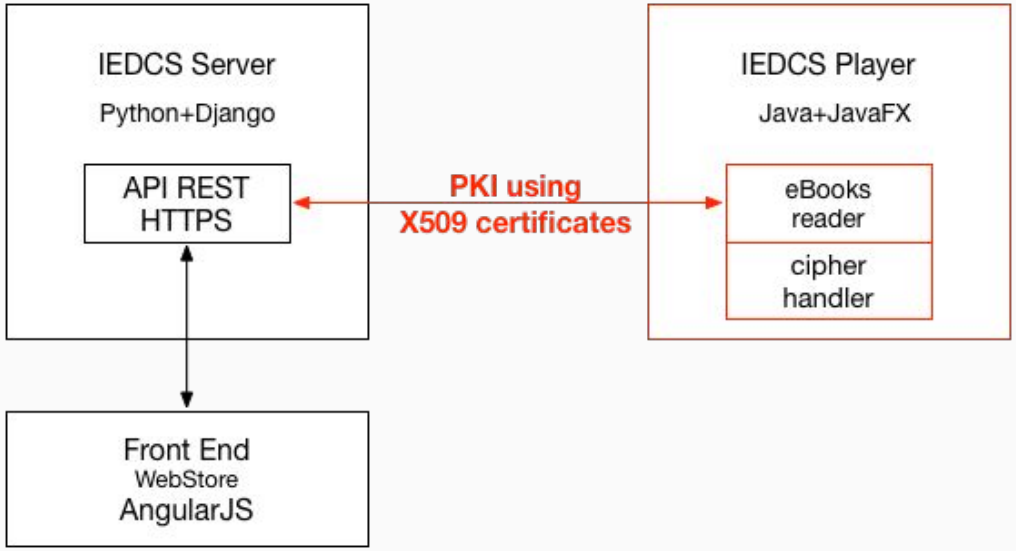
Responsabilities:

- **Store eBooks in the FS**
- **Manage all the connections with Player and FrontEnd**
- **Authenticate users**
- **Control node**

Security measures:

- **Cipher process for the eBook purchased and stock eBooks.**
- **SQL Injections, Buffer Overflows and XSS Attacks + Cross-site request forgery**
- **Authorization and authentication process**

IEDCS Player



Responsabilities:

- **Read ciphered eBooks**
- **Handle cipher process to get eBook content one page at the time** *(Random Access Stream cipher)*
- **Don’t store eBook content**

Security measures:

- **Cipher process for the eBook purchased and stock eBooks.**
- **Buffer Overflows**
- **Check player intigrity with JAR File Signature or Cyclic redundancy check (CRC)**
- **Generate Device key and send it to IEDCS Server**

Use cases

When the player is installed

IEDCS Server:

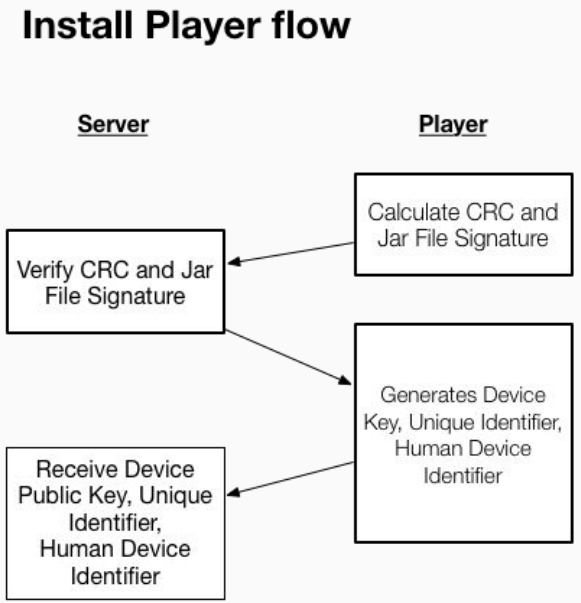
- **Receive** Device Public Key, Unique Idenfier and human device identifier

IEDCS Player:

- **Generates an assymetric device key**
- **Genarates an unique identifier**
  - Ethernet MAC addresses, devices present, CPU, serial numbers of the mother board
- **Send one human device identifier and the device key + unique identifier**

Security measures:

- **Check the integrity of the Player with one exchange by the player to the server with the CRC and Jar File Signature**



Use cases

When an user buy a book

IEDCS Server:

- **Cipher and store the book with cipher process**
- **Generates a File key**

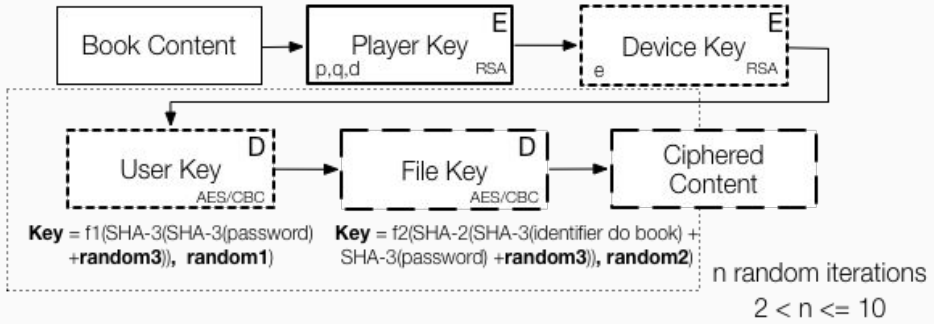
Security measures:

- **Cipher process for the eBook purchased**
- **Store some cryptography information in the database with a cipher process**
- **n = (random3 mod nº max it)**

Token generated:

- **File identifiers**
- ***Crypto tokens:***
  - **random3** *(will be sent when the player initiate the challange)*

Book content cipher process



f1(bit[] array_secret, bit[] valor_aleatorio):
-> p = array_secret + valor_aleatorio
-> p = p << 1
-> p = p mod valor_aleatorio

f2(bit[] array_secret, bit[] valor_aleatorio):
-> p = array_secret mod valor_aleatorio
-> p = p + 3
-> p = p >> 1

Note: The server and the player knows: SHA-3(password)

e = encrypt, d = decrypt

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this will be used for store some random numbers...

User crypto information

When an user buys a book..

f1(SHA-3(password), user_email):
-> p = SHA-2(SHA-3(password)<<6 + SHA-3(user_email)[first two bytes])
-> p = p << 1
-> return p

PBKDF2

f2(content, key):
-> AES/CBC(content, key)

f2(content, f1(SHA-3(password), user_email))

Use cases

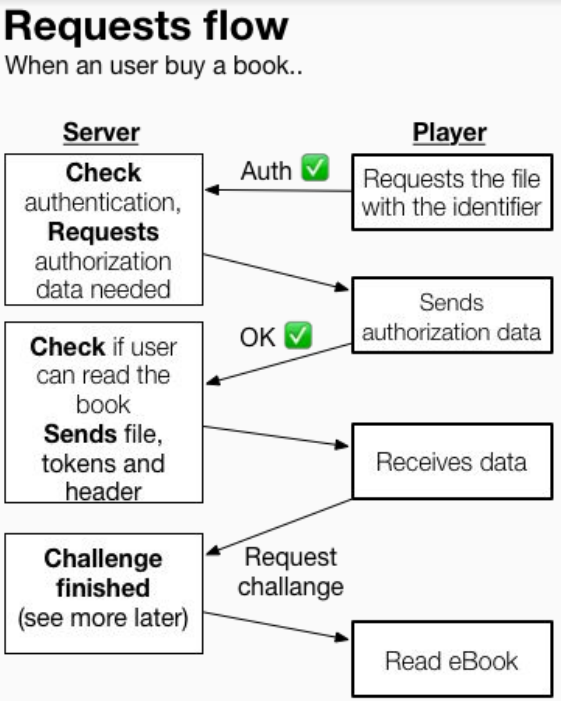
When an user view the book in the Player

IEDCS Server sends:

- **Authentication Token**
- **Authorization Token**
- **Identification Token**
- **Cryptographic headers**
- **Ciphered eBook**

IEDCS Player needs:

- **Check the player integrity**
- **Check the file integrity (CRC)**
- **Decrypt the eBook**
- **Challange the server to end the decryption**



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Authentication token

X-Auth-Token User	Player Jar Signature

Identification header

Book identifier	File identifiers

Cryptographic header

random3

Authorization token

Restrictions

Location	Player ID
OS	System ID
Time of the Day	

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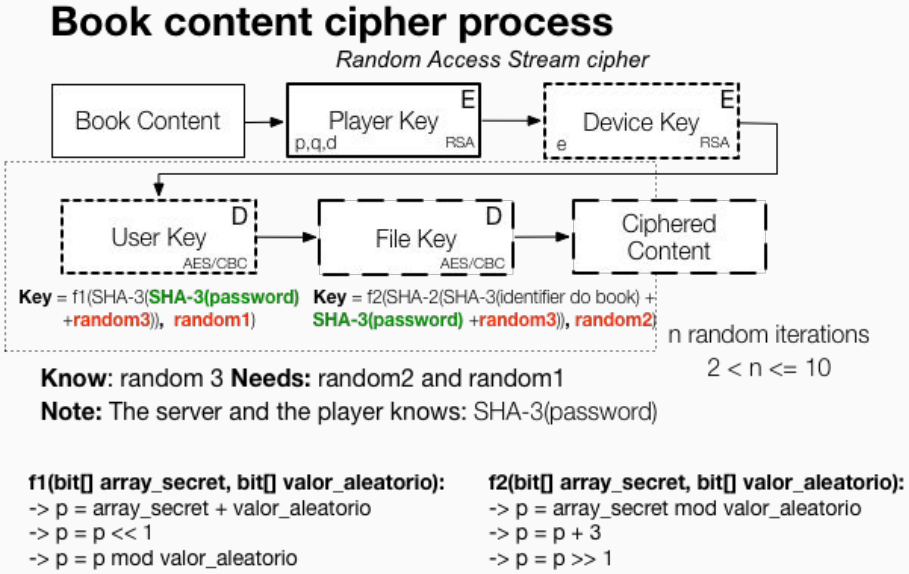

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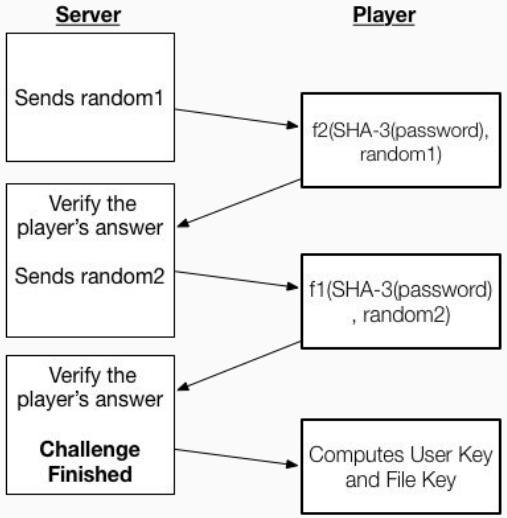
Challenge flow



END

"The quieter you become, the more you are able to hear."