

TLS certificate

```
sudo certbot certonly --manual --agree-tos --no-eff-email --staple-ocsp --key-type=ecdsa  
--elliptic-curve=secp256r1 --preferred-challenges dns --debug-challenges -d \*.smartbin.me  
-d smartbin.me
```

This command will output something similar to:

Please deploy a DNS TXT record under the name:

`_acme-challenge.smartbin.me.`

with the following value:

`ypyQ92XIljLKZRMQONkqAKD1IKcFg9glctc8PRkf2S8`

```
□ TXT Record      _acme-challenge      ypyQ92XIljLKZRMQONkqAKD1IKcFg9glctc8PRkf2S8      5 min      🗑️
```

```
Challenges loaded. Press continue to submit to CA.  
Pass "-v" for more info about challenges.  
-----  
Press Enter to Continue  
  
Successfully received certificate.  
Certificate is saved at: /etc/letsencrypt/live/smartbin.me/fullchain.pem  
Private key is saved at: /etc/letsencrypt/live/smartbin.me/privkey.pem  
This certificate expires on 2023-03-20.  
These files will be updated when the certificate renews.  
  
NEXT STEPS:  
- This certificate will not be renewed automatically. Autorenewal of --manual certificates requires the use of an authentication hook script (--manual-auth-hook) but one was not provided. To renew this certificate, repeat this same certbot command before the certificate's expiry date.  
  
-----  
If you like Certbot, please consider supporting our work by:  
* Donating to ISRG / Let's Encrypt: https://letsencrypt.org/donate  
* Donating to EFF: https://eff.org/donate-le  
-----  
ales@cot-smartbin:~$
```

```
ines@cot-smartbin:~$ sudo openssl x509 -in /etc/letsencrypt/live/smartbin.me/fullchain.pem -text -noout  
Certificate:  
  Data:  
    Version: 3 (0x2)  
    Serial Number:  
      03:bd:72:b4:8f:7d:bb:07:67:e2:3d:f2:1d:ec:3f:89:41:47  
    Signature Algorithm: sha256WithRSAEncryption  
    Issuer: C = US, O = Let's Encrypt, CN = R3  
    Validity  
      Not Before: Dec 20 20:29:46 2022 GMT  
      Not After : Mar 20 20:29:45 2023 GMT  
    Subject: CN = *.smartbin.me  
    Subject Public Key Info:  
      Public Key Algorithm: id-ecPublicKey  
      Public-Key: (256 bit)  
      pub:  
        04:c0:07:3f:fd:77:b4:8e:af:22:a8:16:fc:71:89:  
        0d:c2:a7:46:12:5e:ee:62:54:40:b6:25:40:c0:60:
```

```

X509v3 Subject Alternative Name:
    DNS:*.smartbin.me, DNS:smartbin.me
X509v3 Certificate Policies:
    Policy: 2.23.140.1.2.1
    Policy: 1.3.6.1.4.1.44947.1.1.1
    CPS: http://cps.letsencrypt.org

CT Precertificate SCTs:
    Signed Certificate Timestamp:
        Version      : v1 (0x0)
        Log ID       : 7A:32:8C:54:D8:B7:2D:B6:20:EA:38:E0:52:1E:E9:84:
                        16:70:32:13:85:4D:3B:D2:2B:C1:3A:57:A3:52:EB:52
        Timestamp    : Dec 20 21:29:46.753 2022 GMT
        Extensions   : none
        Signature    : ecdsa-with-SHA256
                        30:45:02:20:0E:18:DE:B8:C7:05:31:A2:9F:60:35:F5:
                        6B:DA:34:EB:2C:5E:2A:60:59:54:17:1D:C7:B8:67:AF:

```

We now have a valid certificate to use with all subdomains.

```

ines@cot-smartbin:~$ sudo openssl pkcs12 -export -out cert.pfx -inkey /etc/letsencrypt/live/smartbin.me/privkey.pem -in
/etc/letsencrypt/live/smartbin.me/cert.pem -certfile /etc/letsencrypt/live/smartbin.me/fullchain.pem
Enter Export Password:
Verifying - Enter Export Password:
ines@cot-smartbin:~$ sudo keytool -importkeystore -srckeystore cert.pfx -srcstoretype PKCS12 -srcstorepass azerty2wxcQSD
fgh -storepass azerty2wxcQSDfgh -destkeystore cert.jks -deststorepass azerty2wxcQSDfgh
Importing keystore cert.pfx to cert.jks...
Entry for alias 1 successfully imported.
Import command completed: 1 entries successfully imported, 0 entries failed or cancelled

```

MQTT Broker

Install Mosquitto: type the following commands, through install. mosquitto and mosquitto-clients will be installed:

```

$ sudo apt-get update
$ sudo add-apt-repository ppa:mosquitto-dev/mosquitto-ppa
$ sudo apt update
$ sudo apt-get install mosquitto
$ sudo apt-get install mosquitto-clients

```

Start Mosquitto:

```

$ sudo systemctl start mosquitto
$ sudo systemctl enable mosquitto

```

```

ines@cot-smartbin:~$ sudo systemctl enable mosquitto
Synchronizing state of mosquitto.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable mosquitto

```

```

ines@cot-smartbin:~$ sudo systemctl status mosquitto
● mosquitto.service - Mosquitto MQTT v3.1/v3.1.1 Broker
   Loaded: loaded (/lib/systemd/system/mosquitto.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2022-12-27 14:04:11 UTC; 8min ago
     Docs: man:mosquitto.conf(5)
           man:mosquitto(8)
  Main PID: 4543 (mosquitto)
    Tasks: 3 (limit: 9530)
   Memory: 1.4M
   CGroup: /system.slice/mosquitto.service
           └─4543 /usr/sbin/mosquitto -c /etc/mosquitto/mosquitto.conf

Dec 27 14:04:11 cot-smartbin systemd[1]: Starting Mosquitto MQTT v3.1/v3.1.1 Broker...
Dec 27 14:04:11 cot-smartbin mosquitto[4543]: 1672149851: Loading config file /etc/mosquitto/conf.d/default.conf
Dec 27 14:04:11 cot-smartbin mosquitto[4543]: [ 5109.534083]~DLT~ 4543~INFO ~FIFO /tmp/dlt cannot be opened. Retrying...
Dec 27 14:04:11 cot-smartbin systemd[1]: Started Mosquitto MQTT v3.1/v3.1.1 Broker.

```

```
ines@cot-smartbin:~$ mosquitto -version
Error: Unknown option '-version'.
mosquitto version 1.6.9
mosquitto is an MQTT v3.1.1 broker.
```

Configuring MQTT Password:

\$ sudo mosquitto_passwd -c /etc/mosquitto/passwd middleware

```
ines@cot-smartbin:~$ sudo mosquitto_passwd -c /etc/mosquitto/passwd middleware
Password:
Reenter password:
```

Configuring MQTT settings:

\$ sudo nano /etc/mosquitto/conf.d/default.conf

```
listener 1883
allow_anonymous false
password_file /etc/mosquitto/passwd

listener 8883
certfile /etc/mosquitto/certs/server.pem
cafile /etc/mosquitto/certs/server.pem
keyfile /etc/mosquitto/certs/server.key

listener 8083
protocol websockets
certfile /etc/mosquitto/certs/server.pem
cafile /etc/mosquitto/certs/server.pem
keyfile /etc/mosquitto/certs/server.key
```

Restart the broker:

\$ sudo systemctl restart mosquitto

```
ines@cot-smartbin:~$ sudo systemctl restart mosquitto
ines@cot-smartbin:~$ sudo systemctl status mosquitto
● mosquitto.service - Mosquitto MQTT v3.1/v3.1.1 Broker
   Loaded: loaded (/lib/systemd/system/mosquitto.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2022-12-27 14:34:25 UTC; 34s ago
     Docs: man:mosquitto.conf(5)
           man:mosquitto(8)
  Main PID: 5971 (mosquitto)
    Tasks: 3 (limit: 9530)
   Memory: 1.2M
   CGroup: /system.slice/mosquitto.service
           └─5971 /usr/sbin/mosquitto -c /etc/mosquitto/mosquitto.conf

Dec 27 14:34:25 cot-smartbin systemd[1]: Starting Mosquitto MQTT v3.1/v3.1.1 Broker...
Dec 27 14:34:25 cot-smartbin mosquitto[5971]: 1672151665: Loading config file /etc/mosquitto/conf.d/default.conf
Dec 27 14:34:25 cot-smartbin mosquitto[5971]: [ 6923.588897]~DLT~ 5971~INFO ~FIFO /tmp/dlt cannot be opened. Retrying...
Dec 27 14:34:25 cot-smartbin systemd[1]: Started Mosquitto MQTT v3.1/v3.1.1 Broker.
```

Testing the changes:

mosquitto_sub -t "test" -u "<username>" -P "<Password>"

mosquitto_pub -t "test" -m "hello world" -u "<username>" -P "<Password>"

Link the VM to a subdomain:

Add the VM public IP address to the DNS records at Namecheap as an A record with the host as mqtt

<input type="checkbox"/>	A Record	mqtt	4.234.210.92	Automatic	
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configure SSL/HTTPS on WildFly

configure a key-store in the Elytron subsystem that will be used to hold your Let's Encrypt account key.

```
[standalone@localhost:9990 /] /subsystem=elytron/key-store=inbg:add(path=cert.jks,relative-to=jboss.server.config.dir,credential-reference={clear-text="azerty2wxcQSDfgh"},type=JKS)
{"outcome" => "success"}
```

Server Keystore credentials

A key manager definition for creating the key manager list as used to create an SSL context

```
[standalone@localhost:9990 /] /subsystem=elytron/key-manager=inbgksm:add(key-store=inbg,credential-reference={clear-text="HS8t2zclthRy3nSUBw"})
{"outcome" => "success"}
```

Server keystore Protocols

An SSL context for use on the server side of a connection.

```
[standalone@localhost:9990 /] /subsystem=elytron/server-ssl-context=inbgsslcontext:add(key-manager=inbgksm,protocols=["TLSv1.3"],cipher-suite-names="TLS_AES_256_GCM_SHA384:TLS_CHACHA20_POLY1305_SHA256:TLS_AES_128_GCM_SHA256")
{"outcome" => "success"}
```

Store SSL Context information in undertow

```
[standalone@localhost:9990 /] /subsystem=undertow/server=default-server/https-listener=https:write-attribute(name=ssl-context,value=inbgsslcontext)
{"outcome" => "success",
 "response-headers" => {
   "operation-requires-reload" => true,
   "process-state" => "reload-required"
 }}
{"outcome" => "success"}
```

```
[standalone@localhost:9990 /] /core-service=management/management-interface=http-interface:write-attribute(name=ssl-context,value=inbgsslcontext)
{"outcome" => "success",
 "response-headers" => {
   "operation-requires-reload" => true,
   "process-state" => "reload-required"
 }}
{"outcome" => "success"}
```