TELECOM TECHNOLOGY CENTER

PoC of DNS identifier

Chi-Yuan Chen

Consultant from Telecom Technology Center（TTC）and Professor from Dept. of Computer Science and Information Engineering of National Ilan University

Objective

- The numbering of Telecommunication IoT devices was mainly based on the “Recommendation E.164”in the past. And the mature and flourish development in the next generation of telecommunication and Internet technology brings the IoT application and devices rapidly advanced; however, telecom numbers and the management method of its numbers on the basis of “the principle of Recommendation E.164”lead to difficulties in managing and identifying billions of IoT devices.

- The research is based on the concept from the report of “5G Technology” which is published by ICANN, and we utilize DNS as IoT identifiers and design the Proof of Concept（PoC）, then manage the devices of IoT through the auto-allocation DNS identifiers from the customed program.

- We design two different empirical fields under network slicing environment of next generation telecommunication network, and the requirement of devices mobility, the same full domain names should be connected to different IP address and DNS for operation. Through full domain names, we can query IP address and connect to different application indicators as 5G IoT DNS identifier, and as the management method for 5G IoT.

Key innovations

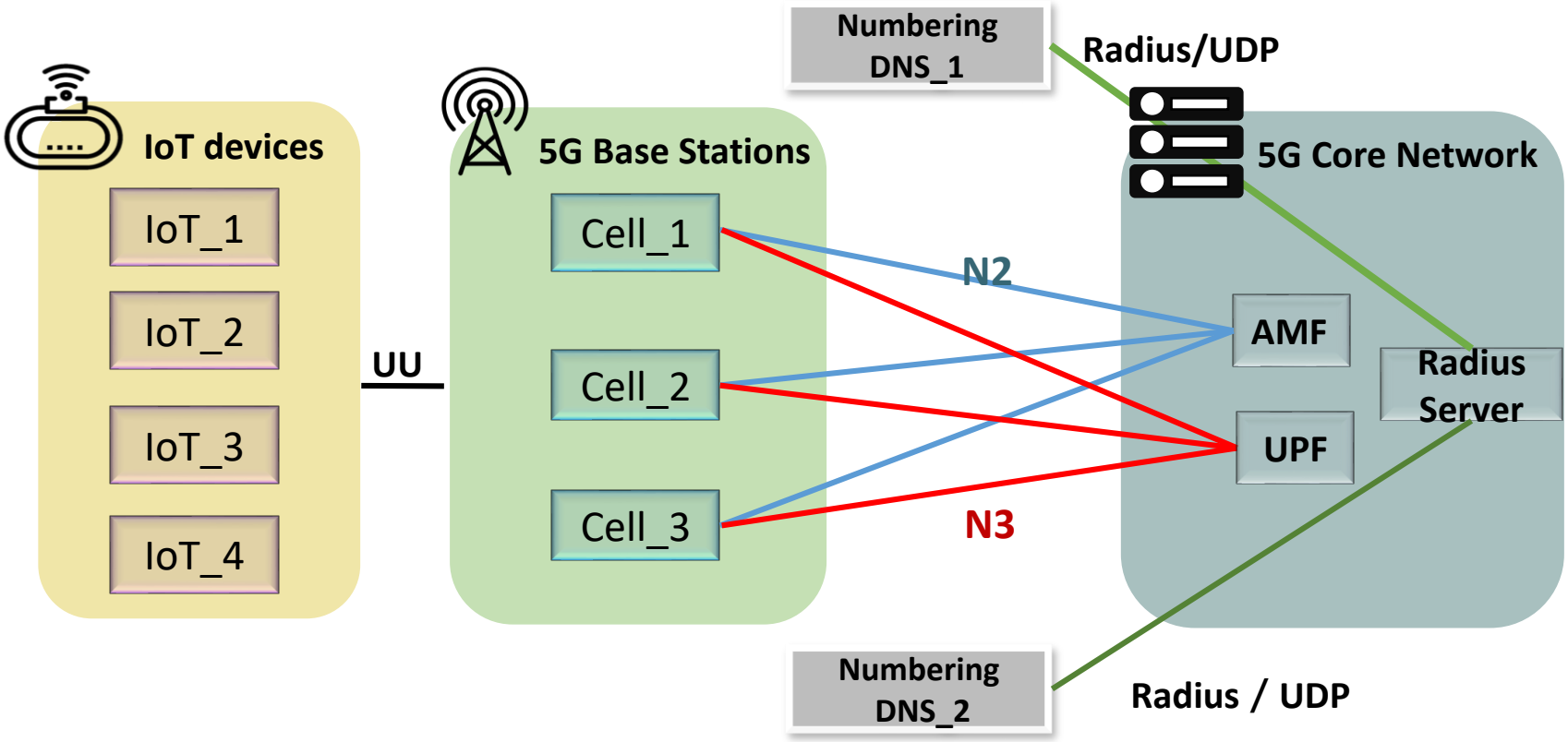
- Through the mechanism of DNS identifiers, the management of fixed and moving IoT devices under 5G is more efficient, and the IoT devices are improved their intuitive identifiability and managemental efficiency.

- In the context of 5G network slicing, Core Network（CN）sends APN, Cell ID, IMSI, MSISDN, IMEI, IP to Gn DNS to give identifiers on IoT devices according to Remote Authentication Dial-In User Service（RADIUS）

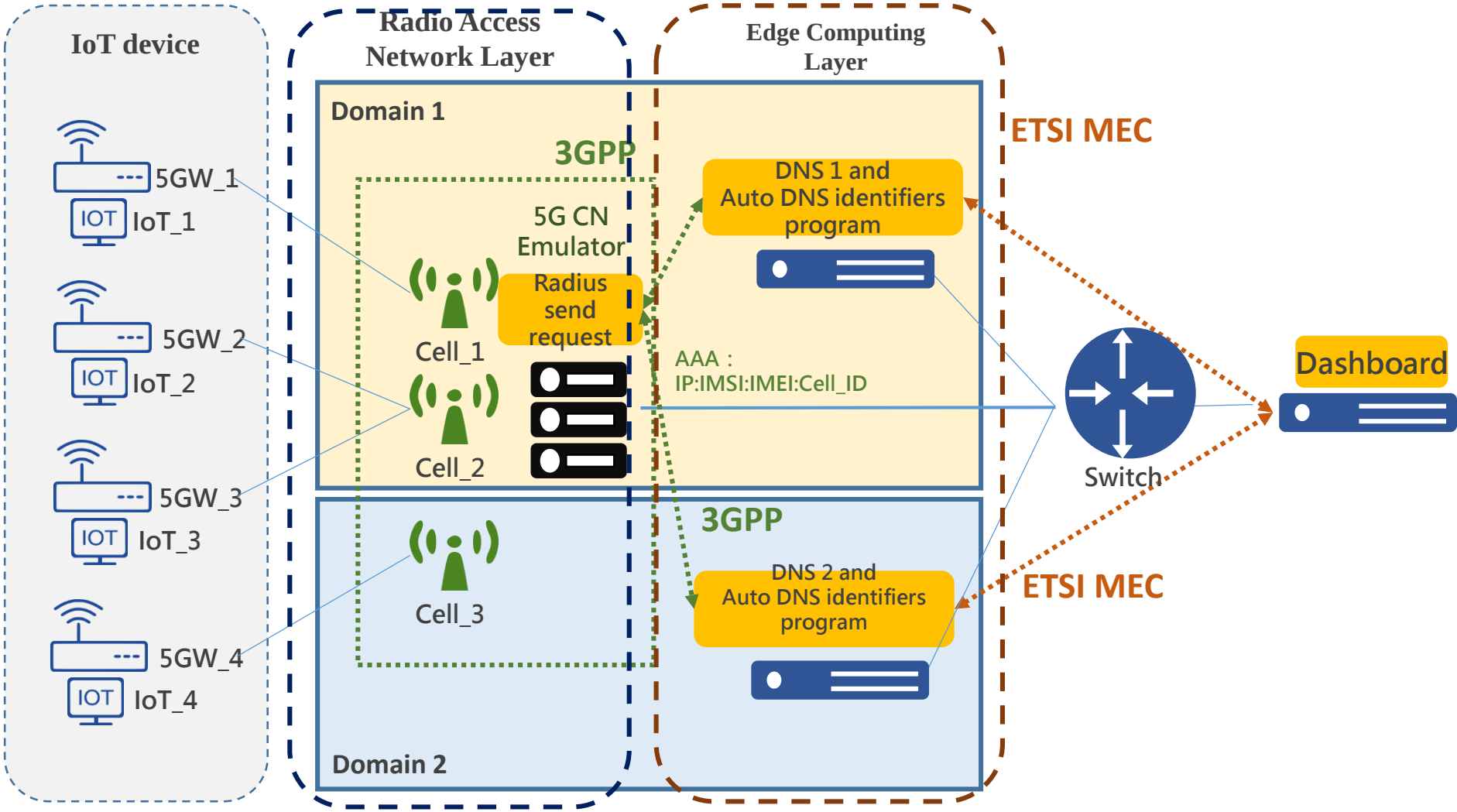
The Structure of PoC Experimental Platform

platform's fundamental settings

- Built in the Private Network
- SA WG2. Architecture that supported "3GPP Release 15"
- 5G Wireless Network Slicing for eMBB、URLLC、MIOT



The Structure of PoC Experimental Platform



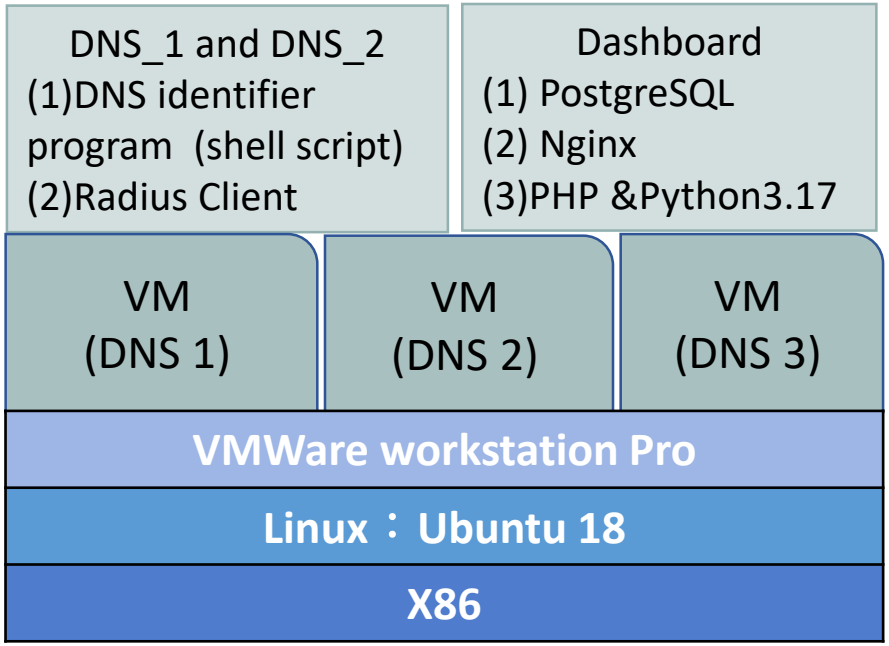
: represented for VM

The Structure of PoC Experimental Platform and its Equipment

PoC platform's Equipment and its Specification

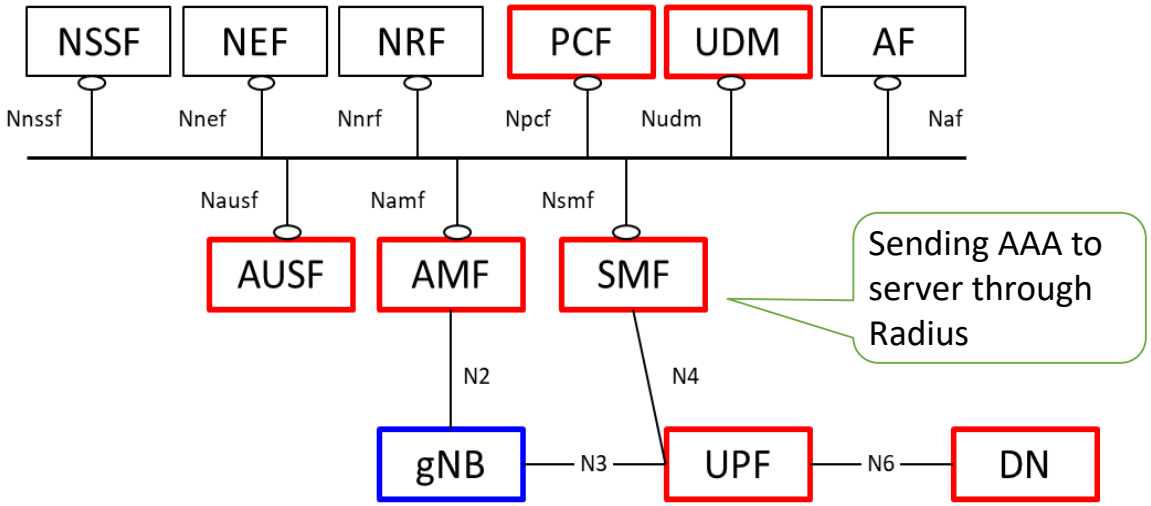
Equipment	Specification	Application
5G Gateway Radio Access Network Device	DTA1164W 5G SA/NSA Gateway*4	5G Router with 5G SIM
IPC Equipment	ADLINK MXE-211-M2G*4	Industrial Host PC in field experiment
5G Simulator Equipment	Amarisoft Classic Callbox*1	Simulator of gNB Based 5G R15 SA
Network Switch	Aruba 2930F-24G PoE+4SFP+ Swch*1	Providing 5G simulator, DNS, Dashboard Network Interface
MEC Server	ADLINK MECS-6110*3	Installed DNS and Dashboard System Software in field experiments

Applied Platform Structure



The Structure of the Function Elements of 5G Simulator

With the aim of verifying PoC, we adopted 3GPP R15 based 5G simulator to imitate the standard behavior of gNB and 5GC. What interface among function elements adopted are listed below.



NSSF：Network Slice Selection Function

NEF：Network Exposure Function

NRF：Network Repository Function

PCF：Policy Control Function

UDM：Unified data management

AF：Application Function

AUSF：Authentication Server Function

AMF：Access Management Function

SMF：Session Management Function

gNB：Next Generation NodeB／Radio Access Network

UPF：User plane Function

DN：Data Network

Note: Red squares and words are the introduction of 5GC, and blue squares and words are the introduction of gNB.

The Initial Value of the Equipment's Parameter

	IoT_1	IoT_2	IoT_3	IoT_4
APN	internet1	internet2	internet3	internet4
IMEI	355979860003363	355979860003702	355979860003728	355979860003785
NSSAI	eMBB	eMBB	URLLC	MIOT
SST	1	1	2	3
Template	AR/VR 8K Videos	AR/VR 8K Videos	Factory Automatic Machines	Smart City Sensors
Throughput	1Gbps/1Gbps	1Gbps/1Gbps	500Mbps/500Mbps	1Mbps/1Mbps

Identifier mechanism

The experimental platform referred to “3GPP TS 23.003”, and the specifications of identifier proposed are below:

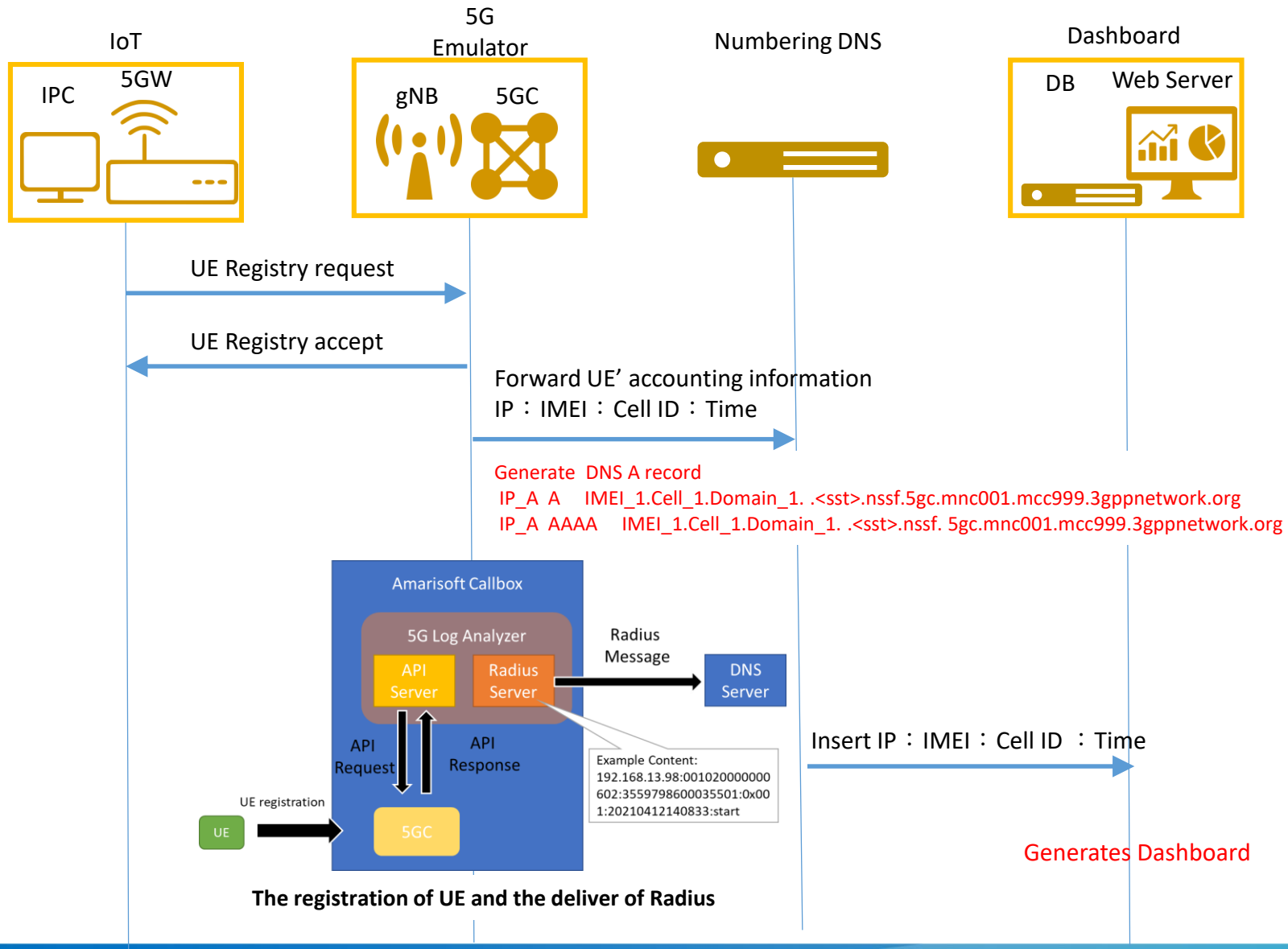
<IMEI>.<Cell_ID>.<Domain_ID>. <sst>.nssf.5gc.mnc<MNC>.mcc<MCC>.3gppnetwork.org

- According to “RFC952”, A “name” (Net, Host, Gateway, or Domain name) is a text string up to 24 characters drawn from the **alphabet** (A - Z), **digits** (0 - 9), minus sign (-), and period (.).
- According to “RFC1123”, host software MUST handle host names of up to 63 characters and SHOULD handle host names of up to 255 characters. Whenever a user inputs the identity of an Internet host, it SHOULD be possible to enter either (1) a host domain name or (2) an IP address in dotted-decimal ("#.#.#.#") form.

1. **IMEI**：Regarding the brand, model number, serial number and verification code of IoT, the numbering of IMEI device have uniqueness, which result in the uniqueness of the numbers that are generated form local host.
2. **Cell_ID**：ID of the Base Station
3. **Domain_ID**：geographical location
4. **SST**：Slice / Service Type
5. **MNC**：Mobile Network Code
6. **MCC**：Mobile Country Code

Category	Terminal Layers of IoT	Radio Access Network Layer	Edge Computing Layer	Core Network Layer
Standard	GMSA TS.06 v18.2	3GPP TS29.061		3GPP TS 23.003
DNS identifier	IMEI	Cell_ID	Domain_ID	SST, MNC, MCC
	(equipment).	.(Cell).	.(area).	<sst>.nssf.5gc.mnc(mnc) .mcc(mcc).3gppnetwork.org
Example	355979860003363	Cell_1	Domain_1	<sst_1>.nssf.5gc.mnc001 .mcc999.3gppnetwork.org

Experimental Platform and Registration Process



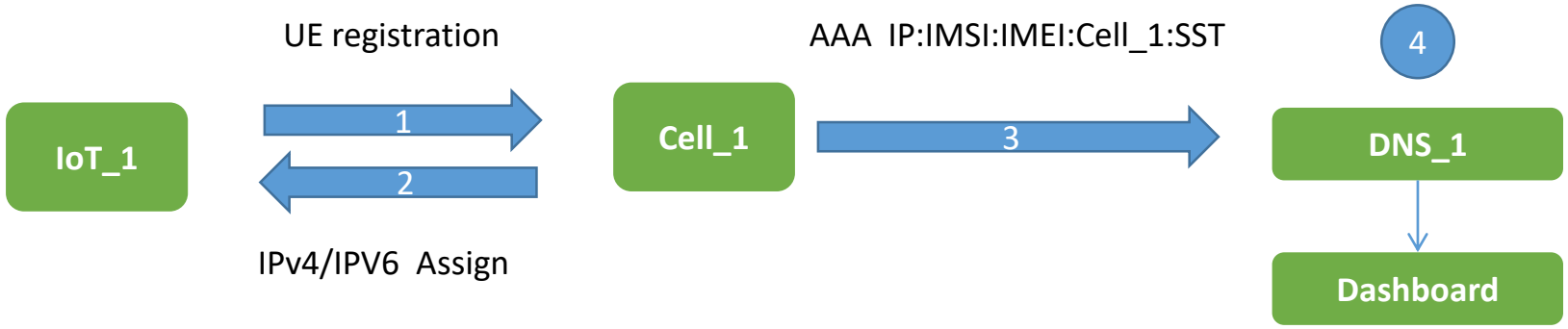
The registration of UE and the deliver of Radius

IoT End Device Registration for the Auto DNS Identifiers

4 Generate DNS A record

IP_A A IMEI_1.Cell_1.Domain_1. <sst>.nssf.5gc.mnc001.mcc999.3gppnetwork.org

IP_A AAAA IMEI_1.Cell_1.Domain_1. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org

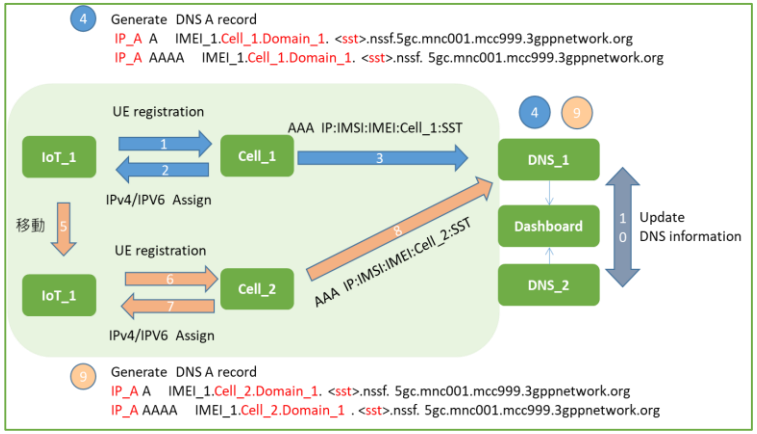


Testing the PoC of DNS Identifiers

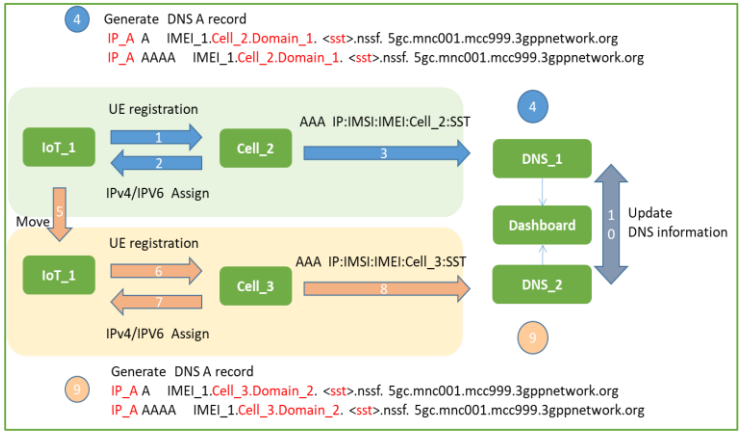
the final result of PoC testing this year：

1. **Fixed and moving IoT devices under 5G network can be efficiently managed through DNS identifiers mechanism.**
2. **A huge amounts of IoT devices under 5G network will be efficiently auto-allocated numbers by the DNS identifiers mechanism.**

Inter-Domain Verification Signaling Procedure Chart



Cross-Domain Verification Signaling Procedure Chart



Verification items in scenarios

item	Inter-Domain	Cross-Domain
1	Edge computing on data switching of MEC and DNS	Edge computing on data switching of MEC and DNS
2	Simulation of switching of IoT and DNS of IPv4／IPv6	the simulation of switching of IoT and DNS of IPv4／IPv6
3	Auto DNS identifiers mechanism and its management	the mechanism of auto-allocation DNS identifiers and its management
4	the behavior of multiple devices registered DNS in the meantime	

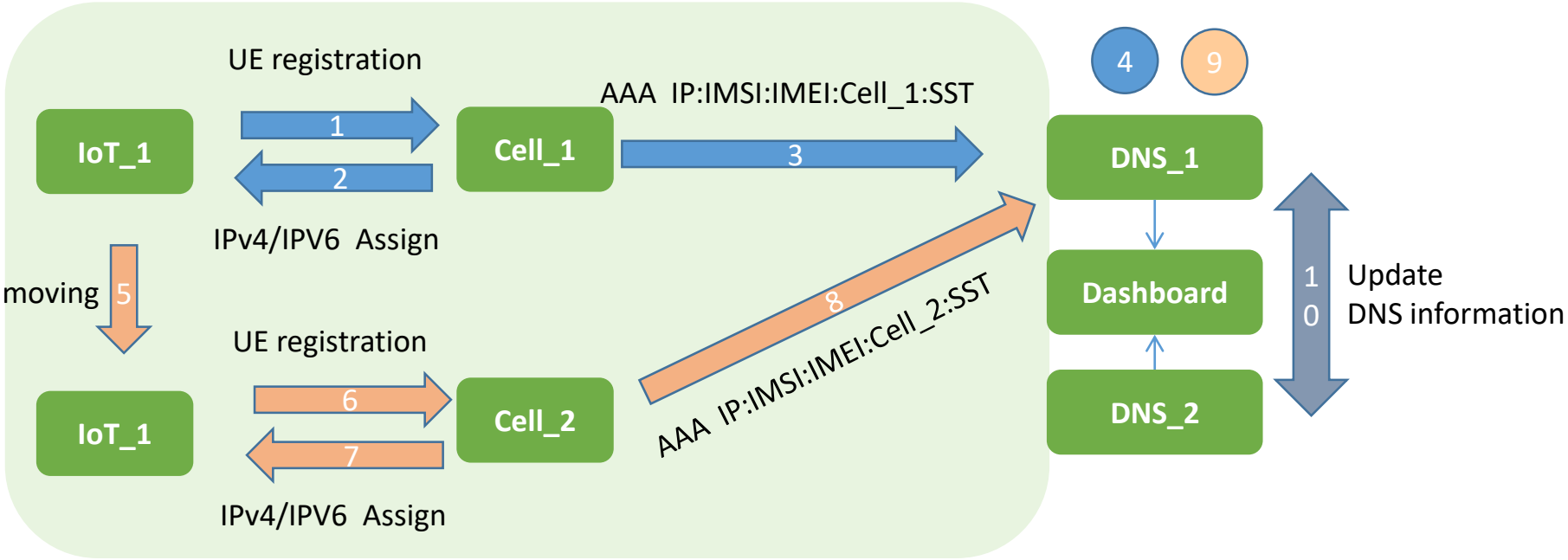
The Registration Process of IoT End Devices in Inter-Domain

From Cell_1（Domain1）to Cell_2（Domain1）

4 Generate DNS A record

IP_A A IMEI_1.Cell_1.Domain_1. <sst>.nssf.5gc.mnc001.mcc999.3gppnetwork.org

IP_A AAAA IMEI_1.Cell_1.Domain_1. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org



9 Generate DNS A record

IP_A A IMEI_1.Cell_2.Domain_1. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org

IP_A AAAA IMEI_1.Cell_2.Domain_1 . <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org

Inter-Domain's Test Steps

Step	Procedure	Introduction of procedure
1	UE registration	IoT connects to Cell_1 and registered.
2	IPv4／IPv6 Assign	Callbox（MEC）assigns IP to IoT.
3	Send the registration information to DNS	Information like [IP:IMSI:IMEI:Cell_1:SST] is sent to DNS.
4	Generate DNS A record	DNS auto-generates domain names and DNS A record through auto-allocation program.

Step 1 to Step 4

（ the demonstration of system operation ）

Callbox

```
[root@localhost RadiusApp]# python3 pyrad_server.py
10.10.11.2,10:10:11:2:200:ff:fe00:0,999010000000001,355979860003363,1,20210917134421,start,1
10.10.12.2,10:10:12:2:200:ff:fe00:0,999010000000002,355979860003702,1,20210917134431,start,1
10.10.13.2,10:10:13:2:200:ff:fe00:0,999010000000003,355979860003728,1,20210917134446,start,2
10.10.14.2,10:10:14:2:200:ff:fe00:0,999010000000004,355979860003785,1,20210917134456,start,3
```

DNS

1 2 3

```
10.10.11.2,10:10:11:2:200:ff:fe00:0,999010000000001,355979860003363,1,20210917134421,start,1
10.10.12.2,10:10:12:2:200:ff:fe00:0,999010000000002,355979860003702,1,20210917134431,start,1
10.10.13.2,10:10:13:2:200:ff:fe00:0,999010000000003,355979860003728,1,20210917134446,start,2
10.10.14.2,10:10:14:2:200:ff:fe00:0,999010000000004,355979860003785,1,20210917134456,start,3
#####################################
at nssf.5gc.mnc001.mcc999.3gppnetwork.org
#####################################
```

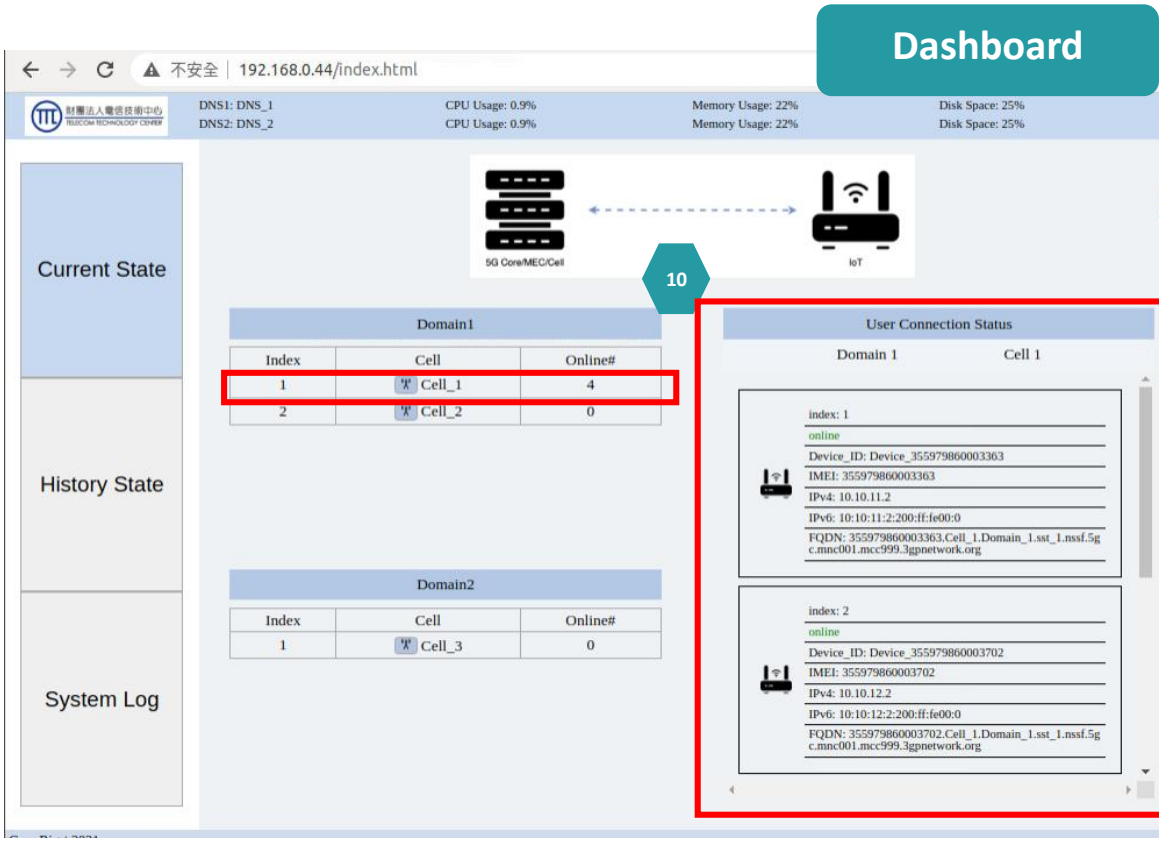
4

```
; BIND data file for local loopback interface
;
$TTL    604800
@       IN      SOA     localhost. root.localhost. (
                              2         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@       IN      NS      localhost.
ns      IN      A       127.0.0.1
ns      IN      AAAA    ::1
355979860003363.Cell_1.Domain_1.sst_1  IN      A       10.10.11.2
355979860003363.Cell_1.Domain_1.sst_1  IN      A       10:10:11:2:200:ff:fe00:0
355979860003702.Cell_1.Domain_1.sst_1  IN      A       10.10.12.2
355979860003702.Cell_1.Domain_1.sst_1  IN      A       10:10:12:2:200:ff:fe00:0
355979860003728.Cell_1.Domain_1.sst_2  IN      A       10.10.13.2
355979860003728.Cell_1.Domain_1.sst_2  IN      A       10:10:13:2:200:ff:fe00:0
355979860003785.Cell_1.Domain_1.sst_3  IN      A       10.10.14.2
355979860003785.Cell_1.Domain_1.sst_3  IN      A       10:10:14:2:200:ff:fe00:0
```

4

Inter-domain's test steps

Step	Procedure	Introduction of procedure
1	UE registration	IoT connects to Cell_1 and registered.
2	IPv4／IPv6 Assign	Callbox（MEC）assigns IP to IoT.
3	Send the registration information to DNS	Information like [IP:IMSI:IMEI:Cell_1 :SST] is sent to DNS.
4	Generate DNS A record	DNS auto-generates domain names and DNS A record through auto-allocation program.



Inter-domain's test

This chart shows some parameters that IoT register IP and auto-register DN.
（after step 1 to step 4）

		IoT_1	IoT_2	IoT_3	IoT_4
	APN	internet1	internet2	internet3	internet4
	IMEI	355979860003363	355979860003702	355979860003728	355979860003785
	NSSAI	eMBB	eMBB	URLLC	MIOT
	SST	1	1	2	3
	Template	AR/VR 8K Videos	AR/VR 8K Videos	Factory Automatic Machines	Smart City Sensors
	Throughput	1Gbps/1Gbps	1Gbps/1Gbps	500Mbps/500Mbps	1Mbps/1Mbps
Step 1、2	**Service IP IPv4 (DHCP)**	10.10.11.2/24	10.10.12.2/24	10.10.13.2/24	10.10.14.2/24
Step 1、2	**Service IP IPv6 (DHCP)**	10:10:11.2::/80	10:10:12.2::/80	10:10:13.2::/80	10:10:14.2::/80
Step 3、4	**DN**	355979860003363.Cell_1.Domain_1.sst_1.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003702.Cell_1.Domain_1.sst_1.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003728.Cell_2.Domain_1.sst_2.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003785.Cell_1.Domain_1.sst_3.nssf.5gc.mnc001.mcc999.3gppnetwork.org

Inter-domain's test steps

Step	Procedure	Introduction of procedure
5	UE moving	It moves from Cell_1 to Cell_2, and it is still Domain_1.
6	UE registration	IoT connects to Cell_2 and registered.
7	IPv4／IPv6 Assign	Callbox（MEC）assigns IP to IoT, and it utilizes the original IP because it is still Domain_1.
8	Send the registration information to DNS	Information like [IP:IMSI:IMEI:Cell_1:SST] is sent to DNS by Callbox（MEC）.
9	Generate DNS A record	DNS auto-generates domain names and DNS A record through auto-allocation program.
10	Update the DNS and Dashboard	Dashboard accesses the latest DNS A record.

Step 5 to step 9
（ the demonstration of system operation ）

Callbox

```
[root@localhost RadiusApp]#python3 pyrad_server.py
10.10.11.2,10:10:11:2:200:ff:fe00:0,999010000000001,355979860003363,2,20210917134928,start,1
10.10.12.2,10:10:12:2:200:ff:fe00:0,999010000000002,355979860003702,2,20210917134928,start,1
10.10.13.2,10:10:13:2:200:ff:fe00:0,999010000000003,355979860003728,2,20210917134928,start,2
10.10.14.2,10:10:14:2:200:ff:fe00:0,999010000000004,355979860003785,2,20210917134928,start,3
```

5 6 7 8 DNS

```
{ "Message" : "Upload success" }{ "Message" : "Upload success" }
10.10.11.2,10:10:11:2:200:ff:fe00:0,999010000000001,355979860003363,2,20210917134928,start,1
10.10.12.2,10:10:12:2:200:ff:fe00:0,999010000000002,355979860003702,2,20210917134928,start,1
10.10.13.2,10:10:13:2:200:ff:fe00:0,999010000000003,355979860003728,2,20210917134928,start,2
10.10.14.2,10:10:14:2:200:ff:fe00:0,999010000000004,355979860003785,2,20210917134928,start,3
########################################
cat 5gc.mnc001.mcc999.3gppnetwork.org
########################################
```

9

```
;
; BIND data file for local loopback interface
;
$TTL    604800
@       IN      SOA     localhost. root.localhost. (
                              2         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@       IN      NS      localhost.
ns      IN      A       127.0.0.1
ns      IN      AAAA    ::1
355979860003363.Cell_2.Domain_1.sst_1  IN      A       10.10.11.2
355979860003363.Cell_2.Domain_1.sst_1  IN      A       10:10:11:2:200:ff:fe00:0
355979860003702.Cell_2.Domain_1.sst_1  IN      A       10.10.12.2
355979860003702.Cell_2.Domain_1.sst_1  IN      A       10:10:12:2:200:ff:fe00:0
355979860003728.Cell_2.Domain_1.sst_2  IN      A       10.10.13.2
355979860003728.Cell_2.Domain_1.sst_2  IN      A       10:10:13:2:200:ff:fe00:0
355979860003785.Cell_2.Domain_1.sst_3  IN      A       10.10.14.2
355979860003785.Cell_2.Domain_1.sst_3  IN      A       10:10:14:2:200:ff:fe00:0
```

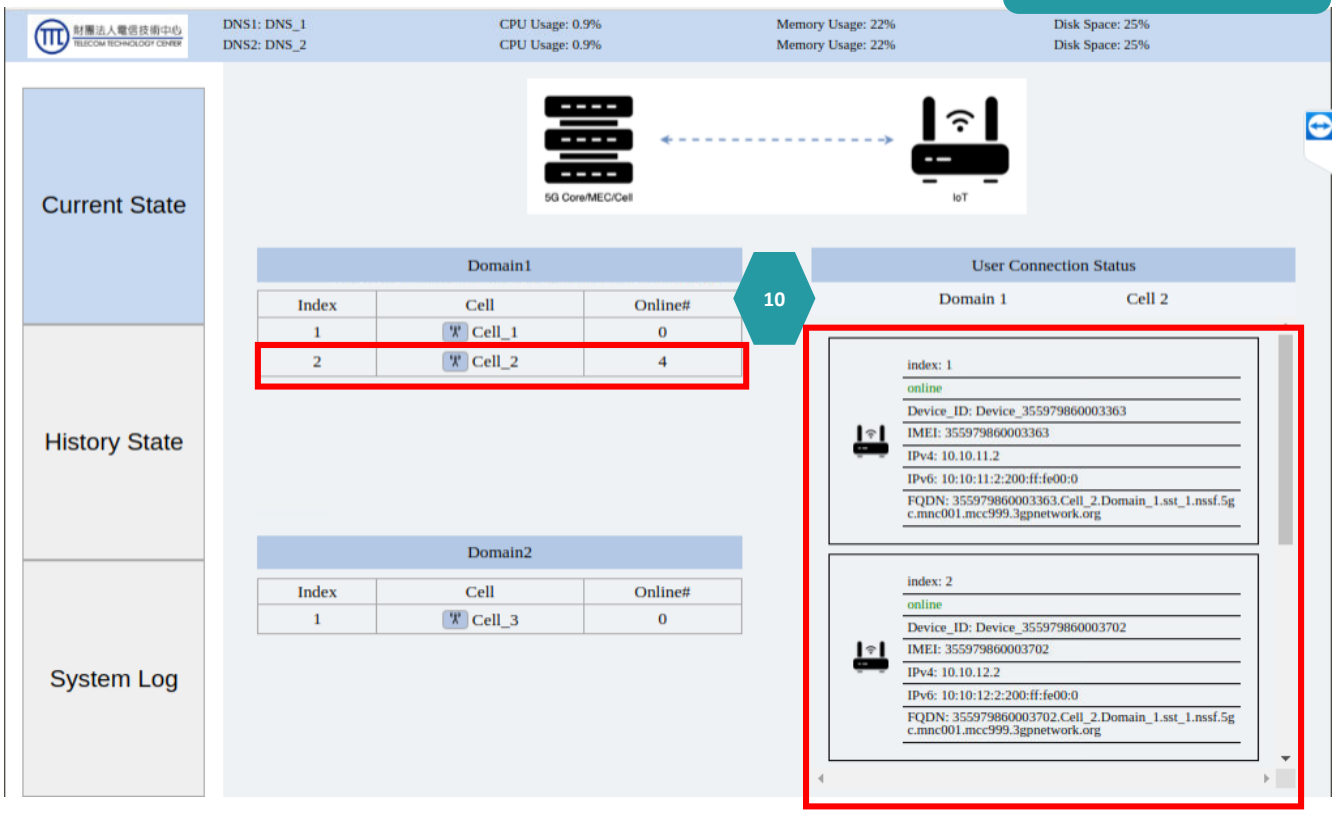
9

Inter-domain's test steps

Step	Procedure	Introduction of procedure
10	Update the DNS and Dashboard	Dashboard accesses the latest DNS A record.

Step 10（ the demonstration of system operation ）

Dashboard



Inter-domain's test

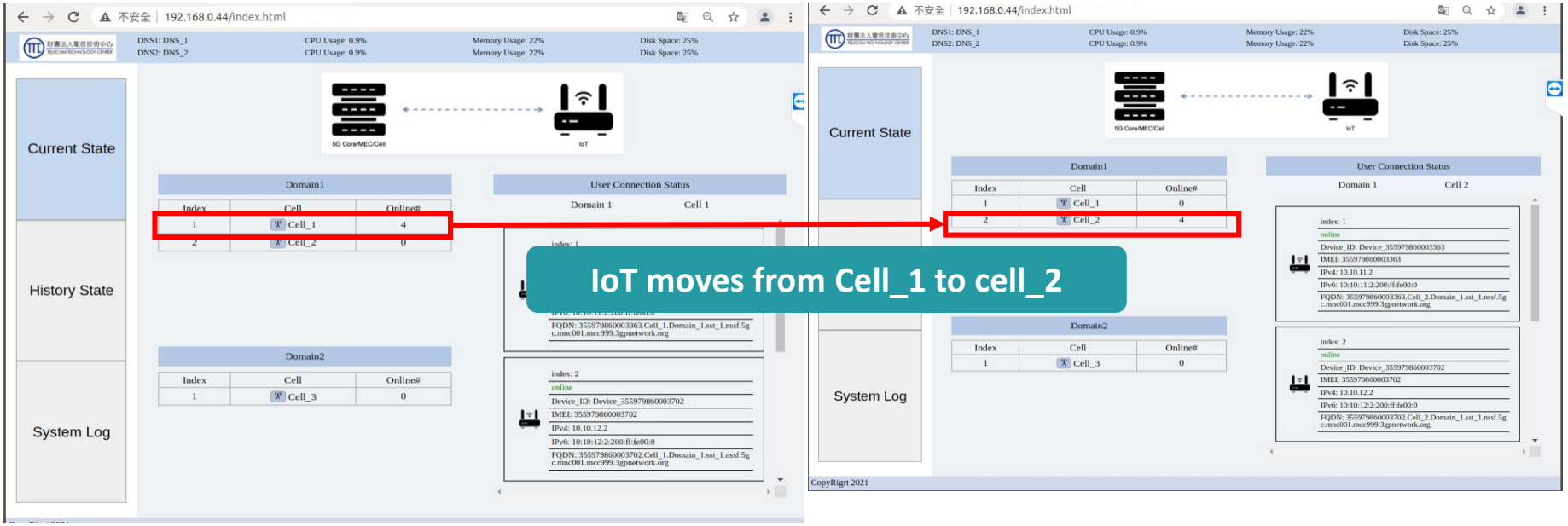
This chart shows some parameters for step 6 to step 10

When the IoT end device（ IoT_1 ）move from Cell_1 to Cell_2, DN will change the name of Cell, but APN and IP remain unchanged.

		IoT_1	IoT_2	IoT_3	IoT_4
	APN	internet1	internet2	internet3	internet4
	IMEI	355979860003363	355979860003702	355979860003728	355979860003785
	NSSAI	eMBB	eMBB	URLLC	MIOT
	SST	1	1	2	3
	Template	AR/VR 8K Videos	AR/VR 8K Videos	Factory Automatic Machines	Smart City Sensors
	Throughput	1Gbps/1Gbps	1Gbps/1Gbps	500Mbps/500Mbps	1Mbps/1Mbps
Step 6 to 7	**Service IP IPv4 (DHCP)**	10.10.11.2/24	10.10.12.2/24	10.10.13.2/24	10.10.14.2/24
Step 6 to 7	**Service IP IPv6 (DHCP)**	10:10:11.2::/80	10:10:12.2::/80	10:10:13.2::/80	10:10:14.2::/80
Step 8 to 10	**DN**	355979860003363.Cell_2.Domain_1.sst_1.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003702.Cell_2.Domain_1.sst_1.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003728.Cell_2.Domain_1.sst_2.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003785.Cell_2.Domain_1.sst_3.nssf.5gc.mnc001.mcc999.3gppnetwork.org

Inter-domain's test steps

Check the Dashboard after the completion of the inter-domain test.



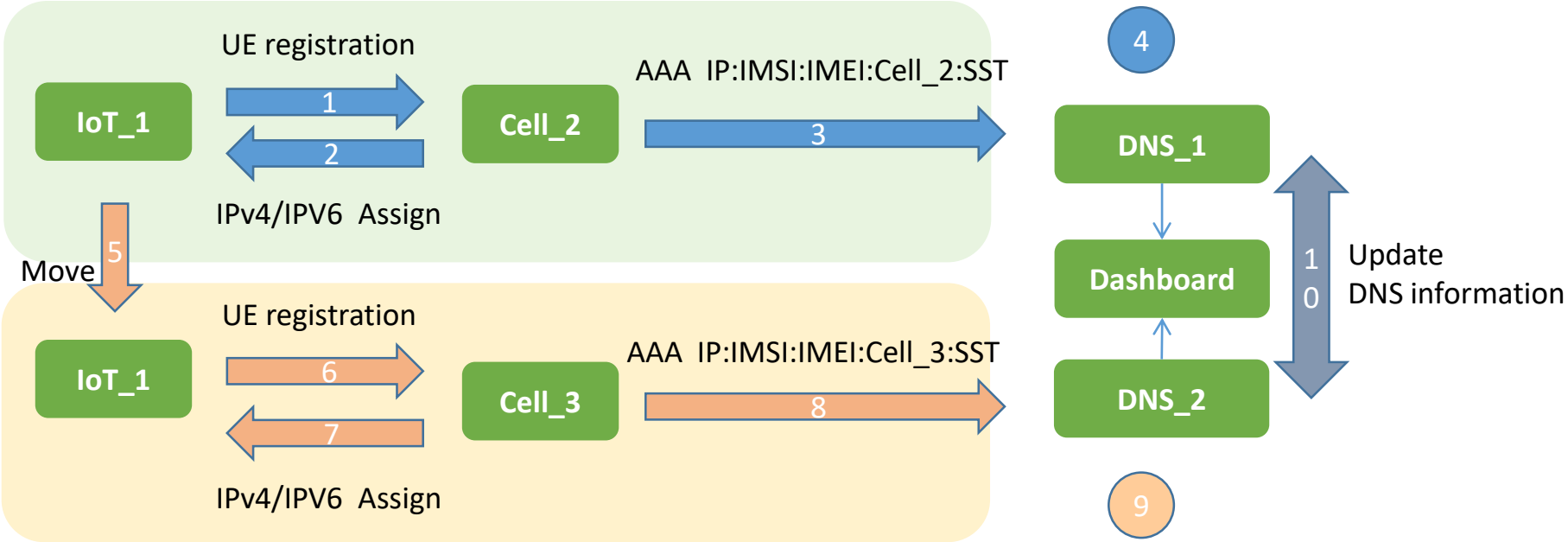
The Registration Process of IoT End Devices in Cross-Domain

The IoT end device move from Domain_1（cell_2）to Domain_2（ cell_3）

4 Generate DNS A record

IP_A A IMEI_1.Cell_2.Domain_1. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org

IP_A AAAA IMEI_1.Cell_2.Domain_1. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org



9 Generate DNS A record

IP_A A IMEI_1.Cell_3.Domain_2. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org

IP_A AAAA IMEI_1.Cell_3.Domain_2. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org

Cross-domain's test steps

Step	Procedure	Introduction of procedure
5	UE moving	It moves from Cell_2 to Cell_3, and it moves from Domain_1 to Domain_2 .
6	UE registration	IoT connects to Cell_3 and registers.
7	IPv4／IPv6 assign	Callbox（MEC）assigns IP to IoT
8	Send the registration information to DNS	Information like [IP:IMSI:IMEI:Cell_1:SST] is sent to DNS by Callbox（MEC）.
9	Generate DNS A record	DNS auto-generates domain names and DNS A／AAA A record through auto-allocation program.

Step 5 to step 9
（ the demonstration of system operation ）

CallBox

```
[root@localhost RadiusApp]# python3 pyrad_server.py
10.10.11.3,10:10:11:2:200:ff:fe00:0,999010000000001,355979860003363,3,20210917141322,start,1
10.10.12.3,10:10:12:2:200:ff:fe00:0,999010000000002,355979860003702,3,20210917141322,start,1
10.10.13.3,10:10:13:2:200:ff:fe00:0,999010000000003,355979860003728,3,20210917141322,start,2
10.10.14.3,10:10:14:2:200:ff:fe00:0,999010000000004,355979860003785,3,20210917141322,start,3
```

DNS

5 6 7 8

```
10.10.11.3,10:10:11:3:200:ff:fe00:0,99[illegible]9860003363,3,2021[illegible]
10.10.12.3,10:10:12:3:200:ff:fe00:0,999010000000002,355979860003702,3,20210917141322,start,1
10.10.13.3,10:10:13:3:200:ff:fe00:0,999010000000003,355979860003728,3,20210917141322,start,2
10.10.14.3,10:10:14:3:200:ff:fe00:0,999010000000004,355979860003785,3,20210917141322,start,3
########################################
cat nssf.5gc.mnc001.mcc999.3gppnetwork.org
########################################
;
; BIND data file for local loopback interface
;
$TTL    604800
@       IN      SOA     localhost. root.localhost. (
                              2         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@       IN      NS      localhost.
ns      IN      A       127.0.0.1
ns      IN      AAAA    ::1
355979860003363.Cell_3.Domain_2.sst_1  IN      A       10.10.11.3
355979860003363.Cell_3.Domain_2.sst_1  IN      A       10:10:11:3:200:ff:fe00:0
355979860003702.Cell_3.Domain_2.sst_1  IN      A       10.10.12.3
355979860003702.Cell_3.Domain_2.sst_1  IN      A       10:10:12:3:200:ff:fe00:0
355979860003728.Cell_3.Domain_2.sst_2  IN      A       10.10.13.3
355979860003728.Cell_3.Domain_2.sst_2  IN      A       10:10:13:3:200:ff:fe00:0
355979860003785.Cell_3.Domain_2.sst_3  IN      A       10.10.14.3
355979860003785.Cell_3.Domain_2.sst_3  IN      A       10:10:14:3:200:ff:fe00:0
```

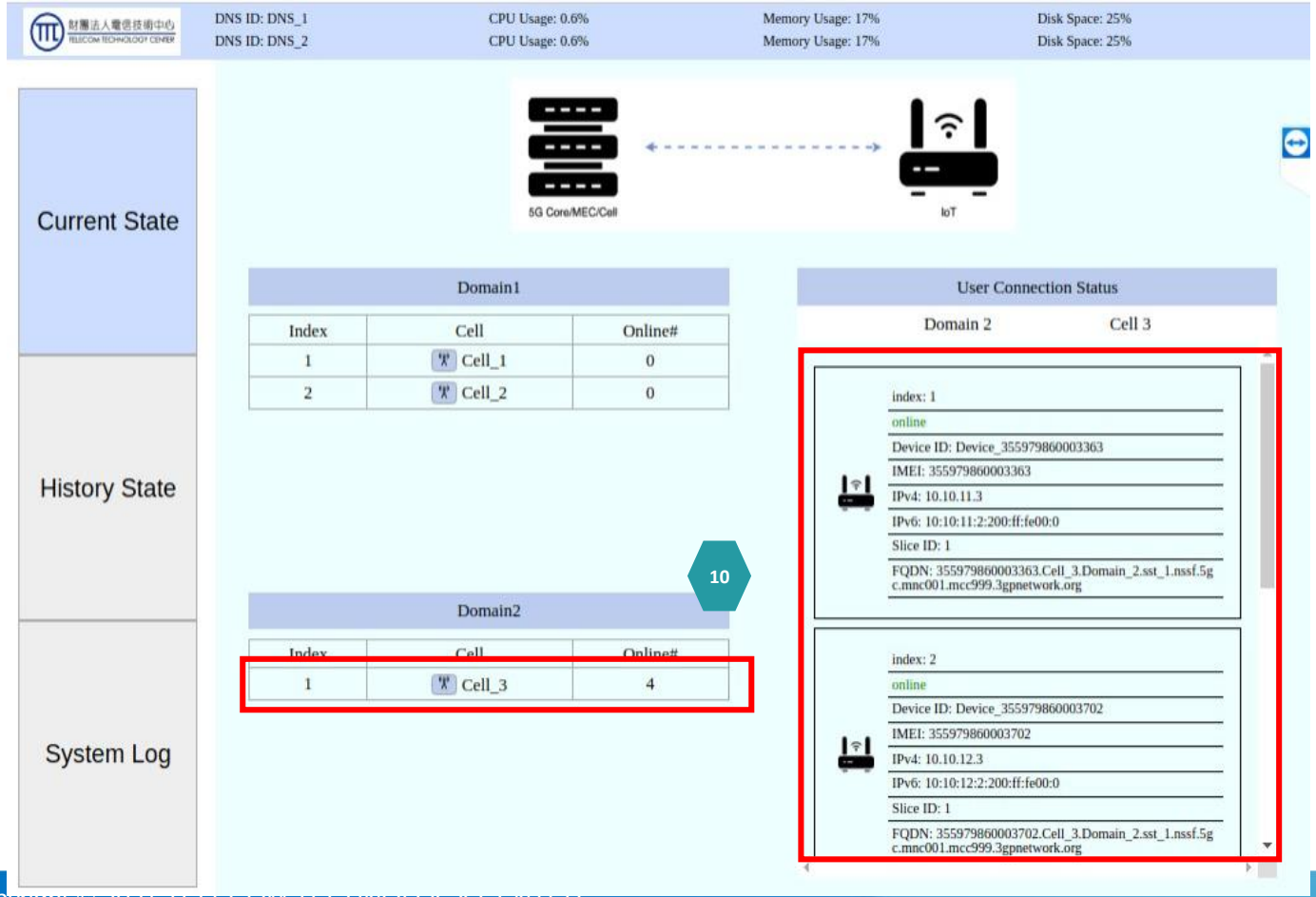
9

9

Cross-domain's test steps

Step	Procedure	Introduction of procedure
10	Update the DNS and Dashboard	Dashboard accesses the latest DNS A／AAAA record.

Step 10（ the demonstration of system operation ）



Cross-domain's test

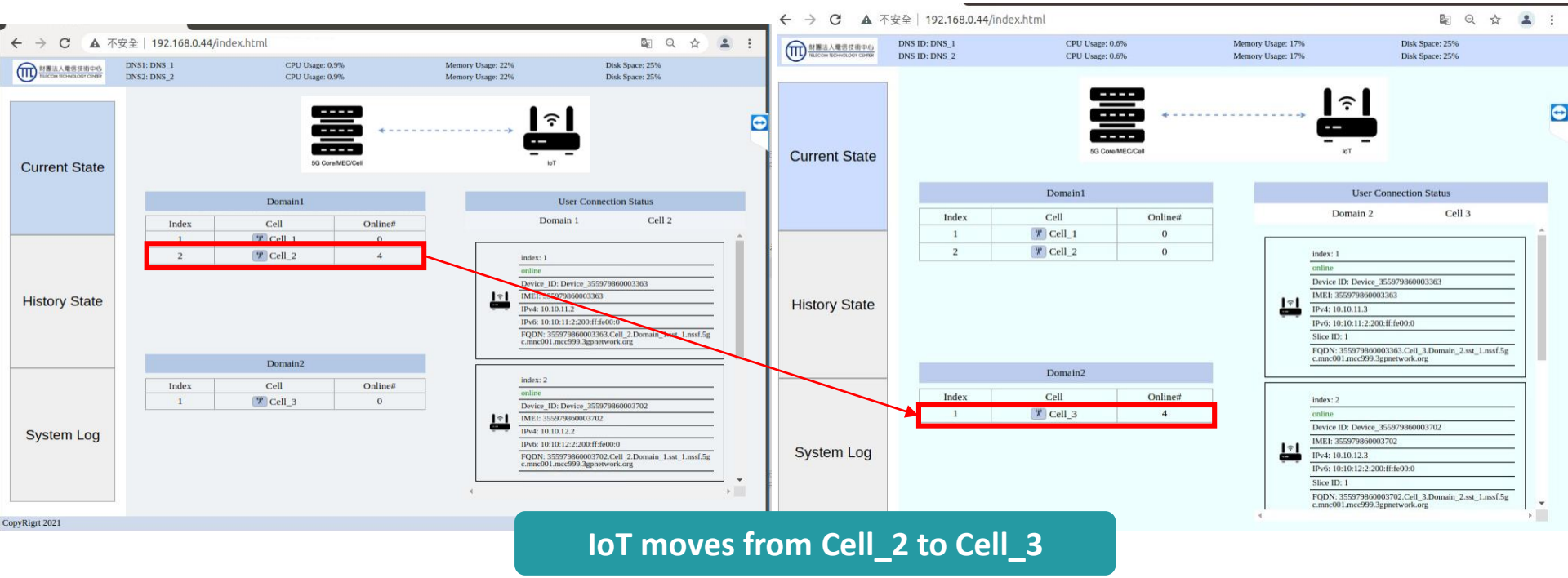
this chart shows some parameters for step 6 to step 10

When the IoT end device（ IoT_1 ）moves from Cell_2 to Cell_3 and gets new IP through registration, DN will change the name of Cell.

		IoT_1	IoT_2	IoT_3	IoT_4
	APN	internet1	internet2	internet3	internet4
	IMEI	355979860003363	355979860003702	355979860003728	355979860003785
	NSSAI	eMBB	eMBB	URLLC	MIOT
	SST	1	1	2	3
	Template	AR/VR 8K Videos	AR/VR 8K Videos	Factory Automatic Machines	Smart City Sensors
	Throughput	1Gbps/1Gbps	1Gbps/1Gbps	500Mbps/500Mbps	1Mbps/1Mbps
Step 6、7	Service IP IPv4 (DHCP)	10.10.11.3/24	10.10.12.3/24	10.10.13.3/24	10.10.14.3/24
	Service IP IPv6 (DHCP)	10:10:11.3::/80	10:10:12.3::/80	10:10:13.3::/80	10:10:14.3::/80
Step 8-10	DN	355979860003363.Cell_3.Domain_2.sst_1.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003702.Cell_3.Domain_2.sst_1.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003728.Cell_3.Domain_2.sst_2.nssf.5gc.mnc001.mcc999.3gppnetwork.org	355979860003785.Cell_3.Domain_2.sst_3.nssf.5gc.mnc001.mcc999.3gppnetwork.org

Cross-domain's test

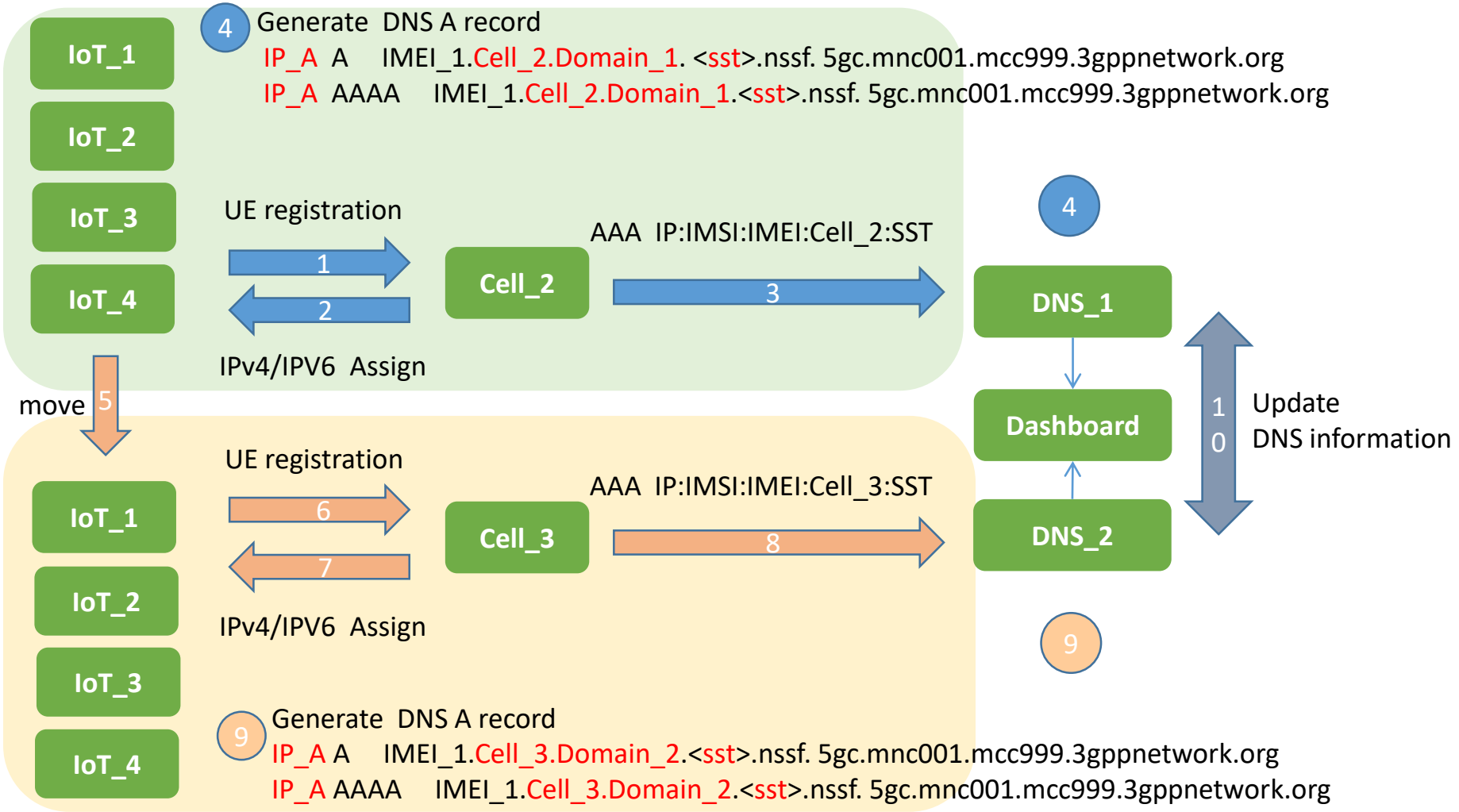
Check the Dashboard after the completion of the cross-domain test



IoT moves from Cell_2 to Cell_3

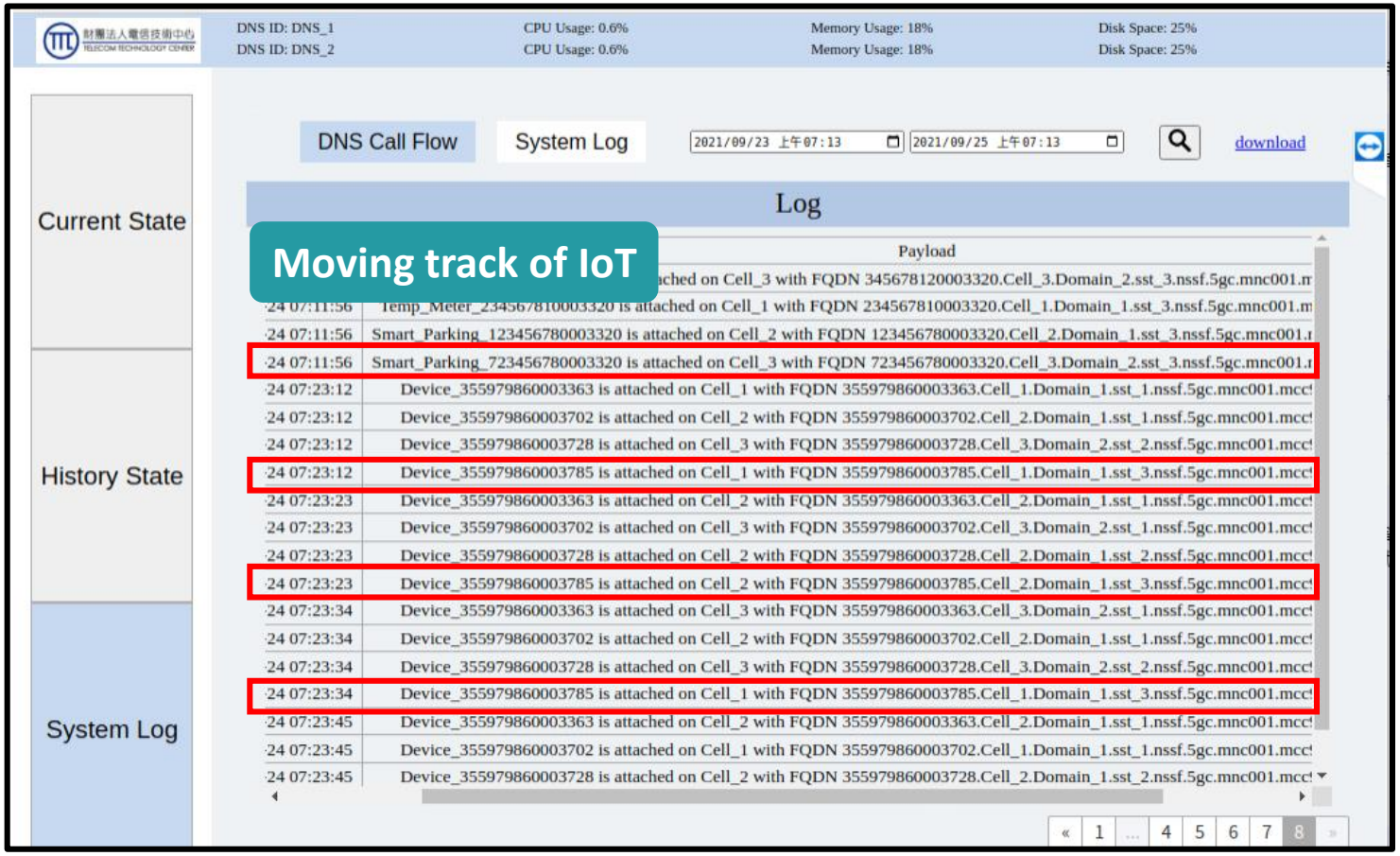
Scenario 1:
Large amounts of IoT devices are given identifiers automatically

Four sets of IoT equipment are used in 20 minutes and move among different Cells and Domains



Scenario 1: Testing large amounts of IoT devices are given identifiers automatically

Identify the status of DN after the movement of IoT device through log



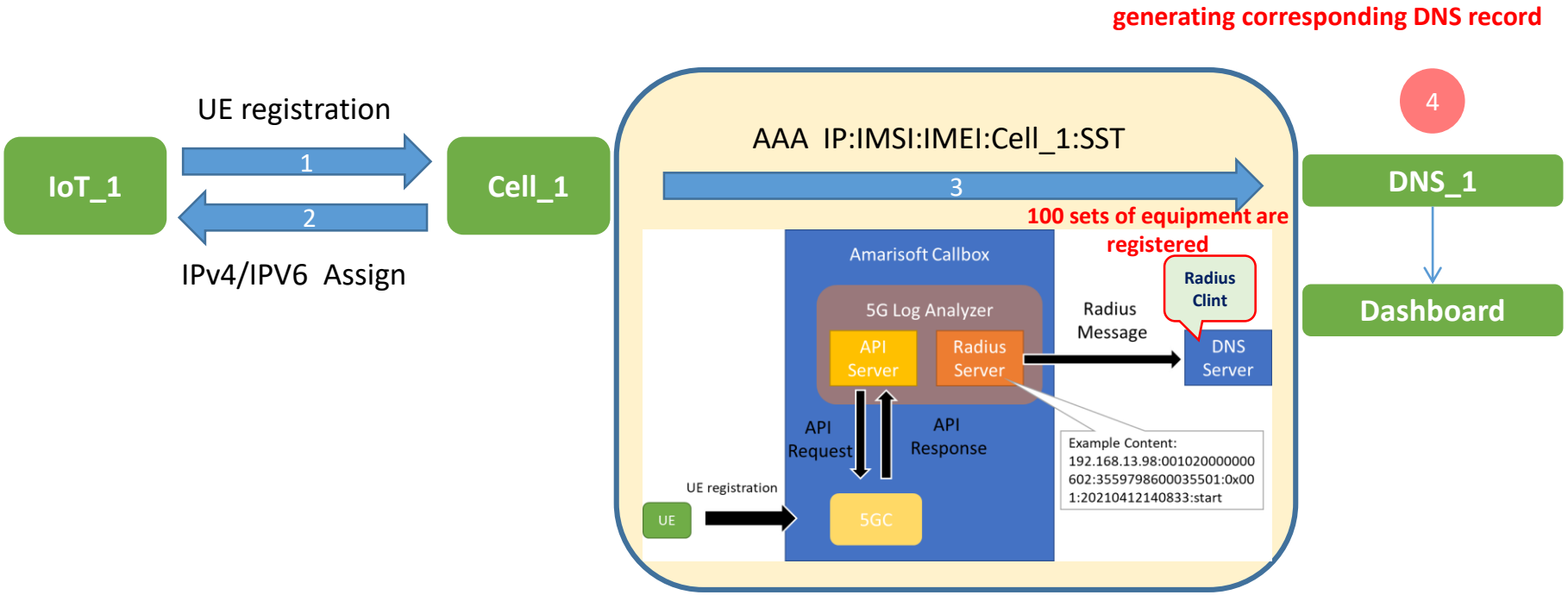
Scenario 2:
Testing large amounts of IoT devices are given identifiers automatically

Register large amounts of IoT devices and then generate Radius record that will be sent to DNS server.

4 Generate DNS A record

IP_A A IMEI_1.Cell_1.Domain_1. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org

IP_A AAAA IMEI_1.Cell_1.Domain_1. <sst>.nssf. 5gc.mnc001.mcc999.3gppnetwork.org

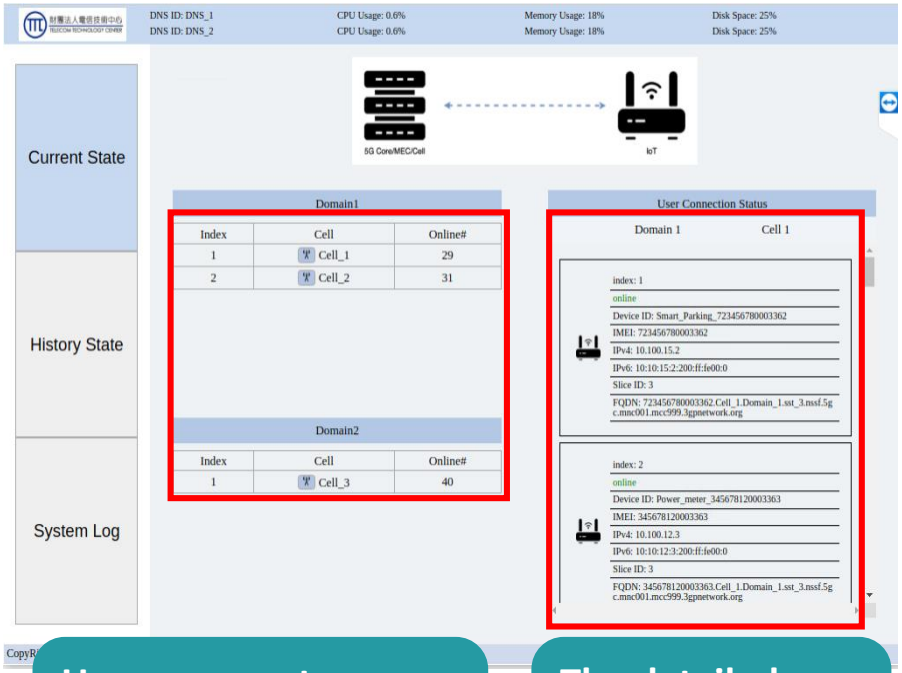


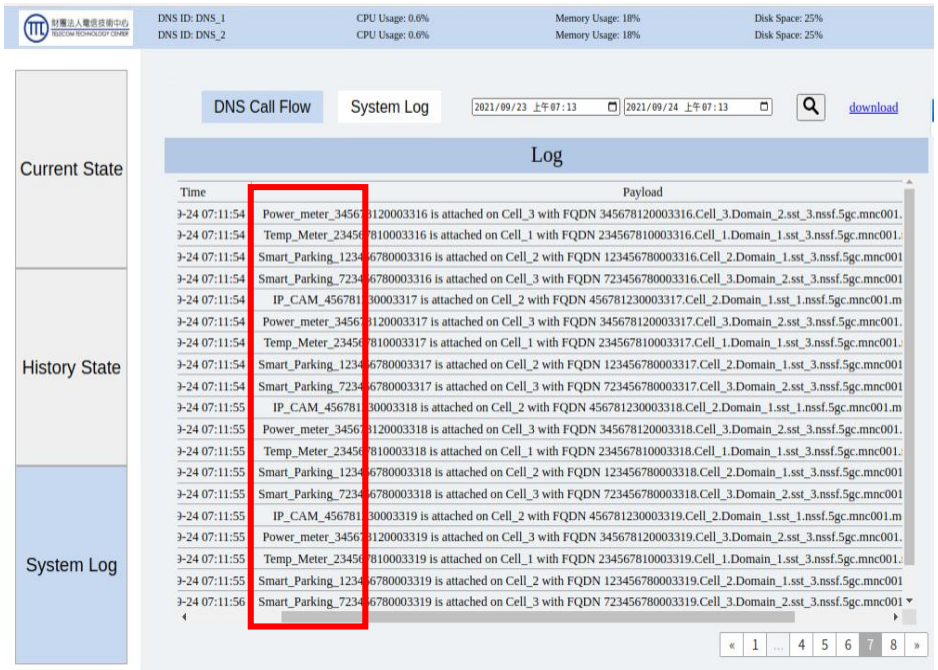
Scenario 2:
Testing large amounts of IoT devices are given identifiers automatically

Name	IP_CAM	Power_Meter	Temp_Meter	Smart_Parking	Smart_Lamps
APN/DNN	IP_CAM	Power_Meter	Temp_Meter	Smart_Parking	Smart_Lamps
TAC (IMEI 8 code)	45678123	34567812	23456781	12345678	72345678
NSSAI	eMBB	MIOT			
SST	1	3			
Template	High quality Video	Smart City sensor			
Throughput	100Mbps/100Mbps	1Mbps/1Mbps			
Zone	nssf.5gc.mnc001.mcc999.3gppnetwork.org				
Service IP IPv4	10.100.11.0/24	10.100.12.0/24	10.100.13.0/24	10.100.14.0/24	10.100.15.0/124
Service IP IPv6	10.:100:11:(1-254):200:ff:fe00:00	10.:100:12:(1-254):200:ff:fe00:00	10.:100:13:(1-254):200:ff:fe00:00	10.:100:14:(1-254):200:ff:fe00:00	10.:100:15:(1-254):200:ff:fe00:00

Scenario 2:
Testing large amounts of IoT devices are given identifiers automatically

Dashboard





Use program to simulate 100 fixed IoT devices in 3 Cells

The detailed description of fixed IoT devices

<DNN>_<IMEI> are the IMEI identifier of IoT, and these logs are different IoT devices registered in 3 different Cells.

Summary

- This Project was funded by MOTC .
- Through the mechanism of DNS identifiers, the management of fixed and moving IoT devices under 5G is more efficient, and the IoT devices are able to be given identifiers under 5G efficiently.
- The PoC of the research based on the context above verify the mechanism and methods of auto DNS identifiers, which can apply to the latest 5G slicing network context and manage the IoT devices efficiently.
- In the next phase of the research, we plan to do the Proof of Service（PoS）on the real 5G network context.

Research Partners

TAIWAN TECH NATIONAL TAIWAN UNIVERSITY OF SCIENCE AND TECHNOLOGY

ADLINK TECHNOLOGY INC.

國立宜蘭大學 National Ilan University NIU

O'PRUEB

鑑智實相科技 Digiforen Technology Co.,Ltd

網路中文 net-chinese.com.tw

TELECOM
TECHNOLOGY CENTER

Thank you

If you have questions or feedbacks, you can send them via email.

Email: Emily.Chien@ttc.org.tw