FP:(Soracom Inc)

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1. 20190059005 CONTROL APPARATUS FOR GATEWAY IN MOBILE COMMUNICATION SYSTEM US - 21.02.2019

Int.Class H04W 24/02 Appl.No 15764122 Applicant SORACOM, INC Inventor KENTA YASUKAWA

A control apparatus for a gateway functioning as the endpoint of a core network in a mobile communication system is provided. The gateway includes a first server configured to receive data from a user apparatus and one or more second servers configured to transfer the data received by the first server to an external network. The control apparatus performs an operation of changing performance of the one or more second servers, an operation of monitoring a processing status of the one or more second servers, and an operation of selecting, from the one or more second servers in accordance with the processing status of the one or more second servers, a second server as a transfer destination of the data received from the user apparatus by the first server.

2. WO/2022/014581 COMMUNICATION SYSTEM FOR CAPTURING PORTION OF DATA, COMMUNICATION METHOD, AND PROGRAM FOR SAME WO - 20.01.2022

Int.Class H04L 12/70 Appl.No PCT/JP2021/026267 Applicant SORACOM, INC. Inventor MATSUI Motokatsu

Provided is a communication system for providing an IoT apparatus with an access to an IP network, wherein data, which has been transmitted from a designated IoT apparatus, can be acquired conveniently in response to a request. A cloud facility 101 is enabled to perform communication on a U frame by establishing, in response to a session establishment request from an MNO facility 110, a session in association with an SIM mounted on an IoT apparatus 130 and returning, to the MON facility 110, a response including a TEID of the session to the session establishment request. However, in the present invention, before transmitting the response, the cloud facility 101 causes a capture server 102 to determine whether it is necessary to start capturing data transmitted by the communication on the U frame. When a capture function is validated, the capture server 102 allows data capture to be started, and the cloud facility 101 returns the response to the MNO facility 110 thereafter.

3. **2017005667** COMMUNICATION SYSTEM AND COMMUNICATION METHOD FOR PROVIDING RADIO TERMINAL WITH ACCESS TO EXTERNAL NETWORK — JP - 05.01.2017

Int.Class H04W 28/08 **Appl.No** 2015127567 **Applicant** SORACOM INC **Inventor** TAMAGAWA KEN

PROBLEM TO BE SOLVED: To increase the number of simultaneously connectable apparatuses in a communication system and a communication method for providing a radio terminal with an access to an external network.

SOLUTION: Each server which configures a first server group 211 includes: a receiver unit which receives data from a radio terminal; a selection unit which selects one of a plurality of transmission destination addresses on the basis of a header in the received data; and a transfer unit which transfers the received data to the transmission destination address selected by the selection unit. The selection can be performed by rewriting an IP address indicated by an IP header in a header. In one example of the present invention, a gateway 210 is separated into a first server group 211, which is a part to be connected to an MNO communications infrastructure, and a second server group 212 which is a part to perform additional data processing etc. Further, by the limitation of data processing in the first server group 211, the number of simultaneously connectable apparatuses can be increased within the limit of the number of gateways, without addition of additional data processing.

SELECTED DRAWING: Figure 2

4. **20220060464** SERVER FOR PROVIDING A TOKEN — US - 24.02.2022

Int.Class H04L 29/06 **Appl.No** 17516108 **Applicant** SORACOM, INC **Inventor** Kenta YASUKAWA

A server for providing a token to a mobile terminal includes a network interface and a processing unit coupled to the network interface. The processing unit is configured to receive from the mobile terminal a request asking for the token, to obtain subscriber identification information of the mobile terminal, to obtain a token which includes a user profile associated with the subscriber identification information and to which an electronic signature is added, and to transmit the token to the mobile terminal.

5. **20180351943** SERVER FOR PROVIDING A TOKEN — US - 06.12.2018

Int.Class G06F 21/33 **Appl.No** 16040907 **Applicant** SORACOM, INC **Inventor** Kenta Yasukawa

A server for providing a token to a mobile terminal includes a network interface and a processing unit coupled to the network interface. The processing unit is configured to receive from the mobile terminal a request asking for the token, to obtain subscriber identification information of the mobile terminal, to obtain a token which includes a user profile associated with the subscriber identification information and to which an electronic signature is added, and to transmit the token to the mobile terminal.

6. **20170366963** MANAGEMENT METHOD AND MANAGEMENT SERVER FOR USING SIM CARDS — US - 21.12.2017

Int.Class H04W 8/18 **Appl.No** 15691198 **Applicant** SORACOM, INC. **Inventor** Ken Tamagawa

In a management method and a management server for using a plurality of SIM cards, a large number of users can start use easily. First, an MVNO **230**A that has obtained one or more SIM cards logs in to a management screen provided by an MVNE **210** in association with a user ID of the MVNO **230**A. From the standpoint of the MVNE **210**, it is determined whether a user ID of a user who has accessed a management screen of a management server of the MVNE **210** is under MVNO contract (S**301**). When the user ID is under MVNO contract, an identification number given to each SIM card and a passcode for authentication given as needed are received as registration information (S**302**). If the management server of the MVNE **210** can receive necessary registration information, each SIM card of which an identification number is specified by the registration information is associated with the user ID as an SIM card used by the MVNO **230**A and the association is registered in the management server of the MVNE **210** or a database **211** accessible therefrom (S**303**).

7. WO/2018/122189 NETWORK COMMUNICATIONS FOR CONNECTED DEVICES

WO - 05.07.2018

Int.Class H04W 8/18 **Appl.No** PCT/EP2017/084471 **Applicant** SORACOM, INC. **Inventor** SHANKAR, Arun

We describe a system for activating SI Ms, where the system comprises more SI Ms than will be authorised for use on a mobile network. The system comprises a plurality of SIMs, each of the SIMs being configured to provide a first SIM identifier. The first SIM identifiers are reused amongst said plurality of SIMs such that one of the SIMs may provide the same SIM identifier as another of the SIMs. The system includes a SIM authorisation server configured to receive the first SIM identifier from a SIM requesting activation and, in response, to provide a new SIM identifier. The new SIM identifier enables the SIM requesting activation to communicate traffic over the mobile network.

8. WO/2020/009659 UPDATING A SUBSCRIBER IDENTITY MODULE

WO - 09.01.2020

Int.Class H04W 12/00 **Appl.No** PCT/SG2019/050326 **Applicant** SORACOM, INC. **Inventor** COMARMOND, Georges Olivier

A method of updating a subscriber identity module,SIM, on a host device, wherein the method is performed by an agent on the host device and comprises: deriving a pre-shared key, said deriving comprising: requesting a SIM identifier of the SIM via a communication module of the host device; receiving the SIM identifier from the SIM via the communication module and deriving an agent identifier from the SIM identifier; transmitting the agent identifier and the SIM identifier over a network to a SIM update server; receiving, via said network, a random value from the SIM update server; supplying the random value to the SIM via the communication module to initiate a SIM authentication procedure, and in reply receive an authentication response from the SIM via the communication module; and deriving the pre-shared key from the authentication response; transmitting an update request message over said network to the SIM update server, wherein the update request message comprises said agent identifier and is encrypted prior to transmission using the pre-shared key; receiving an update response message, via said network, from the SIM update server, wherein the update response message comprises update data and is encrypted using the pre-shared key; and following decryption of the update response message using the derived pre-shared key, transmitting the update data to the communication module for relaying to the SIM for execution to update the SIM.

9. 2017005672 COMMUNICATION SYSTEM AND COMMUNICATION METHOD FOR PROVIDING RADIO TERMINAL WITH ACCESS TO EXTERNAL NETWORK

JP - 05.01.2017

Int.Class H04W 28/08 **Appl.No** 2015184926 **Applicant** SORACOM INC **Inventor** TAMAGAWA KEN

PROBLEM TO BE SOLVED: To increase the number of simultaneously connectable apparatuses in a communication system and a communication method for providing a radio terminal with an access to an external network.

SOLUTION: A communication system 200 to provide a radio terminal with an access to an IP network includes a gateway 210 to cause the IP network to pass data from the radio terminal, as a gateway on a cloud. The gateway 210 does not include a function on the C plane, whereas the communication system 200 includes the function on the C plane. Using a connection start request from the radio terminal as a trigger, one or a plurality of instances to be used in the gateway 210 are determined on the basis of the computing resource use state of the gateway 210.

SELECTED DRAWING: Figure 2

10. 2020010099 DEVICE AND METHOD FOR MEDIATING SETTING OF AUTHENTICATION INFORMATION

JP - 16.01.2020

Int.Class H04L 9/08 **Appl.No** 2018127031 **Applicant** SORACOM INC **Inventor** KATAYAMA AKIO

PROBLEM TO BE SOLVED: To facilitate setting of authentication information for a service provided on an IP network.

SOLUTION: In a situation where there is no authentication information shared between an IoT apparatus and a service provider device of a service used by the apparatus, an intercalary device capable of authentication for propriety access therebetween is intermediated. As an example, a cryptographic key CK stored in the intercalary device and the IoT apparatus, as a result of SIM authentication of a SIM in the IoT apparatus, is a master key of the IoT apparatus for using each service. In the intercalary device and the IoT apparatus, an application key specific to the service used by the IoT apparatus is generated based on the master key, and transmitted to the service provider device from the intercalary device through secure connection, thus setting a key common to the IoT apparatus and the service provider device as the authentication information. The process of SIM authentication generating cryptographic key can restrain aggression to SQN by a bad request.

SELECTED DRAWING: Figure 1