

【CLAIMS】

【Claim 1】

A device-to-device authentication method performed by a first device based on a virtual authentication code, the method comprising:

transmitting to a verification device a first code for generating the virtual authentication code received from a client device, wherein the first code is generated based on identification information of the client device and is used by the verification device for authentication of the client device through verification of the first code;

receiving a second code reflecting an authentication result for the first code from the verification device, wherein the second code includes a hash value and role information for the client device generated by the verification device based on the first code;

generating a third code that is the virtual authentication code, based on the first code and the second code; and

transmitting the third code to at least one second device related to the role information.

【Claim 2】

The method of claim 1, wherein the second code further includes valid time information on the second code, and

wherein the method further comprises:

receiving the third code for updating an expired second code from the second device,

transmitting the first code to the verification device,

requesting the verification device to update the second code when authentication of the client device is completed based on the first code, and then to transmit the updated second code to the first device,

regenerating a third code based on the first code, the updated second code, and reception

time data of the updated second code, and transmitting the regenerated third code to a second device.

【Claim 3】

The method of claim 1, wherein the second code includes a plurality of detailed codes, wherein the plurality of detailed codes are generated by being changed for each unit count by the client device, and

wherein the unit count is set at a specific time interval, and is changed as the time interval elapses.

【Claim 4】

The method of claim 3, wherein the plurality of detailed codes includes a first detailed code and a second detailed code having a correlation with each other,

wherein the first detailed code determines a search starting point for the role information of the client device in the verification device, and

wherein the second detailed code determines a search path for the role information from the search starting point.

【Claim 5】

A device-to-device authentication method performed by a verification device based on a virtual authentication code, the method comprising:

receiving a first code, that is a source code for generating the virtual authentication code, from a client device through a first device, wherein the first code is generated based on identification information of the client device;

performing authentication of the client device by searching for a storage location of the identification information of the client device, based on the first code;

generating role information on the client device when authentication of the client device

is completed;

generating a hash value for the client device based on the first code;

generating a second code reflecting an authentication result for the first code, based on the generated role information and hash value; and

transmitting the second code to the first device so that the first device generates a third code that is the virtual authentication code, based on the second code.

【Claim 6】

The method of claim 10, wherein the second code further includes valid time information on the second code, and

wherein the method further comprises:

when a request for update of an expired second code is received in a state where a valid time of the second code for the first code received from the first device has expired, performing authentication of the client device by determining whether the first code received from the first device and a previously stored first code are identical; and

upon completion of authentication of the client device, updating the second code and transmitting the updated second code to the first device.

【Claim 7】

A program combined with a computer as hardware, stored in a medium to execute the method of any one of claims 1 to 6.