

conducting apparatus estimates a time required for diagnosing vulnerability of the certain host device on the basis of the history information and generates a schedule for diagnosing the certain host device on the basis of the estimated time.

5 [Citation List]

[Patent Literature]

[0008]

PTL 1: International Publication No. WO 2008/007669

PTL 2: Japanese Laid-open Patent Publication No.
10 2007-328417

PTL 3: Japanese Laid-open Patent Publication No.
2009-237807

[Summary]

[0009]

15 Attack method of malicious communication destination to a device increases. As a consequence, for example, even though vulnerability of the server is efficiently diagnosed using the vulnerability diagnosis conducting apparatus disclosed in Patent Literature 3, the apparatus cannot always diagnose all types of
20 vulnerability. The reason for this is because the apparatus is not always able to detect the communication destination that attacks according to various attack methods.

[0010]

Therefore, various embodiments provide a communication
25 destination determination device and the like capable of detecting a suspicious communication destination as a threat.

[0011]

In a first aspect, the present disclosure provides a communication destination determination device comprising: signal transmission means for transmitting a second signal in response to a first signal requiring certain information to a communication destination when the first signal is received from the communication destination via a communication network; communication destination determination means for determining whether or not the communication destination is suspicious as a threat on a basis of whether or not a third signal requiring certain information transmitted from the communication destination is received within a certain time period after a timing of transmission of the second signal; history specifying means for reading a signal from communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination; signal selection means for selecting a signal different from the signal read by the history specifying means from signal information including a signal transmittable to the communication destination; and history update means for adding the second signal transmitted by the signal transmission means to the communication history information, wherein the signal transmission means transmits the signal selected by the signal selection means to the communication destination as the second signal and the second signal includes content that has not been transmitted to the destination.

[0011a]

In a second aspect, the present disclosure provides a communication destination determination device comprising:

signal transmission means for transmitting a second signal in response to a first signal requiring certain information to a first communication destination when the first signal is received from the first communication destination via a communication network;

5 communication destination determination means for determining that at least one of the first communication destination and a second communication destination is suspicious as a threat when a third signal requiring the certain information is received from the second communication destination within a certain time period
10 after a timing of transmission of the second signal; history specifying means for reading a signal from communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination; signal selection means for
15 selecting a signal different from the signal read by the history specifying means from signal information including a signal transmittable to the communication destination; and history update means for adding the second signal transmitted by the signal transmission means to the communication history information,
20 wherein the signal transmission means transmits the signal selected by the signal selection means to the communication destination as the second signal and the second signal includes content that has not been transmitted to the destination.

[0011b]

25 In a third aspect, the present disclosure provides a communication destination determination device comprising: signal transmission means for transmitting a second signal in response to a first signal requiring certain information to a first communication destination when the first signal is received from

the first communication destination via a port through which communication connection with a communication network is performed; communication destination determination means for determining that at least one of the first communication
5 destination and a second communication destination is suspicious as a threat when a third signal requiring certain information is received from the second communication destination via the port within a certain time period after a timing of transmission of the second signal; history specifying means for reading a signal from
10 communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination; signal selection means for selecting a signal different from the signal read by the history specifying means from signal information including a
15 signal transmittable to the communication destination; and history update means for adding the second signal transmitted by the signal transmission means to the communication history information, wherein the signal transmission means transmits the signal selected by the signal selection means to the communication
20 destination as the second signal and the second signal includes content that has not been transmitted to the destination.

[0011c]

In a fourth aspect, the present disclosure provides a communication destination determination comprising: signal
25 transmission means for transmitting a second signal in response to a first signal to a first communication destination when the first signal is received from the first communication destination via a communication network; and communication destination determination means for specifying a first device via which

communication with the first communication destination is performed and a second device via which communication with a second communication destination is performed when a third signal is received from the second communication destination within a certain time period after a timing of transmission of the second signal, and determines that at least one of the first communication destination and the second communication destination is suspicious as a threat when the first device and the second device coincide with each other.

10 [0011d]

In a fifth aspect, the present disclosure provides a communication destination determination method comprising: transmitting a second signal in response to a first signal requiring certain information to a communication destination when the first signal is received from the communication destination via a communication network; and determining whether or not the communication destination is suspicious as a threat on a basis of whether or not a third signal requiring certain information transmitted from the communication destination is received within a certain time period after a timing of transmission of the second signal; reading a signal from communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination; selecting a different signal from the signal read by the history specifying means from signal information including a signal transmittable to the communication destination; and adding the second signal transmitted by the signal transmission means to the communication history information, wherein in transmitting the second signal, transmits the different

signal to the communication destination as the second signal and the second signal includes content that has not been transmitted to the destination.

[0011e]

5 In a sixth aspect, the present disclosure provides a recoding medium storing a communication destination determination program recorded therein, the program making a computer achieve: a signal transmission function for transmitting a second signal in response to a first signal requiring certain information to a
10 communication destination when the first signal is received from the communication destination via a communication network; a communication destination determination function for determining whether or not the communication destination is suspicious as a threat on a basis of whether or not a third signal requiring certain
15 information transmitted from the communication destination is received within a certain time period after a timing of transmission of the second signal; a history specifying function for reading a signal from communication history information including the second signal transmitted to the communication destination when
20 the first signal is received from the communication destination; a signal selection function for selecting a signal different from the signal read by the history specifying function from signal information including a signal transmittable to the communication destination; and a history update function for adding the second
25 signal transmitted by the signal transmission function to the communication history information, wherein the signal transmission function transmits the signal selected by the signal selection function to the communication destination as the second signal and the second signal includes content that has not been

transmitted to the destination.

[0011f]

In order to achieve the above-described object, as an embodiment of the present disclosure, a communication
5 destination determination device including:

signal transmission means for transmitting a second signal in response to a first signal to a communication destination when the first signal is received from the communication destination via a communication network; and

10 communication destination determination means for determining whether or not the communication destination is suspicious as a threat on a basis of whether or not a third signal transmitted from the communication destination is received within a certain time period after a timing of transmission of the second
15 signal.

[0012]

In addition, as another embodiment of the present disclosure, a communication destination determination method including:

transmitting a second signal in response to a first signal to a
20 communication destination when the first signal is received from the communication destination via a communication network; and

determining whether or not the communication destination is suspicious as a threat on a basis of whether or not a third signal transmitted from the communication destination is received within
25 a certain time period after a timing of transmission of the second signal.

[0013]

Furthermore, the object is also realized by an

associated communication destination determination program, and

a computer-readable recording medium which records the program.

[Advantageous Effects]

[0014]

In accordance with the communication destination
5 determination device and the like according to the present
disclosure, it is possible to detect a suspicious communication
destination as a threat.

[Brief Description of Drawings]

[0015]

10 [Fig. 1] Fig. 1 is a block diagram illustrating a
configuration of a communication destination determination
device according to a first example embodiment of the present
disclosure.

[Fig. 2] Fig. 2 is a flowchart illustrating the flow of
15 processing in the communication destination determination device
according to the first example embodiment.

[Fig. 3] Fig. 3 is a diagram illustrating an example of a
request signal.

[Fig. 4] Fig. 4 is a diagram illustrating an example of a
20 response signal (the second signal).

[Fig. 5] Fig. 5 is a block diagram illustrating a
configuration of a communication destination determination
device according to a second example embodiment of the present
disclosure.

25 [Fig. 6] Fig. 6 is a flowchart illustrating the flow of
processing in the communication destination determination device
according to the second example embodiment.

[Fig. 7] Fig. 7 is a diagram conceptually illustrating an
example of signal information.

CLAIMS

[Claim 1]

A communication destination determination device comprising:

signal transmission means for transmitting a second signal in response to a first signal requiring certain information to a communication destination when the first signal is received from the communication destination via a communication network;

communication destination determination means for determining whether or not the communication destination is suspicious as a threat on a basis of whether or not a third signal requiring certain information transmitted from the communication destination is received within a certain time period after a timing of transmission of the second signal;

history specifying means for reading a signal from communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination;

signal selection means for selecting a signal different from the signal read by the history specifying means from signal information including a signal transmittable to the communication destination; and

history update means for adding the second signal transmitted by the signal transmission means to the communication history information, wherein

the signal transmission means transmits the signal selected by the signal selection means to the communication destination as the second

signal and

the second signal includes content that has not been transmitted to the destination.

[Claim 2]

The communication destination determination device according to claim 1, further comprising:

history information storage means capable of storing the communication history information including communication information in which a communication destination identifier, which is able to identify the communication destination, and the second signal, which has been transmitted to the communication destination, are associated with each other, wherein,

when a fourth signal is received from a certain communication destination, the history specifying means specifies a signal associated with a communication destination identifier indicating the certain communication destination in the communication history information,

the signal selection means selects a signal different from the signal specified by the history specifying means from the signal information, and

the history update means generates communication information in which a communication destination identifier, which has been transmitted by the signal transmission means and indicates the communication destination, and the second signal, which has been transmitted by the signal transmission means, are associated with each other, and adds the

generated communication information to the communication history information.

[Claim 3]

The communication destination determination device according to claim 1, further comprising:

history information storage means capable of storing the communication history information including communication information in which a time zone, in which the first signal has been received, and the second signal, which has been transmitted with respect to the first signal, are associated with each other, wherein,

when a fourth signal is received in a certain time zone, the history specifying means specifies a signal associated with the certain time zone in the communication history information,

the signal selection means selects a signal different from the signal specified by the history specifying means from the signal information, and

the history update means generates communication information in which the certain time zone, and the second signal, which has been transmitted by the signal transmission means, are associated with each other, and adds the generated communication information to the communication history information.

[Claim 4]

The communication destination determination device according to claim 1, further comprising:

history information storage means capable of storing the communication history information including communication information in which a time zone, in which the first signal has been received from the communication destination, a communication destination identifier, which is able to identify the communication destination, and the second signal, which has been transmitted in response to the first signal, are associated with each other, wherein,

when a fourth signal is received from a communication destination indicated by a certain communication destination identifier in a certain time zone, the history specifying means specifies a signal associated with the certain communication destination identifier and the certain time zone in the communication history information,

the signal selection means selects a signal different from the signal specified by the history specifying means from the signal information, and

the history update means generates communication information in which the certain communication destination identifier, the certain time zone, and the second signal, which has been transmitted by the signal transmission means, are associated with each other, and adds the generated communication information to the communication history information.

[Claim 5]

A communication destination determination device comprising:

signal transmission means for transmitting a second signal in

response to a first signal requiring certain information to a first communication destination when the first signal is received from the first communication destination via a communication network;

communication destination determination means for determining that at least one of the first communication destination and a second communication destination is suspicious as a threat when a third signal requiring the certain information is received from the second communication destination within a certain time period after a timing of transmission of the second signal;

history specifying means for reading a signal from communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination;

signal selection means for selecting a signal different from the signal read by the history specifying means from signal information including a signal transmittable to the communication destination; and

history update means for adding the second signal transmitted by the signal transmission means to the communication history information, wherein

the signal transmission means transmits the signal selected by the signal selection means to the communication destination as the second signal and

the second signal includes content that has not been transmitted to the destination.

[Claim 6]

The communication destination determination device according to claim 5, further comprising:

history information storage means capable of storing the communication history information including communication information in which an information identifier, which is able to identify the certain information requested by the first signal, and the second signal, which has been transmitted in response to the first signal, are associated with each other, wherein,

when a fourth signal requiring information indicated by a specific information identifier is received, the history specifying means specifies a signal associated with the specific information identifier in the communication history information,

the signal selection means selects a signal different from the signal specified by the history specifying means from the signal information, and

the history update means generates communication information in which the specific information identifier and the second signal, which has been transmitted by the signal transmission means, are associated with each other, and adds the generated communication information to the communication history information.

[Claim 7]

A communication destination determination device comprising:

signal transmission means for transmitting a second signal in

response to a first signal requiring certain information to a first communication destination when the first signal is received from the first communication destination via a port through which communication connection with a communication network is performed;

communication destination determination means for determining that at least one of the first communication destination and a second communication destination is suspicious as a threat when a third signal requiring certain information is received from the second communication destination via the port within a certain time period after a timing of transmission of the second signal;

history specifying means for reading a signal from communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination;

signal selection means for selecting a signal different from the signal read by the history specifying means from signal information including a signal transmittable to the communication destination; and

history update means for adding the second signal transmitted by the signal transmission means to the communication history information, wherein

the signal transmission means transmits the signal selected by the signal selection means to the communication destination as the second signal and

the second signal includes content that has not been transmitted to

the destination.

[Claim 8]

The communication destination determination device according to claim 7, further comprising:

history information storage means capable of storing the communication history information including communication information in which a port identifier, which is able to identify the port via which the first signal is received, and the second signal, which has been transmitted in response to the first signal, are associated with each other, wherein,

when a fourth signal is received via a port indicated by a certain port identifier, the history specifying means specifies a signal associated with the certain port identifier in the communication history information,

the signal selection means selects a signal different from the signal specified by the history specifying means from the signal information, and

the history update means generates communication information in which the certain port identifier and the second signal, which has been transmitted by the signal transmission means, are associated with each other, and adds the generated communication information to the communication history information.

[Claim 9]

A communication destination determination comprising:

signal transmission means for transmitting a second signal in response to a first signal to a first communication destination when the

first signal is received from the first communication destination via a communication network; and

communication destination determination means for specifying a first device via which communication with the first communication destination is performed and a second device via which communication with a second communication destination is performed when a third signal is received from the second communication destination within a certain time period after a timing of transmission of the second signal, and determines that at least one of the first communication destination and the second communication destination is suspicious as a threat when the first device and the second device coincide with each other.

[Claim 10]

The communication destination determination device according to claim 9, further comprising:

history specifying means for reading a signal from communication history information including the second signal transmitted when the first signal is received;

signal selection means for selecting a signal different from the signal read by the history specifying means from signal information including a signal in response to the first signal; and

history update means for adding the second signal transmitted by the signal transmission means to the communication history information, wherein

the signal transmission means transmits the signal selected by the

signal selection means as the second signal.

[Claim 11]

The communication destination determination device according to claim 10, further comprising:

history information storage means capable of storing the communication history information including communication information in which a device identifier, which is able to identify the first device via which communication with the first communication destination is performed, and the second signal, which has been transmitted to the first communication destination, are associated with each other, wherein

the history specifying means specifies a signal associated with a certain device identifier indicating a device via which communication with a third communication destination having received a fourth signal is performed in the communication history information,

the signal selection means selects a signal different from the signal specified by the history specifying means from the signal information, and

the history update means generates communication information in which the certain device identifier and the second signal, which has been transmitted by the signal transmission means, are associated with each other, and adds the generated communication information to the communication history information.

[Claim 12]

The communication destination determination device according to

any one of claims 1 to 8, 10, and 11 wherein

the signal transmission means does not transmit the second signal when the signal selection means determines that the signal different from the signal specified by the history specifying means is not included in the signal information.

[Claim 13]

A communication destination determination method comprising:

transmitting a second signal in response to a first signal requiring certain information to a communication destination when the first signal is received from the communication destination via a communication network; and

determining whether or not the communication destination is suspicious as a threat on a basis of whether or not a third signal requiring certain information transmitted from the communication destination is received within a certain time period after a timing of transmission of the second signal;

reading a signal from communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination;

selecting a different signal from the signal read by the history specifying means from signal information including a signal transmittable to the communication destination; and

adding the second signal transmitted by the signal transmission means to the communication history information, wherein

in transmitting the second signal, transmits the different signal to the communication destination as the second signal and

the second signal includes content that has not been transmitted to the destination.

[Claim 14]

A recoding medium storing a communication destination determination program recorded therein, the program making a computer achieve:

a signal transmission function for transmitting a second signal in response to a first signal requiring certain information to a communication destination when the first signal is received from the communication destination via a communication network;

a communication destination determination function for determining whether or not the communication destination is suspicious as a threat on a basis of whether or not a third signal requiring certain information transmitted from the communication destination is received within a certain time period after a timing of transmission of the second signal;

a history specifying function for reading a signal from communication history information including the second signal transmitted to the communication destination when the first signal is received from the communication destination;

a signal selection function for selecting a signal different from the signal read by the history specifying function from signal information

including a signal transmittable to the communication destination; and

a history update function for adding the second signal transmitted by the signal transmission function to the communication history information, wherein

the signal transmission function transmits the signal selected by the signal selection function to the communication destination as the second signal and

the second signal includes content that has not been transmitted to the destination.