

659032

SPRUSON & FERGUSON

AUSTRALIA

PATENTS ACT 1990

**PATENT REQUEST: STANDARD PATENT**

I/We, the Applicant(s)/Nominated Person(s) specified below, request I/We be granted a patent for the invention disclosed in the accompanying standard complete specification.

**[70,71] Applicant(s)/Nominated Person(s):**

Fujitsu Limited, incorporated in Japan, of 1015, Kamikodanaka, Nakahara-ku, Kawasaki-shi, Kanagawa, 211, JAPAN

**[54] Invention Title:**

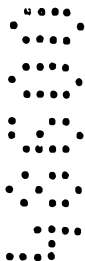
Method For Joining A Plurality Of Networks And Seceding Therefrom

**[72] Inventor(s):**

Akira Ide

**[74] Address for service in Australia:**

Spruson & Ferguson, Patent Attorneys  
Level 33 St Martins Tower  
31 Market Street  
Sydney New South Wales Australia (Code SF)



**Details of Basic Application(s):**

**[31] Appl'n No(s):**

**[33] Country:**

**[32] Application Date:**

4-256329

JP

25 September 1992

**Basic Applicant(s):** Fujitsu Limited

DATED this TWENTY FOURTH day of SEPTEMBER 1993

Fujitsu Limited

By:

  
Registered Patent Attorney

S 040771 240993

IRN: 251660

INSTR CODE: 56093



Australia

Patents Act 1990

NOTICE OF ENTITLEMENT

I, Fraser Patison Old, of Spruson & Ferguson, St Martins Tower, 31 Market Street, Sydney, New South Wales 2000, Australia, being the patent attorney for the Applicant(s)/Nominated Person(s) in respect of Application No 48600/93 state the following:-

The Applicant(s)/Nominated Person(s) has/have entitlement from the actual inventor(s) as follows:-

The Applicant(s)/Nominated Person(s), by virtue of a Contract of Employment between the actual inventor(s) as employee(s) and the Applicant(s)/Nominated Person(s) as employer(s), is a person entitled to have the patent assigned to it if a patent were granted on an application made by the actual inventor(s).

The Applicant(s)/Nominated Person(s) is/are the applicant(s) of the basic application(s) listed on the Patent Request. The basic application(s) listed on the Patent Request is/are the first application(s) made in a Convention Country in respect of the invention.

DATED this 15th day of December 19 93

  
.....

F P Old

IRN:

INSTR CODE:

36

665P





AU9348600

**(12) PATENT ABRIDGMENT (11) Document No. AU-B-48600/93**  
**(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 659032**

- (54) Title  
METHOD FOR JOINING A PLURALITY OF NETWORKS AND SECEDING THEREFROM  
International Patent Classification(s)  
(51)<sup>5</sup> H04L 029/02  
(21) Application No. : 48600/93 (22) Application Date : 24.09.93  
(30) Priority Data  
(31) Number (32) Date (33) Country  
4-256329 25.09.92 JP JAPAN  
(43) Publication Date : 14.04.94  
(44) Publication Date of Accepted Application : 04.05.95  
(71) Applicant(s)  
FUJITSU LIMITED  
(72) Inventor(s)  
AKIRA IDE  
(74) Attorney or Agent  
SPRUSON & FERGUSON , GPO Box 3898, SYDNEY NSW 2001  
(57) Claim

1. A method for joining a plurality of communications networks, the method comprising the steps of:

(a) registering as first system definition information, at a first one of the communications networks indicated by first address information, second address information indicating with which of a second one of the communications networks said first communications network requests to communicate;

(b) registering as second system definition information, at said first communications network, said second address information indicating that said first communications network is allowed to communicate with said second communications network; and

(c) assigning, at said first communications network, a management number to the first address information and the second address information so as to be operatively linked together, whereby said first communications network can communicate with said second one of the communications networks by using the second system definition information referred to by the management number.

1 TITLE OF THE INVENTION

METHOD FOR JOINING A PLURALITY OF NETWORKS  
AND SECEDING THEREFROM

5 BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a  
communications system including a plurality of  
networks, and more particularly to a method for joining  
10 such networks and seceding therefrom.

2. Description of the Prior Art

There is in present technology a  
communications system having a plurality of networks  
coupled to each other. Each communications network is  
15 allowed to communicate with one or a plurality of  
remote communications networks which are previously  
registered. If a communications network generates a  
request to communicate with (join) a remote  
communications network which has not been registered, a  
20 network system address indicating the above  
communications network is registered in the remote  
communications network, and a network system address  
indicating the remote communications network is  
registered in the communications network which has  
25 generated the above request.

When a communications network has a request  
to secede from the above remote communications network,  
the network system address indicating the  
communications network having the above request is  
30 deleted from the remote communications network, and the  
network system address indicating the remote  
communications network is also deleted from the  
communications network having the above request.

Conventionally, the registration and seceding  
35 processes are manually carried out in a state in which  
communications services provided by the communications  
networks being considered are interrupted.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a process for automatically joining a plurality of communications networks and seceding therefrom without interrupting communications services.

5           Therefore, the invention discloses a method for joining a plurality of communications networks, the method comprising the steps of:

          (a)       registering as first system definition information, at a first one of the communications networks indicated by first address information, second address information indicating with which of a second one of the communications networks said  
10 first communications network requests to communicate;

          (b)       registering as second system definition information, at said first communications network, said second address information indicating that said first communications network is allowed to communicate with said second communications network; and

15           (c)       assigning, at said first communications network, a management number to the first address information and the second address information so as to be operatively linked together, whereby said first communications network can communicate with said second one of the communications networks by using the second system definition information referred to by the management number.

20           Preferably, the above method comprises the further steps of:

          (d)       registering, at the second communications network, the first address information as third system definition information together with said management number,



the first address information registered in the third system definition information indicating that said second communications network is allowed to communicate with said first communications network.

Preferably, the above method comprises the further steps of:

5 (e) deleting the second address information from the first system definition information when said first communications network stops a communication with said second communications network;

(f) deleting the second address information from the second system definition information when said first communications network stops said  
10 communication with the second communications network; and

(g) cancelling the management number when said first communications network stops said communication with the second communications network.

Preferably, the above method comprises the further step of:

(h) deleting the second address information and the management number  
15 from the third system definition information when said first communications network stops a communication with the second communications network.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a communication

5

10

15



1 system having a plurality of communications networks  
according to an embodiment of the present invention;

Fig. 2 is a diagram of a host's own system  
definition information and remote system definition  
5 information according to the embodiment of the present  
invention:

Figs. 3A and 3B are diagrams of formats of a  
network system address according to the embodiment of  
the present invention;

10 Fig. 4 is a flowchart of the operation of the  
embodiment of the present invention;

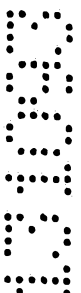
Fig. 5 is a flowchart of the operation of the  
embodiment of the present invention; and

15 Fig. 6 is a diagram showing how host devices  
join networks and secede therefrom.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 is a block diagram of a communications  
system having a plurality of communications networks  
20 NW1, NW2, NW3, NW4 and NW5. The communications network  
NW1 is connected to the communications networks NW2  
through NW5 by means of communications media, such as  
cables. The communications networks NW1 through NW5  
respectively form their own systems. The  
25 communications networks NW1 through NW5 have respective  
host devices HST1 through HST5, to which terminals TE1  
through TE5 are respectively connected. In practice, a  
plurality of terminals are accommodated in the networks  
NW1 through NW5.

30 Each of the communications networks manages  
its own system definition information 1 as shown in  
Fig. 2. The information shown in Fig. 2 is information  
managed by the host device HST1 of the communications  
network NW1. Each of the other host devices HST2  
35 through HST5 of the communications networks NW2 through  
NW5 manages its own system definition information in  
the same way as the host device HST1. For example, the

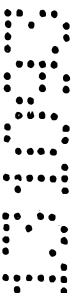


1 network system addresses registered in the own system  
definition information 1 managed by the host device  
HST1 indicate the host devices (networks) that the host  
device NST1 (network NW1) joins and requests to  
5 communicate with.

. More particularly, the system definition  
information 1 managed by the host device HST1 of the  
network NW1 includes an information item including a  
pointer, a management number 3 and a network system  
10 address (NSAP). The pointer is used to serially link  
items contained in the system definition information 1,  
as shown in Fig. 2. As shown in Fig. 2, the  
information items can be formed for the respective  
communications networks NW1 through NW5. In the case  
15 shown in Fig. 2, the information item shown on the  
leftmost side of Fig. 2 relates to the network NW1, and  
the information item next to the above item relates to  
the network NW2. The pointer of the information item  
relating to the network NW1 indicates the beginning of  
20 the information item relating to the network NW2.

The management number 3 is serially assigned  
to the information items. In the case shown in Fig. 2,  
the information items of the networks NW1, NW2 and NW4  
are assigned management numbers 0, 1 and 2,  
25 respectively. The network system addresses nsap1,  
nsap2, nsap3, nsap4, ..., nsapn (n is an integer equal  
to 5 in the communications system shown in Fig. 1) are  
assigned to the communications networks NW1 through  
NW5.

30 Each of the host devices HST1 through HST5 of  
the communications networks NW1 through NW5 manages,  
using the above-mentioned management number, the  
network system addresses of other remote networks as  
remote system definition information 2 shown in Fig. 2.  
35 The information 2 shown in Fig. 2 is information  
managed by the host computer HST1 of the network NW1  
and is related to the communications network NW2. The



1 remote system definition information 2 managed by the  
host device HST1 includes a host address number of the  
network system address NSAP. In the case shown in Fig.  
2, the network system address is nsap2, and the host  
5 address number is 1, which is the management number  
related to the communications network NW2 and managed  
by the host device HST1 of the network NW1. For  
example, the network addresses registered in the remote  
system definition information 2 and managed by the host  
10 device HST1 indicate the host devices (networks) that  
the host device HST (network NW1) is capable of  
communicating with.

Fig. 3A shows a format of the network system  
address NSAP of each of the host devices HST1 of the  
15 networks NW1 through NW5. The network system address  
NSAP includes information indicating the network type  
and the network identification number, and node  
addresses. The network type is, for example, a LAN  
(Local Area Network) or a WAN (Wide Area Network). The  
20 network identification number indicates the  
corresponding communications network. The node  
addresses indicate the addresses of nodes connected to  
the communications network related to the host device  
managing the network system address NSAP shown in Fig.  
25 3A.

Fig. 3B shows the network system address NSAP  
according to the E. 164 format. As shown in Fig. 3B,  
the E. 164 format of the network system address NSAP  
includes:

- 30                    •45  
                      •country code  
                      •subscriber number  
                      •area ID  
                      •end-system ID  
35                    •NSAP selector.

The host device HST1 of the network NW1

1 stores the system definition information items of the  
other networks with which the network NW1 requests to  
communicate. A description will now be given, with  
reference to Figs. 4, 5 and 6, of a case where the host  
5 HST1 of the network NW1 generates a request to  
communicate with the host device ST2 of the network NW2  
and the host device HST4 of the network NW4 when the  
host device HST1 is communicating with the terminal  
TE1.

10 Referring to Fig. 4, the host device HST1 of  
the network NW1 communicates with terminal TE1  
accommodated in the network NW1 in step S1. In step  
S2, the host device HST1 adds the network system  
address nsap2 of the network NW2 to the system  
15 definition information 1 managed by the host device  
HST1, as indicated by [1] in Fig. 6. Originally, the  
system definition information managed by the host  
device HST1 includes information concerning its own  
network NW1. In step S3, the host device HST1 creates  
20 system information concerning the remote network NW2,  
as indicated by [2] shown in Fig. 6, and the host  
device HST2 creates system information concerning the  
remote network NW1, as indicated by [3] shown in Fig.  
6. The created system information concerning the  
25 network NW1 (host device HST1) is registered in the  
remote system definition information 2 managed by the  
host device HST2.

In step S4, the host device HST1 activates  
the system definition information concerning the  
30 network NW2, and the host device HST2 activates the  
system definition information concerning the network  
NW1. Thereby, the host device HST1 becomes capable of  
communicating with the host device HST2, and the host  
device HST2 becomes capable of communicating with the  
35 host device HST1. That is, the host device HST1 has  
joined the network NW2.

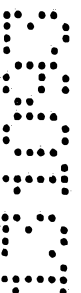
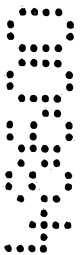
Similarly, in step S5, the host device HST1

1 adds the network system address nsap4 of the network  
NW4 to the system definition information 1 managed by  
the host device HST1, as indicated by [4] shown in Fig.  
6. In step S6, the host device HST1 creates system  
5 information concerning the remote network NW4, as  
indicated by [5] shown in Fig. 6, and the host device  
HST4 creates system information concerning the remote  
network NW1, as indicated by [6] shown therein. The  
created system information concerning the remote  
10 network NW4 is registered in the remote system  
definition 2 managed by the host device HST1. The  
created system information concerning the network NW1  
(host device HST1) is registered in the remote system  
definition information 2 managed by the host device  
15 HST4.

In step S7, the host device HST1 activates  
the system definition information concerning the  
network NW4, and the host device HST4 activates the  
system definition information concerning the network  
20 NW1. Thereby, the host device HST1 becomes capable of  
communicating with the host device HST4, and the host  
device HST4 becomes capable of communicating with the  
host device HST1. That is, the host device HST1 has  
joined the network NW4, and the host device HST4 has  
25 joined the network NW1.

Similarly, as indicated by [8] shown in Fig.  
6, the system definition information concerning the  
host device HST2 is registered in the remote system  
definition information 2 managed by the host system  
30 HST4. Further, as indicated by [7] shown in Fig. 6,  
the system definition information concerning the host  
device HST4 is registered in the remote system  
definition information 2 managed by the host system  
HST2.

35 In step S8, communications among the host  
devices HST1, HST2 and HST4 take place. In the state  
in which the host device HST1 of the network NW1 is



1 communicating with the terminal TE1, the host devices  
HST1, HST2 and HST4 mutually create their own system  
definition information 1 and the remote system  
5 definition information 2 and activate the information 1  
and information 2. Hence, it becomes possible for the  
host devices HST1, HST2 and HST4 to communicate with  
one another.

Fig. 5 is a flowchart of a process for adding  
the network system address NSAP to the system  
10 definition information. The process can be manually or  
automatically performed. In step S11, an operator of  
the host device HST1 of the network NW1 inputs a  
command to the host device HST1 via a keyboard or the  
like, and inputs a desired network system address NSAP  
15 and a management number corresponding to the desired  
network system address NSAP. For example, the operator  
inputs the network system address nsap2. At this time,  
the management number may be automatically assigned  
in response to the input of the network system address  
20 nsap2. In the case shown in Fig. 2, management number  
"1" is assigned to the network system address nsap2.

In step S12, it is determined whether or not  
a network system address (NSAP) storage area  
corresponding to the network system address input in  
25 step S11 has been captured. In Fig. 2, such a network  
system address storage area is indicated by an oval.  
When the result of step S12 is YES, step S15 is  
processed. When the result of step S12 is NO, in step  
S13, a network system address storage area  
30 corresponding to the network system address input in  
step S11 is captured. Then, in step S14, the pointer  
address indicating the captured storage area is set in  
the network system address storage area to which the  
captured storage area should be chained, as shown in  
35 Fig. 2.

In step S15, the network system address input  
in step S11 is stored in the network address storage

1 area captured in step S13 in accordance with the  
management number. For example, the network system  
address nsap2 is stored in the storage area to which  
management number "3" is assigned. In step S16, the  
5 network system address NSAP is finally registered in  
the system definition information 1 managed by the host  
device HST1.

In the above-mentioned manner, if the storage  
area corresponding to the network system address input  
10 in step S11 has not been registered, the above storage  
area is dynamically captured and registered in  
connection with the management number, so that entry of  
the host device HST1 is completed.

As has been described previously, Fig. 6  
15 shows how the own system definition information 1 and  
the remote system definition information 2 are set when  
communications among the networks NW1, NW2 and NW4 take  
place. Before the own system definition information 1  
and the remote system definition information 2 are  
20 updated, the host devices HST1, HST2 and HST4 have  
their own system definition information 1 as follows:

HST1: nsap1  
HST2: nsap2  
HST4: nsap4.

25 After the host devices HST1, HST2 and HST4  
are mutually connected and communications can take  
place between these devices, the host device HST1 has  
its own system definition information as follows:

HST1: nsap1, nsap2, nsap4.

30 Further, the host device HST1 has the following remote  
system definition information 2:

nsap2, address no. "1" regarding HST2 (NW2)  
nsap4, address no. "2" regarding HST4 (NW4).

As has been described previously, the address number  
35 corresponds to the management number. That is, the  
address number "1" corresponds to the management number  
"1". The host device HST2 has its own system

1 definition information 1 indicating only its own  
address nsap2, and the remote system definition  
information 2 indicating the remote networks (host  
devices) nsap1 and nsap4. By referring to the  
5 definition information 2, the host device HST2 can  
communicate with the host devices HST1 and HST4.  
Similarly, the host device HST4 manages its own system  
definition information 1 and the remote system  
definition information 2.

10 As shown in Fig. 1 and Fig. 6, the own system  
definition information 1 and the remote system  
definition information 2 are registered so that the  
information 1 and the information 2 are linked by the  
management number. Hence, the networks NW1, NW2 and  
15 NW4 can communicate with one another.

Further, Fig. 6 shows how to secede from the  
networks. In the seceding procedure, items of the  
remote system definition information 2 indicated by  
ovals are deleted from tat the host devices HST1, HST2  
20 and HS14.

Each of the host devices HST1 through HST5  
includes a CPU, a memory, a communications controller,  
and an input/output device. Similarly, each of the  
terminals TE1 through TE5 has a CPU, a memory, a  
25 communications controller and an input/output device.  
It will be noted that the hardware configurations of  
the host devices and the terminals are known.

It is possible for the terminal to perform  
the procedures shown in Figs. 4 through 6 instead of  
30 the host devices.

The present invention is not limited to the  
specifically disclosed embodiments, and variations and  
modifications may be made without departing from the  
scope of the present invention.

35

The claims defining the invention are as follows:

1. A method for joining a plurality of communications networks, the method comprising the steps of:

5 (a) registering as first system definition information, at a first one of the communications networks indicated by first address information, second address information indicating with which of a second one of the communications networks said first communications network requests to communicate;

(b) registering as second system definition information, at said first communications network, said second address information indicating that said first communications network is allowed to communicate with said second communications network; and

10 (c) assigning, at said first communications network, a management number to the first address information and the second address information so as to be operatively linked together, whereby said first communications network can communicate with said second one of the communications networks by using the second system definition information referred to by the management number.

2. A method as claimed in claim 1, comprising the further step of:

20 (d) registering, at the second communications network, the first address information as third system definition information together with said management number,

the first address information registered in the third system definition information indicating that said second communications network is allowed to communicate with said first communications network.

25

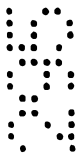
3. A method as claimed in claim 1 and for seceding from a plurality of communications networks, comprising the further steps of:

30 (e) deleting the second address information from the first system definition information when said first communications network stops a communication with said second communications network;

(f) deleting the second address information from the second system definition information when said first communications network stops said communication with the second communications network; and

35 (g) cancelling the management number when said first communications network stops said communication with the second communications network.

4. A method as claimed in claim 2 and for seceding from a plurality of communications networks, comprising the further step of:



(h) deleting the second address information and the management number from the third system definition information when said first communications network stops a communication with the second communications network.

5           5.       A method as claimed in claim 1, wherein said second address information contains information indicating the type of said second communications network.

          6.       A method as claimed in claim 1, wherein:  
10           step (a) comprises the step of forming a first storage area in which the first definition information is stored; and  
              step (b) comprises the step of forming a second storage area in which the second definition information is stored; and further whereby:  
              said management number operatively links the first storage area and the second  
15       storage area.

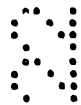
DATED this Twenty-first Day of February 1995

**Fujitsu Limited**

Patent Attorneys for the Applicant

SPRUSON & FERGUSON

20



Method For Joining A Plurality Of Networks And Seceding Therefrom

1     ABSTRACT OF THE DISCLOSURE

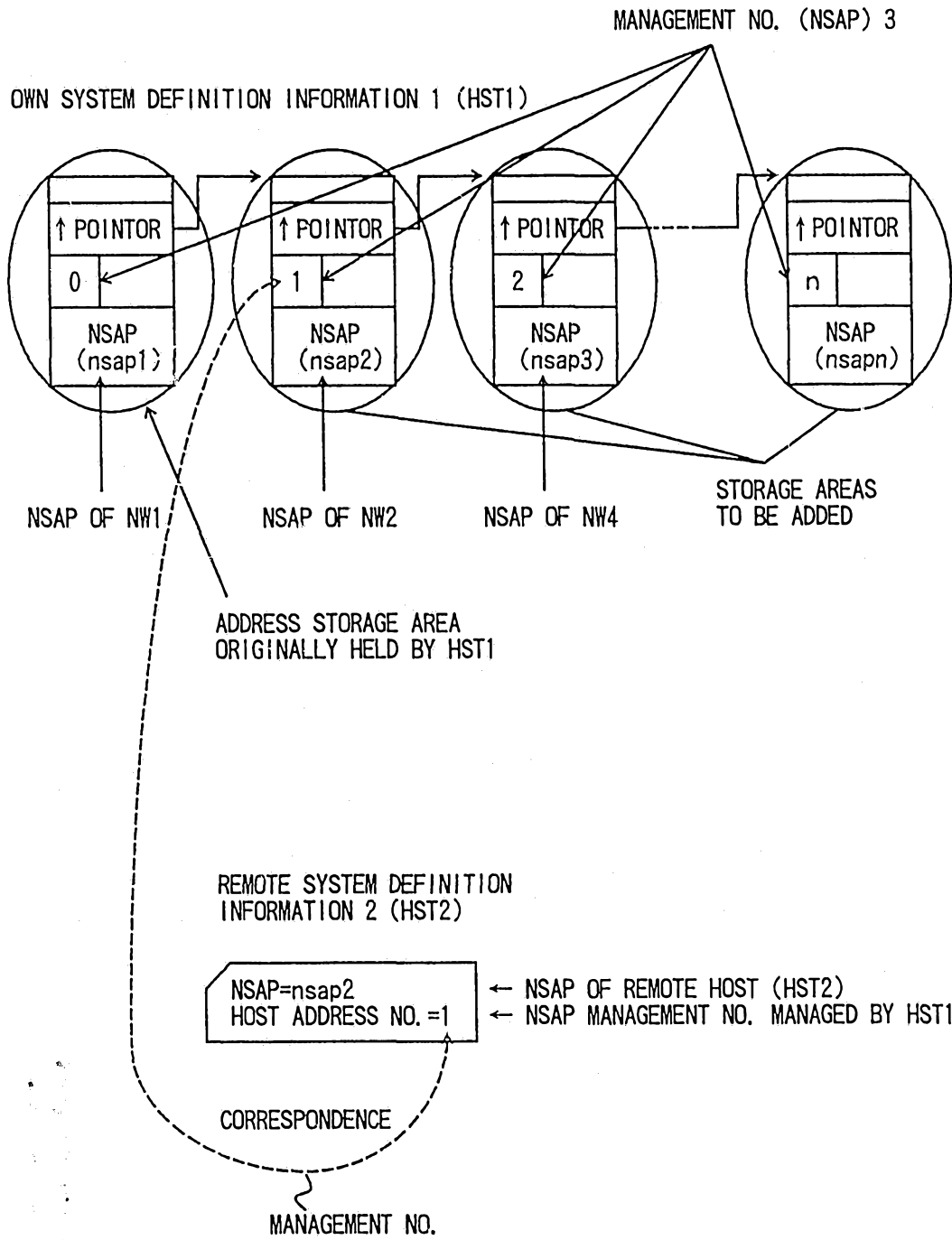
          A method for joining and seceding from  
communications networks includes steps (a), (b) and  
(c). Step (a) is to register, at a first one of the  
5     communications networks (NW1 - NW5) indicated by first  
address information, second address information in  
first system definition information (1), the second  
address information registered in the first system  
definition information concerning the first one of the  
10    communications networks indicating a second one of the  
communications networks with which the first one of the  
communications networks requests to communicate. Step  
(b) is to register, at the first one of the  
communications networks, the second address information  
15    in second system definition information (2), the second  
address information registered in the second system  
definition information indicating that the first one of  
the communications networks is allowed to communicate  
with the second one of the communications networks.  
20    Step (c) is to assign, at the first one of the  
communications networks, a management number (3) to the  
first address information and the second address  
information so as to be operatively linked together,  
whereby the first one of the communications networks  
25    can communicate with the second one of the  
communications networks by using the second system  
definition information referred to by the management  
number.

30    Figure 1.

35



# FIG. 2



131093 48600

FIG. 3A

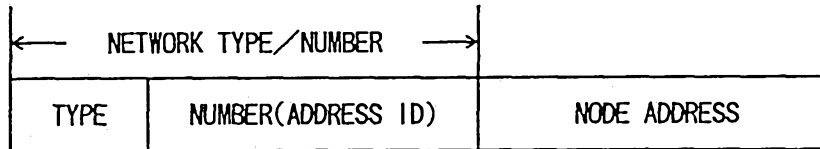


FIG. 3B

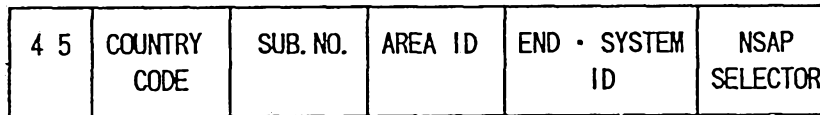


FIG. 4

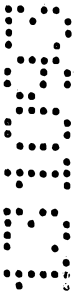
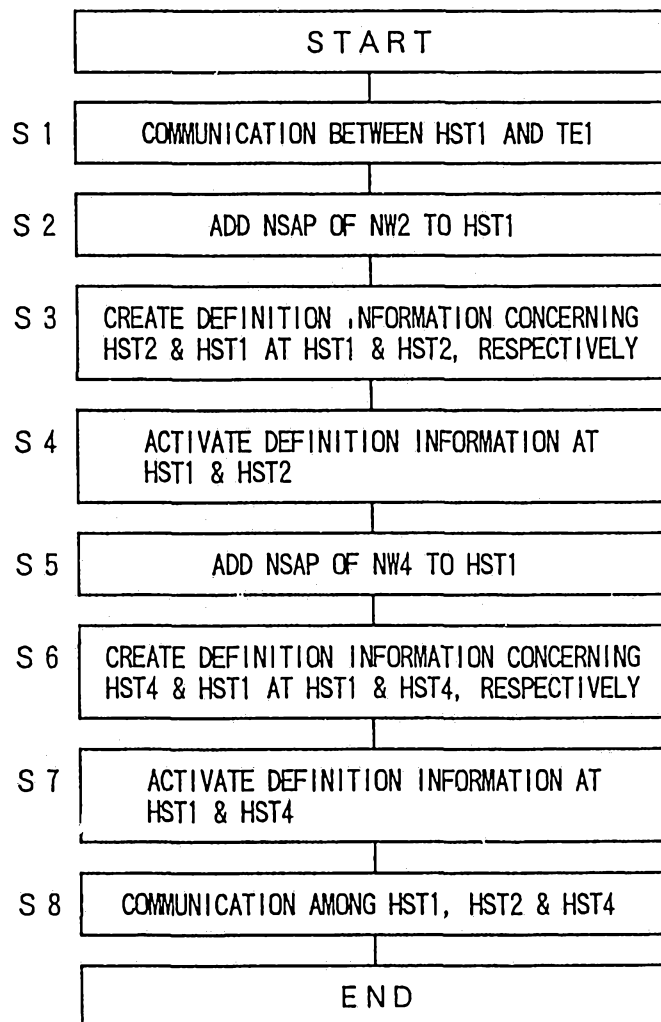
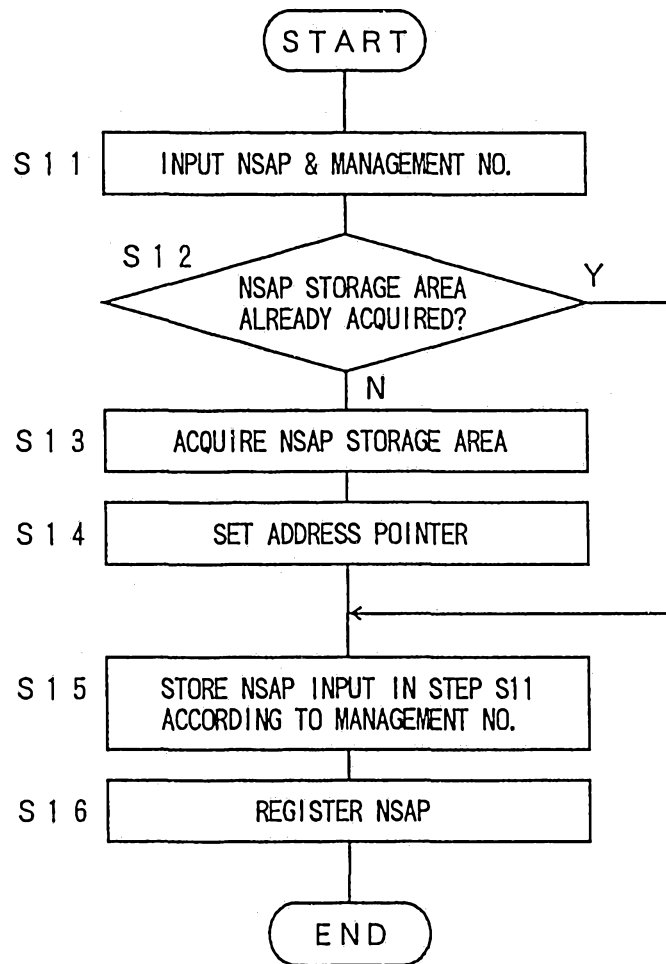


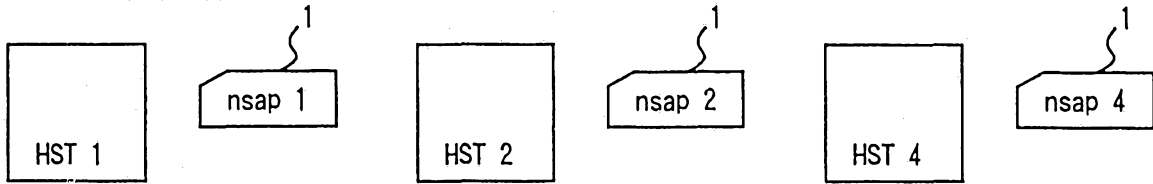
FIG. 5



SECRET

# FIG. 6

BEFORE CONNECTION



JOIN

AFTER CONNECTION

