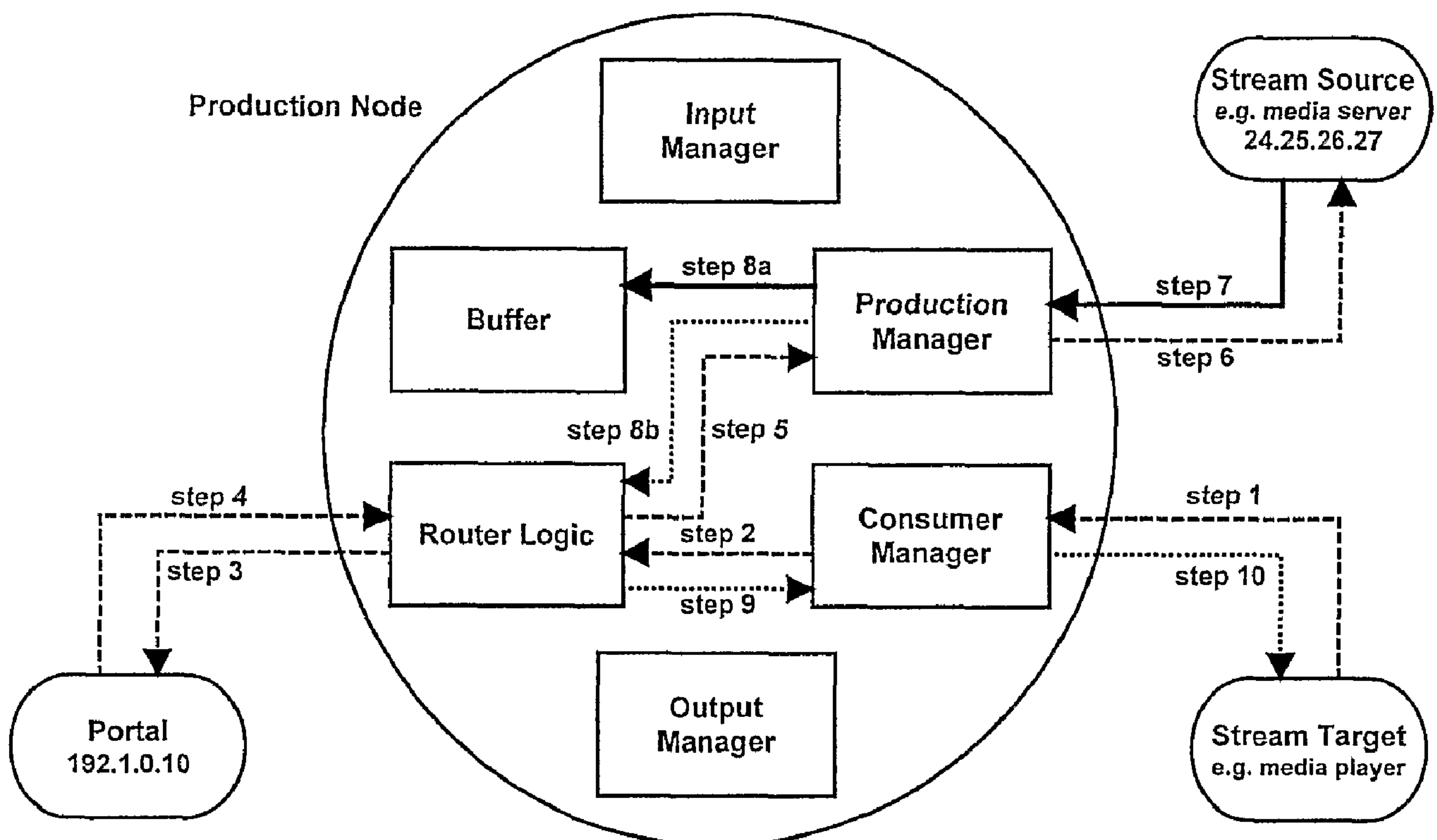




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(54) Title: ORGANIC DATA NETWORK HAVING A DYNAMIC TOPOLOGY



(57) Abrégé/Abstract:

The invention relates to a device for either generating or maintaining a organic data network having a dynamic topology, comprising a data processing unit, at least one data connection to a data network to which several devices provided with a data processing

(57) Abrégé(suite)/Abstract(continued):

unit are connected by means of a data connection, and software having a receiving routine for receiving data packages of at least one transmitting device in the data network, a transmission routine for transmitting data packages, received from the transmitting device or devices in the data network to at least one receiving device that is connected to the data network, independent of the transmitting device or devices. Additionally the invention relates to a method and software for data packages received from a transmitting device to at least one receiving device, independent of said transmitting device. A device according to the invention can be used in for instance mobile phones, streaming internet applications and cable television.

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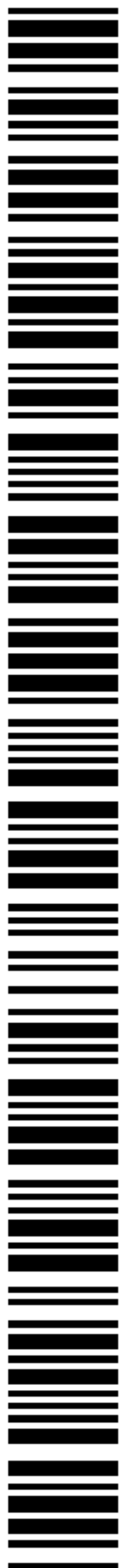
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(54) Title: ORGANIC DATA NETWORK HAVING A DYNAMIC TOPOLOGY

(57) Abstract: The invention relates to a device for either generating or maintaining a organic data network having a dynamic topology, comprising a data processing unit, at least one data connection to a data network to which several devices provided with a data processing unit are connected by means of a data connection, and software having a receiving routine for receiving data packages of at least one transmitting device in the data network, a transmission routine for transmitting data packages, received from the transmitting device or devices in the data network to at least one receiving device that is connected to the data network, independent of the transmitting device or devices. Additionally the invention relates to a method and software for data packages received from a transmitting device to at least one receiving device, independent of said transmitting device. A device according to the invention can be used in for instance mobile phones, streaming internet applications and cable television.



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Organic data network having a dynamic topology

BACKGROUND OF THE INVENTION

The invention relates to a device for either generating or maintaining an organic network having a dynamic topology, a method for it and a carrier
5 provided with software for it.

It is known for instance from US-A-6.052.718, to duplicate a server in an internet environment to relieve the main server. In those cases however the entire server software and complete files of the server are duplicated. This
10 first of all is too large a burden for the duplicate. Additionally not any given computer will be suitable for that purpose, let alone any given computer requesting information to the server (the "client"). Additionally it is not possible to offer a client an optimal transfer speed of the content in this way by an intelligent choice of the route or possibly another, closer (regarding the
15 transfer speed) (duplicate) server.

Additionally it is known from U-A-5.944.783 to provide data packages with software (Java Applets) with which the content of the data packages or other data can be processed on the receiving computer. In this case,
20 however, there is no question of communication, but of distributed processing. One large task is divided over several agents, wherein each agent carries out a part of the task and is in contact with the common server.

Additionally a network ("multicast network") of nodes is known from US
25 patent 5.511.167 which nodes, however, are each part of a hierarchic system. Each node is centrally controlled here by means of a central node.

5 In Onn Shehory et al., Agent Cloning: an Approach to Agent Mobility and Resource Allocation, IEEE Communications Magazine, July 1998, a multi-agent system is described comprising agents which can duplicate themselves on remote computers when overload of the agent occurs. The duplicate agent is hierarchically placed below the original agent. This requires an overhead structure. An agent is sent out to perform a task, and reports back to its origin.

10 In US 6.085.240 a system of agents is described. The agent devices are managed by an overlaying structure. Thus, the system requires an overhead structure.

SUMMARY OF THE INVENTION

15 To that end in one aspect the invention provides a device for either generating or maintaining an organic data network having a dynamic topology, comprising

- a data processing unit,
- at least one data connection to a data network to which several devices provided with a data processing unit are connected by means of a data connection, and
- software having
 - a receiving routine for receiving data packages of at least one transmitting device in the data network,
 - 25 - a transmission routine for transmitting data packages, received from the transmitting device or devices in the data network to at least one receiving device that is connected to the data network, independent of the transmitting device or devices.

30 By choosing such a device an organic data network can be built up or created in which independent devices according to the invention are able to provide other independent devices according to the invention with data so

that for instance data that are available to a network are quickly accessible to any given device in a network.

5 Additionally it is possible to build up a data network without hierarchy, in contrast to the classic networks and the internet. After all, when a server fails or gets overloaded very many computers drop out of the network. It is possible therefore, using a device according to the invention, to build or maintain a network having a very low failure sensitivity.

10 Additionally it is possible to set up a reliable "streaming" video or audio broadcast via the internet or another similarly organised network.

For that matter numerous applications of so-called peer-to-peer networks that may or may not have client/server technology are known.

15 However, an organic network having a dynamic topology wherein data transfer between server and client takes place like in the device according to the invention, is not described in them. In conformity with the device according to the invention it is namely possible that the same peer at one moment acts as server having a second peer as client and at another moment acts as client of the second peer now acting as server, without a control being at the basis thereof. The two devices change role on their own initiative.

25 Content as meant in the present invention relates to the data such as music in digital form, converted images in digital form, data base information, simple ascii data, but all other possible data as well. This is the information that has to be distributed to as many devices as possible when they request such. For instance in internet terms, streaming video or streaming audio can be thought of. In this case the quality of a data connection is particularly important. Content namely is generally divided into smaller data packages, that are subsequently transmitted. In case of a streaming audio or video

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application the sequential order of several data packages is of importance because en route delaying during the transmission of a data package results in an irregular broadcast.

5 A data processing unit according to the invention first of all may relate to a digital data processing unit, or a central processing unit, CPU, having ALU, a calculation unit, such as known from the so-called PC or other similar computers. In a broader sense processors can be thought of that may among others be placed in mobile phones and other equipment for the
10 (electronic) control of internal processes.

A data storage unit as meant according to the invention may be a generally known computer memory (RAM), but also a hard disk or another dynamic data storage medium.

15

According to the invention a data network does not only mean a physically cabled network; it may also comprise a series of data connections that use electromagnetic waves that propagate through the air or an optical cable.

20 Combinations are also possible. A physically cabled network may also comprise a data network that uses cabling for conducting current (power voltage). In this text a data network is also called network for short.

In this text by a connection first of all a physical connection is meant, for
25 instance a cable, optical cable, electricity cable, or any possible physical connection over which data packages can be transmitted in electromagnetic form. By connection (sometimes called data connection) is also meant a wireless connection, such as via infrared or radio waves or otherwise.

30 In one aspect of the invention, the software is provided with a transmission routine for transmitting the software together with the data packages

independent of the transmitting device. In this way a new device can quickly be added in the network.

5 In an embodiment, the software may be provided with a test routine for testing connections with other devices in the data network.

10 Additionally, in the same or another embodiment in a device according to the invention the software may be provided with a transmission routine for transmitting data packages to receiving devices in the data network devices other than the transmitting and receiving devices in the network ordering to that end.

15 In the same or another embodiment of the invention, the software may comprises a conversion routine for either converting or transforming the data packages.

20 In the same or another embodiment of the invention, the software may be provided with an evaluation routine for evaluating the quality of the data connections.

25 In the same or another embodiment of the invention, the software may be further provided with an inventory routine for making an inventory of at least a number of the other devices in the data network, and trying out the connection to another device in the data network for transmitting and/or receiving when existing connections are broken off or come below a threshold value.

30 In the same or another embodiment of the invention, the device may be provided with a memory for storing a data network address of at least one other device in the data network.

In the same or another embodiment of the invention, the software may be provided with a decision routine which on the basis of predetermined criteria decide to make a new connection to either an additional device or another transmitting device.

5

In the same or another embodiment of the invention, the device may be provided with an environment evaluation routine for asking for addresses of devices that are connected to the transmitting and/or receiving devices. In this way a device can operate even better autonomously in the network and change the topology.

10

Additionally the invention may relate to software, suitable for a device described above. Said software may for instance be placed on a data carrier such as, by way of example, a CD, DVD, optomagnetic disk, tape, but also in an IC such as a PROM, EPROM, or directly on a produced IC.

15

In accordance with another aspect the invention moreover may relate to a method for setting up and maintaining an organic data network, of which the nodes are provided with a data processing unit and software having

20

- a receiving routine for receiving data packages of at least one transmitting device in the data network,
- a transmission routine for transmitting data packages, received from the transmitting device or devices in the data network to at least one receiving device that is connected to the data network, independent of the transmitting device or devices,

25

wherein the software either receives content, split up in data packages, from one or more transmitting devices, or retrieves content from the device itself and either delivers or passes on the content, which may or may not be in the form of data packages, to one or more receiving devices, independent of the transmitting devices.

30

In this way an organic network as described may be set up and maintained.

5 In the same or another embodiment of the method according to the invention, the method according to the invention that the software, when the quality of a connection with the transmitting device deteriorates or appears to be insufficient, asks for addresses of other devices from the transmitting and receiving devices connected to the device, contacts at least one of said other devices, tests the quality of the connection to one or more other devices, and subject to satisfactory performance of one or more of those connections effects a connection to suitable other devices and adds it to the device as transmitting devices, and repeats the asking until the total receipt of data packages complies with a predetermined criterion.

15 In the same or another embodiment of the method according to the invention, the method according to the invention the software breaks off a connection to a transmitting device when the quality is lower than a predetermined criterion.

20 Additionally the invention may particularly relate to mobile communication equipment, a media player, communication equipment, or traffic information system comprising a device according to the invention. Conventional telephones as well may be provided with such a device according to the invention. Furthermore, satellite communication, and especially inter-satellite communication, may also comprise a device, method or software according to the present invention.

25 In this case by mobile communication equipment are among others meant mobile phones, walkie-talkies, satellite telephones, pocket computers, PDAs, game computers, that may or may not be portable and wherein a game can be played wireless with a game computer, and the like.

30

By a media player is meant a television, radio or playback equipment for prerecorded music or films, but also personal computers that are suitable to that end.

5 By a traffic information system is for instance meant a route navigation system for cars, that may or may not be provided with GPS, trains, planes, boats, but also systems that provide vehicles with information, such as car radios and any other possible system, among others radar.

10 The invention may additionally relate to software for either generating or maintaining an organic data network having a dynamic topology, comprising a receiving routine for receiving data packages of various transmitters, a transmission routine for transmitting data packages to various receivers, a management routine for keeping up the data packages received, data
15 packages transmitted, addresses of transmitters and receivers of data packages, an evaluation routine for evaluating the quantity, time intervals and quality of the incoming flow of data packages, a search routine for searching new potential transmitters via transmitters and receivers, a test routine for testing the quality of data connections to new potential
20 transmitters, and a decision routine for deciding to set up connections to new transmitters and closing down connections to transmitters.

A possible device according to the invention is a consumer node that will be discussed below. The device according to the invention is not limited to that
25 however.

In an organic data network that can be built up and maintained by means of a device according to the invention, various types of nodes can be distinguished. Not all these types of nodes are essential to the activity of the
30 data network. Preferably a node is adapted such that the node can change type by means of the software, or may even be several types at the same

time. The latter being preferred in view of achieving a maximum flexibility of the organic network.

5 The first node may be a node transmitting content to other nodes when they request such. Such a node is further called production node. Additionally a number of portal nodes may be defined. These are nodes that keep up a list of nodes in the network and are able to insert a node to be newly inserted into the data network. Said nodes are not of essential importance to an organic network according to the invention.

10

Central in the network are the consumer nodes. Said nodes may be provided with software to receive content and to deliver it to other nodes requesting such independent of the source. Additionally the software may be provided with routines to test the quality of a data connection and to keep up to date with the location of a number of other nodes in the network. The consumer nodes may preferably generate content themselves as well, and in that way obtain either a part, or the entire functionality of the production nodes.

15

Finally so-called router nodes may be present. Such nodes do nothing else but receiving and sending on content to other nodes in the network by order of production nodes or consumer nodes.

25 As already discussed before, a node ensures the availability of content for anyone (client) requesting said content. An organic network may expand or start in the following manner. When a first client requests (a part of) the content from a production node, the production node will deliver the content, but at the same time send along the software as a result of which the first client changes into a first consumer node. When a second client now contacts the production node, the production node will, when the second client is not yet provided with software to act like a device according to the invention, send the necessary software, or refer the new client to an existing

30

consumer node to that end, for instance the first consumer node. The second client then also becomes second consumer node and will if necessary search for a better connection. When the connection to the first consumer node is faster than the connection to the production node, the second consumer node can, if so desired, (entirely or partially) connect to the first consumer node, and the software according to the invention is also sent along as well, as a result of which said client changes into a second consumer node. Said second consumer node may get its content from either the production node, or from the first consumer node, whichever data connection it judges as being the better one. Special however is that the consumer node is able to act entirely autonomous and independent of the production node. Better yet, if so desired the consumer node is able to adapt the content, add content itself (for instance subtitling in a certain language in a streaming video content) or generate its own content, such as local advertising messages, or, local news. As a result a consumer node simultaneously is a production node.

A new consumer node may generally be added to the network by initial contact with a production node or a portal node. Said nodes will enable the newcomer to connect to one, or preferably more existing consumer node or nodes (at a time). A new node might at its own initiative, entirely autonomously, go look for an even better connection. This process may be supported because the new node may get information from the nodes to which it is connected about nodes that they in turn are connected to. Said neighbour information may be used to improve the own connection or to have spare connections available in case of failures. Preferably there generally is no question of central control here, so that flexibility and failure sensitivity are reduced.

The nodes, if so desired, may itself, instead of or in addition to just passing on the content at request, add content or change content. For instance local subtitling, advertising messages, conversion of file formats, adding

securities, etc. The node then in fact simultaneously becomes a production node. A production node or consumer node may also add authenticity securities so that the receiving nodes know whether the content is reliable.

5 The source of the content can do that as well, and each transmitting node can for instance check whether the content it delivers is indeed reliable. In this way a network is created having a high degree of reliability with regard to the authenticity of the content.

10 With a growing number of consumer nodes a data network is created. As said consumer nodes can deal with a request for content themselves, and may be are able to make a selection of an optimal connection (in the sense of reliability and/or transmission speed), and the node may be provided with further functionalities, the consumer node may also be called an intelligent
15 node. The resulting data network has the characteristics of an organism, of which the various parts (nodes) are able to "live" independently. During data transfer, particularly during data transfer wherein the sequential order is of importance, such as for instance streaming audio and streaming video in internet applications, an optimal data connection is of great importance.

20 Additionally the capacity of a server that provides content usually may only be capable of serving a limited number of clients, while the organic network of the invention, in contrast, has a nearly unlimited capacity which grows with the number of users.

25 In the device according to the invention each consumer node with a certain overcapacity will be able to contribute to the increase of the total distribution capacity of the network when added to this network. The larger the network becomes, i. e. the more nodes, the more capacity will be available and the
30 quicker the network potentially may become, without expansion of the capacity of the server, by using the device according to the invention. The device according to the invention uses the intrinsic overcapacity present in a

network, for instance because most computers have a full-duplex data connection and only transmit or receive at certain moments. A production or consumer node having a limited transmission capacity can still transmit relatively much content over a network of many consumer nodes using its unused capacity. The unused receive or transmit capacity can be used by other nodes to obtain content or transmit it to other nodes. It may even be so that as the transmission capacity of the production node becomes smaller (to a certain extent: at least one receiver should of course be able to get sufficient content in), as a result of the mutual cooperation of the consumer nodes, the speed of the flow through the network will increase.

As already discussed a number of portal nodes may be defined that contain a list of the various consumer nodes that are operational and maybe various production nodes. A new client may instead of contacting a production node, contact a portal node, which from the list of consumer nodes selects the one who (as to data transfer speed) is the closest. Possibly the portal node may also (start with) transmitting software to install the new client as consumer node. The new client will subsequently connect to an existing consumer node and changes into a new consumer node.

In the process or data network described above, several types of nodes have been mentioned. Most of these nodes may also be defined by one base node.

One base node can be distinguished that has all functionalities, but of which several parts can be switched on or off depending on the functions of the node in the organic network according to the invention.

For instance every node has an input manager and an output manager, buffers, router logics, a local production connection manager, and a local consumer connection manager.

12a

In accordance with one aspect of the invention there is provided a method for providing receiver-driven streaming of an item of content in a peer-to-peer network, the peer-to-peer network includes a receiver peer node and a plurality of transmitter peer nodes. The method involves providing, at
5 the receiver peer node, a plurality of input managers, each of the plurality of input managers using a connection to a corresponding one of the plurality of transmitter peer nodes. The method also involves sending, from the plurality of input managers, one or more requests for at least a part of the item of content to the plurality of transmitter peer nodes in the
10 network, and receiving, in response to the one or more requests, one or more data packages corresponding to at least a part of the item of content at a first input manager of the plurality of input managers. The method also involves receiving, in response to the one or more requests, one or more data packages corresponding to at least another part of the item of
15 content at a second input manager of the plurality of input managers. The method further involves making, at the receiver peer node, incoming content received by at least the first and second input managers, ready for processing and play-back at the receiver peer node, including managing, at the receiver peer node, the data packages received from at least a first
20 transmitter peer node and a second transmitter peer node of the plurality of transmitter peer nodes, so that part of the item of content is streamed to a stream target at the receiver peer node while another part of the item of content is being received by the receiver peer node.

25 Each of the one or more requests for at least a part of the item of content may involve a request for one or more specific data packages.

Each of the one or more requests for at least part of the item of content may be issued in response to information from at least one of the plurality
30 of transmitter peer nodes.

12b

At least one connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes may include an internet connection or a connection to another similarly organized network.

5

At least one connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes may include a wireless connection.

10

At least one connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes may include an encrypted connection.

15

The data packages received by at least the first and second input managers may contain address data identifying locations of one or more other transmitter peer nodes.

20

The method may involve converting or transforming one or more of the data packages received by at least the first and second input managers.

The method may involve changing or adding content to one or more of the data packages received by at least the first and second input managers.

25

At least one connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes may involve an optimal connection selected in accordance with one or more of reliability and transmission speed, and the data packages received by at least the first and second input managers may be transferred to the first and second input managers in a sequential order.

30

12c

The method may involve evaluating a quality and reliability of a connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes.

- 5 Each of the one or more requests for at least a part of the item of content may involve a hypertext transfer protocol request.

10 The method may involve setting up and closing down a connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes.

The setting up and closing down may be performed in accordance with information received from one or more of the transmitter peer nodes.

- 15 The method may involve outputting of the incoming content made ready for processing and play-back.

20 Making at the receiver peer node the incoming content requested and received by the first and second input managers ready for processing and play-back may further involve adding, at the receiver peer node, further content to the incoming content.

25 The further content added to the incoming content may include at least one of advertising messages, local news, subtitles, and content generated internally at the receiver peer node.

The item of content may be at least one of audio content or video content.

30 The method may involve using at least one buffer for storing the data packages received by at least the first and second input managers.

12d

In accordance with another aspect of the invention there is provided a peer-to-peer network system for providing receiver-driven streaming content. The system includes a plurality of transmitter peer devices, and at least one receiving peer device that receives streaming content from the plurality of transmitter peer devices over a network, the streaming content received by the at least one receiving peer device corresponding to an item of content and including data packages. The at least one receiving peer device includes at least one data processing unit including software code including a routine for providing a plurality of input managers at the receiving peer device, each of the plurality of input managers issuing one or more requests for at least a part of the item of content to the plurality of transmitter peer devices, each input manager using a connection over the network to a corresponding one of the plurality of transmitter peer devices. The routines also include a routine for storing, in a buffer of the receiving peer device, incoming data packages transmitted by the transmitter peer devices and received by the plurality of input managers, and a routine for making at least a part of the incoming data packages received by two or more input managers ready for processing and play-back at the receiving peer device. The routines also include a routine for managing the data packages in the buffer of the receiving peer device, so that part of the item of content is streamed to a stream target at the receiving peer device while another part of the item of content is being received into the buffer of the receiving peer device. At least one of the plurality of transmitter devices that transmit the streaming content has a copy of the software code running thereon.

The item of content may be at least one of audio content or video content.

All of the plurality of transmitter devices that transmit the streaming content to the at least one receiver device have a copy of the software code running thereon.

12e

In accordance with another aspect of the invention there is provided a computer-readable medium. The computer readable medium includes computer executable instructions for providing receiver-driven streaming of an item of content to a receiver peer node from a plurality of transmitter peer nodes in a network, the computer executable instructions, when executed by a processor, perform the steps of providing a plurality of input managers at the receiver peer node, each input manager using a connection to a corresponding one of the plurality of transmitter peer nodes, sending one or more requests for data packages representing at least a part of the item of content from each input manager to a corresponding transmitter peer node in the network, receiving, in response to the one or more requests, one or more data packages representative of at least part of the item of content at a first input manager of the plurality of input managers, and receiving, in response to the one or more requests, one or more data packages representative of at least part of the item of content at a second input manager of the plurality of input managers. The computer executable instructions also perform the steps of making, at the receiver peer node, the data packages received by at least the first and second input managers ready for processing and play-back at the receiver peer node, including managing, at the receiver peer node, the data packages received by at least the first input manager and the second input manager, so that part of the item of content is streamed to a stream target at the receiver peer node while another part of the item of content is being received by the receiver peer node.

25

In accordance with another aspect of the invention there is provided a method of growing a network and distributing data using the network, the network including one or more production nodes that send data, and a plurality of consumer nodes. Each consumer node receives data from one or more production nodes or at least one other consumer node. The method involves (a) providing first software that resides on each of the consumer nodes, the first software on each given consumer node (i)

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issues requests for data only to a production node or another consumer node that is directly connected to the given consumer node without any intermediate node logically positioned therebetween, (ii) in response to a request for data issued by one other consumer node, the first software

5 transmits data from the given consumer node to the one other consumer node only if the given consumer node can fulfill at least a portion of the request itself, and (iii) in response to the request for data issued in step (a)(ii), the first software on the given consumer node takes no action to retrieve data from a node other than the given consumer node if the given

10 consumer node is unable to fulfill the request itself. The method also involves (b) providing second software that resides on each of the one or more production nodes. For each given production node, the second software transmits data from the given production node to a requesting consumer node in response to a request for data issued by the requesting

15 consumer node only if the given production node can itself fulfill at least a portion of the request issued by the requesting consumer node. The method further involves (c) adding a new node to the network when the new node requests data from at least one consumer node or at least one production node, and (d) using the first software residing on a first

20 consumer node to issue a first request for data to the at least one consumer node or the at least one production node. The method also involves (e) in response to receipt of the first request by the at least one consumer node or the at least one production node (i) if the node receiving the first request is a consumer node, using the first software residing on

25 the node receiving the first request to transmit at least a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion of the first request itself, and (ii) if the node receiving the first request is a production node, using the second software residing on the node receiving the first request to transmit at least

30 a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion of the first request itself. The method further involves (f) after step (e), and independent of

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the first request, using the first software residing on a second consumer node to issue a second request to the first consumer node for data, and (g) in response to receipt of the second request, using the first software residing on the first consumer node to transmit to the second consumer node at least a portion of data requested by the second request only if the first consumer node can fulfill at least a portion of the second request itself.

In accordance with another aspect of the invention there is provided a network that distributes data, the network including one or more production nodes that send data, and a plurality of consumer nodes. Each consumer node receives data from one or more production nodes or at least one other consumer node. The network includes (a) a first software that resides on each of the consumer nodes. The first software on each given consumer node (i) issues requests for data only to a production node or another consumer node that is directly connected to the given consumer node without any intermediate node logically positioned therebetween, (ii) in response to a request for data issued by one other consumer node, the software transmits data from the given consumer node to the other consumer node only if the given consumer node can fulfill at least a portion of the request itself, and (iii) in response to the request for data, the first software on the given consumer node takes no action to retrieve data from a node other than the given consumer node if the given consumer node is unable to fulfill the request itself. The network also includes (b) second software that resides on each of the one or more production nodes. For each given production node, the second software transmits data from the given production node to a requesting consumer node in response to a request for data issued by the requesting consumer node only if the given production node can itself fulfill at least a portion of the request issued by the requesting consumer node. The network is configured such that (c) a new node is added to the network when the new node requests data from at least one consumer node or at least one

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production node. The network also includes (d) a first consumer node, having the first software residing thereon, that issues a first request for data to the at least one consumer node or the at least one production node. The network further includes (e) a node receiving the first request
5 by the at least one consumer node or the at least one production node, in response to receipt of the first request (i) if the node receiving the first request is a consumer node, the first software residing on the node receiving the first request transmits at least a portion of the requested data to the first consumer node only if the node receiving the first request can
10 fulfill at least a portion of the first request itself, and (ii) if the node receiving the first request is a production node, the second software residing on the node receiving the first request transmits at least a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion of the first request itself. The
15 network is also configured such that (f), independent of the first request, the first software residing on a second consumer node issues a second request to the first consumer node for data, and (g) in response to receipt of the second request, the first software residing on the first consumer node transmits to the second consumer node at least a portion of data
20 requested by the second only if the first consumer node can fulfill at least a portion of the second request itself.

In accordance with another aspect of the invention there is provided at least one tangible medium that includes computer code for growing a
25 network and distributing data using the network including one or more production nodes that send data, and a plurality of consumer nodes. Each consumer node receives data from one or more production nodes or at least one other consumer node. The computer code, when executed by one or more processors causes the one or more processors to perform the
30 following steps of (a) providing first software that resides on each of the consumer nodes. The first software on each given consumer node (i) issues request for data only to a production node or another consumer

node that is directly connected to the given consumer node without any intermediate node logically positioned therebetween, (ii) in response to a request for data issued by one other consumer node, the first software transmits data from the given consumer node to the one other consumer node only if the given consumer node can fulfill at least a portion of the request itself, and (iii) in response to the request for data issued in step (a)(ii), the first software on the given consumer node takes no action to retrieve data from a node other than the given consumer node if the given consumer node is unable to fulfill the request itself. The computer code also causes the one or more processors to perform the steps of (b) providing second software that resides on each of the one or more production nodes. For each given production node, the second software transmits data from the given production node to a requesting consumer node in response to a request for data issued by the requesting consumer node only if the given production node can itself fulfill at least a portion of the request issued by the requesting consumer node. The computer code further causes the one or more processors to perform the following steps of (c) adding anew node to the network when the new node requests data from at least one consumer node or at least one production node, and (d) using the first software residing on a first consumer node to issue a first request for data to the at least one consumer node or at least one production node. The computer code also causes the one or more processors to perform the steps of (e) in response to receipt of the first request by the at least one consumer node or the at least one production node (i) if the node receiving the first request is a consumer node, using the first software residing on the node receiving the first request to transmit at least a portion of the requested data to the first consumer node receiving the first request can fulfill at least a portion of the first request itself, and (ii) if the node receiving the first request is a production node, using the second software residing on the node receiving the first request to transmit at least a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion

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of the first request itself. The computer code further causes the one or more processors to perform the steps of (f) after step (e), and independent of the first request, using the first software residing on a second consumer node to issue a second request to the first consumer node for data, and
5 (g) in response to receipt of the second request, using the first software residing on the first consumer node to transmit to the second consumer node at least a portion of data requested by the second request only if the first consumer node can fulfill at least a portion of the second request itself.

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In accordance with another aspect of the invention there is provided a device for generating or maintaining a data network, the device at a first node in the network and. The device includes a data processing unit, at least one data connection to the data network, and software having a
15 receiving routine for receiving streaming media including data packages from at least one transmitting device at a second node in the data network. The software also includes a request routine for sending a first request for one or more data packages of the streaming media to the second node in the network, and a request handling routine for handling a second request
20 for one or more data packages of the streaming media from at least one receiving device at a third node in the network. The first node takes no action to receive from another node the one or more data packages that are the subject of the second request if the one or more data packages that are the subject of the second request were not previously requested
25 by the first node when the second request is received by the first node. The software further includes a transmission routine for transmitting at least one of the one or more requested data packages subject of the first request, received from the at least one transmitting device at the second node in the data network, to the at least one receiving device at the third
30 node in response to the second request. The software, when running on the device at the first node, allows the device at the first node to receive and transmit streaming media and transmit at least the first request for the

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one or more data packages to at least one other device at the second node, receive at least one of the one or more data packages transmitted by the at least one other device at the second node in reply to the first request, the other device thus becoming a transmitting device at the second node, after transmitting the first request, receive at least the second request from at least one further device at the third node for at least a portion of the one or more data packages, and in reply to the second request, transmit at least one data package of the one or more data packages previously received from the second node to the at least one further device at the third node, while at least one data package of the streaming media is being transmitted from the second node to the first node, the further device thus becoming a receiving device at the third node. The first, second and third nodes are part of the data network.

15 In accordance with another aspect of the invention there is provided a method for generating or maintaining a data network using a device at a first node in the network, and. The method involves providing a device at the first node, the device having a data processing unit, at least one data connection to the data network, and software having a receiving routine, a request routine, a request handling routine, and a transmission routine.

20 The method also involves using the receiving routine on the device for receiving streaming media including data packages from at least one transmitting device at a second node in the data network, using the request routine on the device for sending a first request for one or more data packages of the streaming media to the second node in the network, and using the request handling routine on the device for handling a second request for one or more data packages of the streaming media from at least one receiving device at a third node in the network. The first node takes no action to receive from another node the one or more data packages that are the subject of the second request if the one or more data packages that are the subject of the second request were not previously requested by the first node when the second request is

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received by the first node. The method further involves using the transmission routine on the device for transmitting at least one of the one or more requested data packages subject of the first request, received from the at least one transmitting device at the second node in the data network, to the at least one receiving device at the third node in response to the second request. The software, when running on the device at the first node, allows the device at the first node to receive and transmit streaming media, transmitting at least the first request for the one or more data packages to at least one other device at the second node, receiving on the device at least one of the one or more data packages transmitted by the at least one other device at the second node in reply to the first request, the other device thus becoming a transmitting device at the second node. The method further involves after transmitting the first request, receiving on the device at least the second request from at least one further device at the third node for at least a portion of the one or more data packages, in reply to the second request, transmitting from the device at least one data package of the one or more data packages previously received from the second node to the at least one further device at the third node, while at least one data package of the streaming media is being transmitted from the second node to the first node, the further device thus becoming a receiving device at the third node. The first, second and third nodes are part of the data network.

In accordance with another aspect of the invention there is provided a system for distributing media content from a first media player to other media players that include a second media player. The system includes the first media player configured to receive a first play-back request for an item of media content from a component of the first media player. The first media player includes a first stream target. The first media player is configured to, in response to the first play-back request, initiate a first process to retrieve at least a part of the item of media content from at least one device selected from the group consisting of the first media player and

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one or more further devices, output at least the part of the item of media content retrieved as a result of the first process to the first stream target to provide streaming of media content, receive, from a plurality of the other media players, a plurality of further requests for the item of media content that are sent in an uncoordinated order with respect to one another from the plurality of other media players to the first media player, the further requests being received by the first media player after receiving the first play-back request, and in reply to the further requests for the item of media content, transmit one or more parts of the item of media content, retrieved as a result of the first process, to the requesting other media players. The second media player is configured to receive a second play-back request for the item of media content from a component of the second media player. The second media player includes a second stream target. The second media player is configured to, in response to the second play-back request, initiate a second process to retrieve at least a part of the item of media content from the first media player, the second process including sending a request for at least the part of the item of media content to the first media player, receive at least the part of the item of media content retrieved as a result of the second process, and output at least the part of the received media content to the second stream target to provide streaming of media content. The first media player is adapted to output at least a part of the media content to the first stream target while the second media player outputs at least a part of the media content to the second stream target.

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In accordance with another aspect of the invention there is provided a computer-readable medium having computer executable instructions for sharing streaming media content including data packages, from a first media player playing the media content to a plurality of other media players requesting at least a part of the media content. The computer executable instructions when running on the first media player includes instructions that cause the first media player to receive a play-back

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request for an item of media content from a component of the first media player. The first media player includes a stream target. The computer executable instructions further cause, in response to the play-back request, initiation of a first process to retrieve at least a part of the item of media content from at least one device selected from the group consisting of the first media player and one or more further devices. The computer executable instructions further cause the first media player to retrieve at least the part of the item of the media content, pass at least the part of the retrieved media content to the stream target in reply to the play-back request for the item of media content, and after the first media player has received the play-back request, receive from the plurality of other media players a plurality of further requests for the item of media content that are sent in an uncoordinated order with respect to one another from the plurality of other media players to the first media player, and in reply to each of the plurality of further requests for the item of media content, transmit from the first media player to a corresponding requesting other media player one or more parts of the item of media content retrieved at the first media player in response to the play-back request. The one or more parts of the item of media content are transmitted from the first media player to the corresponding requesting other media player while the first media player passes at least the part of the retrieved media content to the stream target to provide streaming of media content.

In accordance with another aspect of the invention there is provided a media player for playing streaming media content including data packages and transmitting at least a part of the media content to a plurality of other devices. The media player includes a data processing unit that executes software having a routine for (i) receiving a play-back request for an item of media content from a component of the media player, the media player includes a stream target, and (ii) in response to the play-back request, initiating a first process to retrieve at least a part of the item of media content from at least one device selected from the group consisting of the

media player and one or more further devices. The data processing unit also executes software having a retrieving routine for retrieving the item of media content, a management routine for managing retrieved media content, a routine for making at least a part of the retrieved media content ready for play-back and providing the media content made ready for play-back to the stream target, a request handling routine for handling, after receiving the play-back request, a plurality of further requests for at least a part of the item of media content. The plurality of further requests are sent from a plurality of other devices in an uncoordinated order with respect to one another to the media player. The data processing unit also executes software having a transmitting routine for streaming at least a part of the item of media content to each of the plurality of other devices. The media player includes software that, when running on the media player allows the media player to receive at least the play-back request for the item of media content from the component of the media player, in response to the play-back request, initiate the first process to retrieve at least a part of the item of media content from at least one device selected from the group consisting of the media player and the one or more further devices, retrieve at least a part of the item of media content from at least one device selected of the group consisting of the media player and the one or more further devices, manage the retrieved media content, make the retrieved media content ready for play-back, provide at least a part of the retrieved media content made ready for play-back to the stream target, receive, from the plurality of other devices in any order, a plurality of requests for the item of media content after having retrieved at least a part of the item of media content at the media player, in reply to a request for the item of media content from a first of the plurality of other devices, stream from the media player to the first device at least a part of the item of media content retrieved at the media player in response to the request from the component of the media player for the media content while the media player is providing media content made ready for playback to the stream target.

In accordance with another aspect of the invention there is provided a computer-readable medium having computer executable instructions for sharing streaming media content including data packages, from a first media player playing the media content to a plurality of other media players requesting at least a part of the media content. The computer executable instructions when running on the first media player includes instructions that cause the first media player to receive a play-back request for an item of media content from a component of the first media player. The first media player includes a stream target. The computer executable instructions includes instructions that cause, in response to the play-back request, initiation of a first process to retrieve at least a part of the item of media content from at least one stream source selected from the group consisting of the first media player and one or more further devices, retrieve at least the part of the item of the media content from the stream source, manage the retrieved media content by using a buffer, get a part of the retrieved media content from the buffer and make that part ready for play-back and pass it to the stream target in reply to the play-back request for the item of media content from the stream target, to provide streaming of media content. The computer executable instructions includes instructions that cause the media player, after the first media player has received the playback request, to receive from-the a plurality of other media players, a plurality of further requests, sent in an uncoordinated order with respect to one another, for the item of media content at one or more output managers, each output manager corresponding to one of the plurality of media players. The computer executable instructions includes instructions that cause the media player to, in reply to each of the plurality of further requests for the item of media content, transmit from the corresponding output manager one or more parts of the item of media content. The buffer is both used by the first media player to make a part of the retrieved media content ready for play-back and by at least one output manager to get a section of the retrieved

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media content in order to transmit the section of the retrieved media content to the corresponding requesting other media player.

5 In accordance with another aspect of the invention there is provided a media player system for receiving streaming content from one or more other media player systems. The media player system includes at least one data processing unit that executes software including a search routine for autonomously identifying one or more other media player systems running the software, the one or more other media player systems initially
10 unknown to the media player system. The software also includes a request routine for requesting content to be streamed from at least one of the one or more identified other media player systems running the software, a receiving routine for receiving streaming content from the one or more identified other media player systems running the software, and a
15 routine for making the incoming streaming content received as a result of the receiving routine ready for play-back. The search routine is configured to be executed by the at least one data processing unit while the receiving routine is being executed.

20 In accordance with another aspect of the invention there is provided a media player system for receiving streaming content at a media player from other media players. The system includes a device storing the media player, and software stored on a computer readable storage medium on the device, the software including a search routine for autonomously
25 identifying one or more other media players running the software, the one or more other media players initially unknown to the media player. The system includes a request routine for requesting content to be streamed from at least one of the one or more identified other media players running the software, a receiving routine for receiving streaming content from a
30 media player running the software, and a routine for making incoming streaming content received as a result of the receiving routine ready for

play-back. The search routine is configured to be executed by the device while the receiving routine is being executed.

5 In accordance with another aspect of the invention there is provided a computer-readable medium having computer executable instructions for receiving streaming content consisting of data packages from one or more other media players transmitting at least a part of the streaming content. The computer executable instructions include instructions for issuing from the media player a request to the one or more other media players for the
10 content to be streamed, the one or more other media players have been identified by the media player searching autonomously for media players including the computer executable instructions, the media players unknown to the media player prior to issuing the request. The computer executable instructions also include instructions for receiving, as a result of
15 the request, at least a part of the streaming content, managing the received streaming content, making the received streaming content ready for play-back, and autonomously searching for additional media players while receiving at least part of the streaming content.

20 In accordance with another aspect of the invention there is provided a method for receiving streaming content. The method involves (a) storing media player software on a device. The media player software (i) searches autonomously to identify other devices in a network running the media player software, (ii) makes an inventory of other devices found as a
25 result of step (i), running the media player software, (iii) issues one or more requests for content to be streamed from the media player software of at least one device of the inventory, by using one or more connections, each connection corresponding to at least one device of the inventory, (iv) receives streaming content from the media player software of at least one
30 device of the inventory in response to step (a)(iii), and (v) makes at least one part of the streaming content of step (a)(iv), received from the media player software of at least one device of the inventory, ready for

processing and play-back. The method also involves (b) searching for other devices in the network running the media player software, while receiving at least a part of the streaming content of step (a)(iv), by using the media player software residing on the device.

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10 In accordance with another aspect of the invention there is provided a method for receiving streaming content over a network, the network enabling communication between a first consumer node, a second consumer node, and a production node. The method involves initiating, from the first consumer node, a first connection to the second consumer node, receiving, in response to initiation of the first connection over the network to the second consumer node, one or more data packages corresponding to at least a part of the content, selecting, from an inventory residing on the first consumer node, address data identifying a location of the production node, initiating, from the first consumer node, a second connection over the network to the production node by using the address data, receiving, in response to initiation of the second connection to the production node, one or more data packages corresponding to at least a part of the content, and making incoming content received from the second consumer node ready for processing and play-back at the first consumer node, so that part of the content is streamed to a stream target at the first consumer node, while another part of the content is being received from the production node.

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30 In accordance with another aspect of the invention there is provided a method for receiver-driven streaming of content over a network, the network enabling communications between a first consumer node, a second consumer node, and a production node. The method involves initiating, from the first consumer node, a first connection over the network to the second consumer node, receiving, in response to initiation of the first connection to the second consumer node, one or more data packages corresponding to at least a part of the content, initiating a second

connection over the network between the first consumer node and a production node, receiving, in response to initiation of the second connection to the production node, one or more data packages corresponding to at least a part of the content, and making incoming content received from the second consumer node ready for processing and play-back at the first consumer node, so that part of the content is streamed to a stream target at the first consumer node, while another part of the content is being received from the production node.

10 In accordance with another aspect of the invention there is provided a device configured for receiving streaming content over a network, the network enabling communication with a consumer node and a production node. The device includes a connection component configured for initiating a first connection over the network to the consumer node, receiving, in response to initiation of the first connection to the consumer node, one or more data packages corresponding to at least a part of the content, initiating a second connection over the network to the production node, and receiving, in response to initiation of the second connection to the production node, one or more data packages corresponding to at least a part of the content. The device also includes a processing component configured for making incoming content received from the consumer node ready for processing and play-back, so that part of the content is streamed to a stream target using the device, while another part of the content is being received from the production node.

25 In accordance with another aspect of the invention there is provided a method for receiver-driven streaming of content over a network, the network enabling communications between a first consumer node, a second consumer node, and a production node. The method involves initiating, from the first consumer node, a first connection over the network to the production node, receiving, in response to initiation of the first connection to the production node, one or more data packages

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corresponding to at least a part of the content, initiating a second connection over the network between the first consumer node and the second consumer node, receiving, in response to initiation of the second connection to the second consumer node, one or more data packages
5 corresponding to at least a part of the content, and making incoming content received from the production node ready for processing and play-back at the first consumer node, so that part of the content is streamed to a stream target at the first consumer node, while another part of the content is being received from the second consumer node.

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In accordance with another aspect of the invention there is provided a method for receiver-driven streaming of content over a network, the network enabling communications between a first consumer node, a second consumer node, and a third consumer node. The method involves
15 initiating, from the first consumer node, a first connection over the network to the second consumer node, receiving, in response to initiation of the first connection to the second consumer node, one or more data packages corresponding to at least a part of the content, initiating a second connection over the network between the first consumer node and the
20 third consumer node, receiving, in response to initiation of the second connection to the third consumer node, one or more data packages corresponding to at least a part of the content, and making incoming content received from the second consumer node ready for processing and play-back at the first consumer node, so that part of the content is
25 streamed to a stream target at the first consumer node, while another part of the content is being received from the third consumer node.

In accordance with another aspect of the invention there is provided a method for receiving data packages of a streaming item of content at a
30 receiving media player, using at least two communication channels. The method involves receiving one or more data packages corresponding to at least a part of the item of content over a first communication channel

operationally coupled to the receiving media player, initiating a request for at least a part of the item of content over a second communication channel operationally coupled to the receiving media player, receiving, in response to initiating the request, one or more data packages corresponding to at least a part of the item of content, over the second communication channel, and making incoming content received over the first communication channel ready for processing and play-back at the receiving media player, such that part of the item of content is streamed to a stream target at the receiving media player, while another part of the item of content is being received by the receiving media player over the second communication channel.

In accordance with another aspect of the invention there is provided a method for receiving data packages of a streaming item of content at a receiving media player, using at least two communication channels. The method involves initiating a first request for receiving at least a part of the item of content over a first communication channel accessible by the receiving media player, receiving, in response to initiating the first request, one or more data packages corresponding to at least a part of the item of content over the first communication channel, initiating a second request for receiving at least a part of the item of content over a second communication channel accessible by the receiving media player, receiving, in response to initiating the second request, one or more data packages corresponding to at least a part of the item of content over the second communication channel, and making incoming content received over the first communication channel ready for processing and play-back at the receiving media player, such that part of the item of content is streamed to a stream target at the receiving media player, while another part of the item of content is being received by the receiving media player over the second communication channel.

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In accordance with another aspect of the invention there is provided a device for receiving data packages of a streaming item of content over at least two communication channels. The device includes a connection component configured for receiving one or more data packages corresponding to at least a part of the item of content over a first communication channel accessible by to the device, initiating a request for at least a part of the item of content over a second communication channel accessible by to the device, and receiving, in response to initiating the request, one or more data packages corresponding to at least a part of the item of content, over the second communication channel. The device also includes a processing component configured for making incoming content received over the first communication channel ready for processing and play-back at the device, such that part of the item of content is streamed to a stream target using the device, while another part of the item of content is being received by the device over the second communication channel.

In accordance with another aspect of the invention there is provided a media player system configured to request and receive streaming content from one or more production nodes or other media player systems. The media player system includes at least one processing unit that executes software including a search routine for autonomously identifying one or more other media player systems running the software, the one or more other media player systems being initially unknown to the media player system. The processing unit also executes software including a request routine for requesting content from at least one of the one or more identified other media player systems or from one or more production nodes, a receiving routine for receiving streaming content from one or more of the identified media player systems or from the one or more production nodes, and a routine for making incoming streaming content received as a result of the receiving routine ready for play-back. The search routine is configured to be executed by the at least one data processing unit while the receiving routine is being executed.

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In accordance with another aspect of the invention there is provided a media player system for receiving streaming content from one or more production nodes or other media player systems. The media player system includes at least one processor, and a set of instructions stored on a computer readable storage medium, the set of instructions being executable by the at least one processor and including a search routine for autonomously identifying one or more other media player systems running the set of instructions, the one or more other media player systems being initially unknown to the media player system. The set of instructions further including a request routine for requesting content from at least one of the one or more identified other media player systems or from one or more production nodes, a receiving routine for receiving streaming content from one or more of the identified media player systems or from the one or more production nodes, and a routine for making incoming streaming content received as a result of the receiving routine ready for play-back. The search routine is configured to be executed by the processor while the receiving routine is being executed.

In accordance with another aspect of the invention there is provided a computer-readable medium including computer executable instructions that are executable by at least one processing unit of a media player to request and receive streaming content from one or more production nodes transmitting at least a part of the streaming content. The computer executable instructions include instructions for issuing from the media player a request for the streaming content to the one or more production nodes or to one or more additional media players, receiving, as a result of the request, at least a part of the streaming content, managing the received streaming content, making the received streaming content ready for play-back, and while receiving at least part of the streaming content, executing a search to identify additional media players including the computer executable instructions, the additional media players being initially unknown to the media player.

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In accordance with another aspect of the invention there is provided a method for receiving streaming content from at least one production node to a media player in a network of media players. The method involves (a) providing media player software that resides on a media player. The media player software is configured to (i) search autonomously to identify other media players in the network running the media player software, (ii) make an inventory of found other media players running the media player software, (iii) issue one or more requests for streaming content to at least one production node, by using one or more connections, each connection corresponding to one production node, (iv) receive streaming content from the at least one production node in response to step (a)(iii), and (v) make at least one part of the streaming content of step (a)(iv), received from the at least one production node, ready for processing and play-back. The method also involves (b) issuing one or more requests for streaming content to a first production node, and receiving streaming content from the first production node, by using the media player software on a first media player, and making at least a part of the received streaming content ready for play-back, and (c) searching for a second media player in the network running the media player software, while receiving at least a part of the streaming content of step (b), by using the media player software residing on the first media player.

In accordance with another aspect of the invention there is provided a method for using software stored on a processing unit of a media player system for requesting and receiving streaming content from one or more production nodes or other media player systems. The method involves autonomously identifying one or more other media player systems running the software, the one or more other media player systems being initially unknown to the media player system, requesting content from at least one of the one or more identified other media player systems or from one or more production nodes, receiving streaming content from one or more of the identified other media player systems or from the one or more

12z

production nodes, and making incoming streaming content received as a result of the receiving routine ready for play-back, the step of autonomously identifying is executed by the data processing unit while receiving streaming content.

5

Below some examples are described wherein an organic network according to the invention can be deployed. Said examples are not limiting, but elucidate the invention. The expert will, on the basis of said examples, be able to think of many other embodiments that fall under the scope of protection of the claims.

10

Streaming Internet applications

Streaming video and streaming audio are known internet applications in which data packages with contents are transmitted from a server or station
5 to clients or consumers. The special thing about these data packages is that the time sequence of the various packages is of importance: a radio broadcast, for instance, has a fixed time line. Additionally the continuity of the data flow is of importance, as otherwise the broadcast will falter. The general principles of such streaming internet application are known to the
10 expert.

A streaming video or audio broadcast via the internet or another data network may be implemented by means of the organic data network in the following manner by means of a device according to the invention.

15

First of all a so-called production node is installed. A production node is a device according to the invention the purpose of which is to make the content, either generated or present in the device itself, available to one or more other devices. Said content may be a streaming audio or video broad-
20 cast.

As soon as a computer, for instance through the internet, contacts the production node, the production node will start transmitting content, accompanied by software, for instance in the form of a "Java applet" or
25 "Java bean", but also in the form of a so-called Windows "Cabinet file". The software subsequently installs itself on the computer and adjusts the computer as a so-called consumer node. As already discussed such a consumer node is capable of receiving content from a device, in this case a production node, and to deliver said content to another device when it
30 requests such.

When for instance a second device presents itself to a production node with

the question to also get content, the production node will transmit the software, when needed, to said second device or, when for instance all outgoing connection are occupied, inform the second device of the existence of the consumer node installed earlier on.

5

Either the production node sends software directly, or through the consumer node to make the second device act as consumer node to the second device, and the second device is installed as second consumer node. The second consumer node will test whether the connection to the production node or to

10 the first consumer node is the best, and subsequently decide whether the content will have to come from either the production node, or via the first consumer node or from both. The first consumer node is able to deliver the content to the second consumer node entirely independent of the production node.

15

Should the second consumer node get a better connection to the production node, said direct contact will lead to the first consumer node deciding to get the content via the second consumer node. From this the dynamic topology appears that may be obtained: the node reverse their rolls.

20

The invention is further elucidated on the basis of several figures showing various aspects of the invention. It should be clear that said figures serve to elucidate the invention, and should not be seen as a limitation of the invention to the embodiments shown in them.

25

DESCRIPTION OF THE DRAWINGS

Figure 1 shows a base node discussed earlier.

30 Figures 2A-2Q show various consecutive stages in the initiating and maintaining of an organic network according to the invention.

Figures 3A-3L show devices according to the invention applied in mobile telephony.

Figures 4A-4E show devices according to the invention applied in a traffic
5 information system.

Figures 5A-5E show devices according to the invention applied in cable networks for television.

10 Figures 6A-6J show the transmission of content in several data packages by a network provided with nodes having devices according to the invention.

Figures 7-15 show the data streams according to the present invention in a specific embodiment of the invention. In figures 7-11 it is shown what
15 happens on the side of a production node, in figures 12-15 it is shown what happens on the side of the consumer node.

DESCRIPTION OF EMBODIMENTS

20 Figure 1 show a base node 1.0 discussed earlier, that is provided with all functionality that make it possible to let the base node function as production node, consumer node, router node or portal node. By switching on or switching off the various functionalities the base node may function as one of the nodes mentioned, or even as a combination thereof or in several
25 capacities acting alongside each other.

The base node is provided with an input manager 1.1 and an output manager 1.4. These are routines in the software that regulate the incoming and outgoing content. Additionally the base node is provided with so-called router
30 logics 1.5 to send on the contents received.

Additionally the base node is provided with one or more buffers 1.6 to store

data for possibly sending it on further.

Finally the base node is provided with a local production manager 1.2 to make the content ready for transmission, and a local consumer manager 1.3
5 to make the incoming content ready for processing and possible play-back (in case of streaming audio or video).

The figures 2A-2Q show several stages of initiating an organic network. The thick lines are connections between nodes. The stripe broken line is a
10 message to a node, the dotted line is the information regarding the nodes connected to the presenting node, a thin line is contacting and testing the quality of a connection.

Figure 2A shows an organic network having a production node 1. The
15 production node delivers content, for instance a streaming audio broadcast via the internet to two consumer nodes 2 and 2'. The content in that case is divided into data packages which are transmitted via the internet. To each of both consumer nodes consumer node 3 and 3' are respectively connected. To 3' a next consumer node 4 is connected. Two portal nodes 0 and 0' are
20 also shown.

The consumer nodes 2 and 2' deliver content that they receive from the production node through to the consumer nodes 3 and 3', consumer node 3
25 in its turn delivers through to 4. As a result only two consumer nodes are directly connected to the production node.

From a certain situation as shown in figure 2A a possible development of the organic network will now be followed in the figures 2B-2Q.

30 In figure 2B production node 1 sends a message to consumer node 2 in which the existence of consumer node 2' is mentioned.

In figure 2C it can be seen that consumer node 2 is testing the connection to consumer node 2'. Apparently consumer node 2' has capacity to spare and a quicker connection to the production node. For instance, in case of an internet application, consumer node 2 may be connected via an analogous
5 modem having a baud rate of 56k6, while consumer node 2' is connected by means of for instance a cable modem, and the actual connection between the production node and consumer node 2 is 28k8 at a maximum. This whereas consumer node 2 can handle 56K6: consumer node 2' receives the content at high speed, higher than 56k6, from the production node and
10 starts to send the content to consumer node 2, independent of the production node, at a speed of 28k8. Consumer node 2 now obtains the content at a speed on 56k6 instead of 28k8 (for instance). This situation is shown in figure 2D. In figure 2D the production node also remains transmitting content to consumer node 2. Node 3 also obtains information
15 delivered from node 2 about the nodes connected to said node.

In figure 2E consumer node 3 is testing, for instance because its connections are not optimal, the connection to various nodes in the network of which it now (directly or indirectly) knows of its existence. This testing may for
20 instance take place because the connection to consumer node 2 gets worse and worse. On this case consumer node 3 tests the connection to production node 1 and consumer node 2'. It appears that consumer node 2' still has capacity to spare. Consumer node 2' now also starts to send content to consumer node 3 (figure 2F).

25

In figure 2G it can be seen how a new consumer node 5 is realised via a portal node 0. The consumer node to-be contacts portal node 0. Should it be the case that said node is not a consumer node yet, and has yet to receive software to be installed as such, the node (to-be) can obtain said software
30 from the portal node 0. As of the moment the software has been installed, the node is a consumer node as well (and in fact it can then also start to operate as production node if it wants to).

In the figure the portal node selects a consumer node from the list it keeps up to date, in this case consumer node 4, that may or may not be added last. Should a node newly to be added not be a consumer node yet, then it
5 will obtain the necessary software (in this case) from the portal node, as well as the information about the presence of consumer node 4 (figure 2H). Consumer node 5 in its turn tests the connection to consumer node 4 (figure 2I) and contacts consumer node 4 (figure 2J).

10 In figure 2K, consumer node 5 obtains information about consumer node 3 from consumer node 4 and subsequently tests (figure 2L) the connection to consumer node 3. When it appears that consumer node 3 has transmission capacity to spare and consumer node 5 has receiving capacity to spare, consumer node 3 will also send content to consumer node 5 independent of
15 the production node or consumer node 2 (figure 2M). Consumer node 5 gears with 4 and 3 what it wants to receive.

In figure 2N consumer node 3 tells consumer node 2 about the existence of nodes 2', 4 and 5. In figure 2O it can then be seen that node 2 is testing the
20 connection to 5, possibly because its connection deteriorates or the connection to 5 is better.

In figure 2P the connection between consumer node 5 and 2 has been made.

25 In figure 2Q it appears that the connection between 2 and 5 and 5 and 3 is so good that 3 now obtains its data packages via 5 instead of 2. The connection between 3 and 2 is broken off.

In figures 3A-3L a device according to the invention is implemented in a
30 mobile phone network. The white arrows here indicate a short control signal, the grey arrows a signal having one conversation, and the black arrows signals having two conversations.

In figure 3A mobile phone 11 wants to make contact. The device according to the invention, built in in mobile phone 11, subsequently searches whether a mobile phone in the direct vicinity has already contacted a support transmitter 10. None of the mobile phones in the direct vicinity has contact with support transmitter 10. The device according to the invention subsequently makes contact between mobile phone 11 and the support transmitter 10 (figure 3B). Mobile phone 11 starts a first conversation with a mobile phone outside the figure.

10

In figure 3C it can be seen how the device according to the invention, also implemented in mobile phone 12, searches in the direct vicinity whether a mobile phone has contact with the support transmitter 10. In figure 3D it can be seen that mobile phone 12 makes contact with mobile phone 11, which now sends on both conversations to the support transmitter 10.

15

In figure 3E it can be seen that the conversation of mobile phone 11 has already ended, but that said phone still sends on the conversation of mobile phone 12.

20

In figure 3F is can be seen that mobile phone 12 has also finished its conversation. Mobile phone 14 wants to call mobile phone 13, but is out of support transmitter 10's reach. Its signal is received by 11, which is able to make contact with the support transmitter. Mobile phone 11 now passes on the signal of 14 to the support transmitter 10, the support transmitter 10 sends on the signal to mobile phone 13 (figure 3G).

25

Mobile phone 13 has meanwhile been informed by for instance the support transmitter 10 that 11 is relatively close (they after all use the same support transmitter). Mobile phone 13 subsequently transmits a (small-range) signal asking mobile phone 11 to make contact with 14, which signal is received by 11 (figure 3H), which takes over the function of the support transmitter 10

30

and ensures the connection between 13 and 14 (figure 3I). Encryption ensures the confidential nature of the connections.

Due to a failure mobile phone 11 breaks down (figure 3J). Both 13 and 14
5 send out a call for help. Mobile phone 12 receives both calls and takes over the role of 11 (figure 3L).

Because of the autonomy of the device according to the invention it is possible first of all to make direct contact between mobile phones that are in
10 each other's vicinity. Additionally it is possible to take care of failures because of the dynamic nature of the topology.

Moreover, by means of the device according to the invention it is possible with a weak support transmitter (preferably as weak as possible, as the
15 mobile phones then will go looking for an alternative route more quickly) and many mobile phones in each other's vicinity to have a good connection with a minimum of transmission capacity of the support transmitter 10.

In figure 4A a traffic situation is shown, in which on one side of the road 48
20 and obstacle 40 is present that limits or blocks the circulation, as a result of which cars 43 and 42 come to a standstill. On the opposite side of the road 47 an approaching car 41 arrives. Ample before the blockage 40 there is an exit 49 with an alternative route. The cars are equipped with a device according to the invention.

25

In figure 4B it can be seen how the approaching car 41 obtains information from the stationary car 42 that it stands still. The car 41 drives on, and in figure 4C it can be seen how a car 44 on the side of the road 48 approaches the obstacle.

30

In figure 4D the car 41 delivers information to requesting car 44, independent of the transmitting car 42.

In figure 4E it can be seen that car 44 decides to take an alternative route via exit 49.

5 The device according to the invention, implemented in a car-information system, in this case receives the information from the transmitting car 42 and independent of the transmitting car sends it through to car 44. In this way car 41 informs the cars coming up behind independent of the cars that sent the information regarding the obstacle, in this example car 42.

10

Another example of the application of the device according to the invention is in television. In figure 5A a situation is shown wherein a number of television sets 54, 55, 57, 58, 59 are connected by means of a cable network 61 to transmission/broadcasting station 50. Television 56 is
15 connected to its own dish antenna 51. Apart from that the televisions are connected to an electricity grid 60, and provided with means for transmitting and receiving data packages via the electricity grid.

20

Television 53, that is not connected via a cable network to the other televisions, but indeed via the electricity grid 60, also has its own satellite connection. Televisions 56 and 53 transmit the signals of the dish antennas 51 and 52 to the other televisions via a device according to the invention. The white circles are content coming from satellites 51 and 52 which is passed on to the other television sets by television sets 53 and 56 via the
25 electricity grid. The grey circles are content that are delivered to television sets 54, 55, 57, 58 and 59 by transmitter 50 via the cable 61.

30

In figure 5B it can be seen how a failure arises in the connection between television 56 and 55. Televisions 54 and 55 send out an emergency signal (grey square) via the electricity grid, that is received by a device according to the invention in a television set that still gets a signal. Said television set (in fact the device according to the invention), in figure 5C television set 57, 58

and 59 receive the emergency signal. Said television sets send a signal to 54 and 55 via the electricity grid that they are able to deliver, and at the request of television sets 54 and 55 they start to deliver via the electricity grid (pale grey circles, figure 5D). In figure 5E it can be seen that the television sets 54 and 55 actually obtain the cable signal. The pale grey circles reach sets 54 and 55.

This example can of course also relate to personal computers, game computers, or even domestic appliances that are connected via a network or wireless, possibly via for instance the blue tooth protocol. Via an alternative channel, but that alternative may also be overcapacity on a certain cabling, errors can be put right or for instance inertia of data transport can be solved.

Figures 6A-6K show the transmission of content in data packages from one point over a network such that those data are available to everybody. That may for instance be streaming video or audio.

Production node 120 has content "12345678" at its disposal, and sends it to two consumer nodes 122 and 123 who request such. The flow via 123 goes much quicker than via 122. In figure 6B it can be seen that the first data package "1" has already been received by 123, whereas 122 still has nothing. Meanwhile 122 and 123 receive requests from 124, 126 and 127, 125, respectively. The data packages to 123 go so quickly that 123 has meanwhile received two packages already, and the connection of 123 to 127 is so good that 127 as well has already received one data package. It is therefore able to grant a request from consumer node 129 and to start sending on (figure 6C).

In figure 6D the consumer node 123 has meanwhile received three data packages already, and because the connection of 123 and 127 is so fast, 127 as well has already received two data packages. Node 125 has meanwhile been informed of the existence of 127 via 123 and has tested the

23

data connection to 127. Because also this data connection appeared to be good, considerably faster than the data connection to 123, the node 125 has decided to request 127 to deliver the data packages. Additionally 131 has also put in a request for delivery of content and is connected to consumer
5 node 129.

As the connection via node 122 of consumer node 126 appeared to be slow, consumer node 126 goes looking for a better connection and finally ends up at consumer node 129. At the request of consumer node 126, consumer
10 node 129 now also starts delivering data packages to 126. In this case the dynamic topology already seems to occur and the result of the dynamic topology is apparent. Consumer node 126 then disconnects the connection to consumer node 122. Meanwhile nodes 128 and 130 as well are added to the network as consumer nodes. This situation is shown in figure 6E.

15 Consumer node 124 as well, due to the slow connection of consumer node 122 to the production node 120, goes looking for a better connection, and ends up at consumer node 126. At the request of consumer node 124, consumer node 126 now also starts delivering data packages to consumer
20 node 124. This situation is shown in figure 6F. Meanwhile consumer nodes 128 and 130 still receive data package "1" that comes from the chain 120-122-124.

In figure 6G it can be seen that the delivery of data packages from the lower
25 chain 123-127-129 goes much quicker than the delivery from production node 120 to consumer node 122. Additionally it can also be seen that the connection of consumer nodes 128 and 130 to consumer node 124 is not optimal: consumer nodes 128 and 130 have received 2 data packages, whereas consumer node 131 has already received 4 data packages.
30 Consumer nodes 128 and 130 are going to look for a better connection, and 128 chooses to use the overcapacity of consumer node 131. This is shown in figure 6H. It can also be seen that consumer node 123 has now received

all content and the connection to the production node is no longer used.

In figure 6I it can be seen that only consumer nodes 128, 130 and 122 have not yet received all content. In figure 6J all consumer nodes except 122
5 have received all content.

In this example it apparently was not possible for consumer node 122 to find a better connection to another node. When, however, it would have appeared for instance that the connection via consumer node 124 was better
10 than the direct connection to the production node, the situation could have arisen that the consumer node 122 decided to request whether consumer node 124 could deliver data packages, as a result of which in fact the part of consumer node had been reversed from receiving consumer node to delivering consumer node. Preferably the consumer nodes are set up in such
15 a way that they only go looking for a new or additional connection when an existing connection is not satisfactory (any more).

Figures 7-15 show a specific embodiment of a production node according to the present invention, and specifically show the data streams through such a
20 production node (figures 7-11) and through a consumer node (figures 12-15). The data streams which are transmitted may be mp3 streams. The streams in this embodiment are transmitted over the internet. In this description of the drawings, reference will be made to mp3 streams. However, it must be clear that any data stream may be transmitted using this production node.
25 The different building block of the production node and the consumer node, e.g. buffer, Router Logic, etcetera are software objects which may be programmed in any suitable general purpose programming language, like C++ , Java, or any task-specific language. These objects are known to a man skilled in the art.

30

Figure 7 shows the processing of opening a media stream by a Production Node (PN). A Stream Target (media player) requests a media stream

through portal with: http://localhost:123/192.1.0.10/stream.mp3

The following steps are preformed:

- 5 **Step 1:** Consumer Manager (CM) receives and recognizes a request
- Step 2:** CM asks Router Logic (RL) for action
- Step 3:** RL asks portal (192.1.0.10) for IP address Stream Source (SS)
- Step 4:** Portal returns IP address SS: 24.25.26.27
- Step 5:** RL asks Production Manager (PM) to call SS
- 10 **Step 6:** PM request SS with: http://24.25.26.27/stream.mp3
- Step 7:** SS returns media stream and http header
- Step 8a:** PM parses data and sends media stream to Buffer
- Step 8b:** PM returns http header to RL
- Step 9:** RL returns http header to CM
- 15 **Step 10:** CM returns http header to Stream Target

In figure 8, the Production Node (PN) starts receiving the media stream. When http header has been passed to the Stream Target (step 10 in figure 7, the Consumer Manager (CM) starts a data retrieval loop: The Consumer
20 Manager asks data from Buffer and waits for reply. Buffer response could either be:

- data media stream (CM will ask for more) or
- data not ready yet (CM will wait and try later) or
- 25 ▪ end of stream (CM will close connection).

The following steps are then performed:

- 30 **Step 1:** Consumer Manager (CM) requests Buffer for data media stream
- Step 2:** Buffer starts sending media stream to CM
- Step 3:** CM passes stream to Stream Target

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In figure 9, Production Node (PN) receives an incoming request from the Consumer Node (CN). The incoming request from a Consumer Node is received by the Output Manager (OM) of the Production Node. The request
5 consists of network information, which is passed to the Router Logic (RL), and a request for a specific part of the media stream (data blocks) which will be handled by the Buffer.

Subsequently, the following steps are performed:

10

Step 1: Incoming node network request is received by the Output Manager (OM)

Step 2a: OM passes network information to the Router Logic

Step 2b: OM requests Buffer for all blocks, including a preferred first
15 block, the Consumer Node is missing.

In figures 10 and 11, the response of the Production Node (PN) on an incoming request of the Consumer Node (CN) is shown. The following situation may occur:

- 20
1. The requested data blocks are available
 2. The data blocks are not available.

These two possible situations will be further elucidated.

1. Blocks available (figure 10)

25 The requested blocks are available in the Buffer of the Production Node, together with network information this data is returned to the requesting Consumer Node. The following steps are then performed:

Step 1a: Network information about PN and the nodes PN is aware of,
30 is returned to the Output Manager (OM) by the Router Logic (RL)

Step 1b: The requested parts of the media stream (data blocks) are

returned by the buffer to the OM

Step 2: The OM bundles the information and returns this to the CN.

2. Blocks NOT available (figure 11)

5

The requested blocks are NOT available in the Buffer of the Production Node, together with network information this data is returned to the requesting Consumer Node.

10 **Step 1a:** Network information about PN and the nodes PN is aware off, is returned to the Output Manager (OM) by the Router Logic (RL)

Step 1b: The Buffer returns no data available

Step 2: The OM returns the network information of the RL to the CN.

28

Figure 12 now shows the different process steps which take place on the side of the Consumer Node (CN) when opening a media stream. A Stream Target (media player) requests a media stream through portal with: http://localhost:123/192.1.0.10/stream.mp3 via the consumer node.

5

The following steps then take place:

- Step 1:** Consumer Manager (CM) receives and recognizes a request
- Step 2:** CM asks Router Logic (RL) for action
- 10 **Step 3:** RL ask portal (192.1.0.10) for IP address other node (PN or CN) participating in the node network
- Step 4:** Portal returns IP address of other node
- Step 5:** RL asks Input Manager (IM) to connect other node
- Step 6:** IM requests other node for connection
- 15 **Step 7:** Other node returns media stream and http header
- Step 8a:** IM parses data and sends media stream to Buffer
- Step 8b:** IM returns http header to RL
- Step 9:** RL returns http header to CM
- Step 10:** CM returns http header to Stream Target

20

In figure 13 is shown what happens when the Consumer Node (CN) starts receiving a media stream. When the http header has been passed to the Stream Target, the Consumer Manager (CM) starts a data retrieval loop: asks data from Buffer and waits for reply. Buffer response could either be:

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- data media stream (CM will ask for more) or
- data not ready yet (CM will wait and try later) or
- end of stream (CM will close connection).

30

The following steps are thus performed:

- Step 1:** Consumer Manager (CM) requests Buffer for data media

stream

Step 2a: Buffer starts sending media stream to CM

Step 2b: Router Logic (RL) registers CN as active node at Portal and confirms its connection with other node

5 **Step 3:** CM passes stream to Stream Target

In figure 14 is shown what happens when the Consumer Node (CN) fails to connect after receiving media stream from another Node. For instance, connection from Consumer Node to other node (A.) is lost. Consumer Node
10 reacts by a request to another node (B.) in the node network. This is done by performing the following steps:

Step 1: Input Manager (IM) fails to connect to other node (A.)

Step 2: IM asks Router Logic (RL) for another IP address in the node
15 network

Step 3: Router Logic (RL) returns IP address of another node (B.)

Step 4: IM sends out a connection request to another node (B.)

Figure 15 shows, by way of summary, the different processing streams in
20 an active Consumer Node (CN). It shows in what way the different parts of the consumer node are interconnected.

The device according to the invention in all examples is autonomously capable of retrieving content from a data network, and sending it on to other
25 devices according to the invention without the intervention of the transmitting side. Additionally each device is capable of testing whether a better connection is within reach, and entirely independently choosing whether to use said connection.

It is to be understood that the above description is included to illustrate the operation of the preferred embodiments and is not meant to limit the scope of the invention. The scope of the invention is to be limited only by the

following claims. From the above discussion, many variations will be apparent to one skilled in the art that would yet be encompassed by the spirit and scope of the present invention.

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY
OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

1. A method for providing receiver-driven streaming of an item of content in a peer-to-peer network, the peer-to-peer network comprising a receiver peer node and a plurality of transmitter peer nodes, the method comprising:

providing, at the receiver peer node, a plurality of input managers, wherein each of the plurality of input managers uses a connection to a corresponding one of the plurality of transmitter peer nodes;

sending, from the plurality of input managers, one or more requests for at least a part of the item of content to the plurality of transmitter peer nodes in the network;

receiving, in response to the one or more requests, one or more data packages corresponding to at least a part of the item of content at a first input manager of the plurality of input managers;

receiving, in response to the one or more requests, one or more data packages corresponding to at least another part of the item of content at a second input manager of the plurality of input managers; and

making, at the receiver peer node, incoming content received by at least the first and second input managers, ready for processing and play-back at the receiver peer node, including managing, at the receiver peer node, the data packages received from at least a first transmitter peer node and a second transmitter peer node of the plurality of transmitter peer nodes, so that part of the item of content is streamed to a stream target at the receiver peer node while another part of the item of content is being received by the receiver peer node.

2. The method of claim 1, wherein each of the one or more requests for at least a part of the item of content comprises a request for one or more specific data packages.

5

3. The method of claim 2, wherein each of the one or more requests for at least part of the item of content is issued in response to information from at least one of the plurality of transmitter peer nodes.

10

4. The method of claim 1, wherein at least one connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes comprises an internet connection or a connection to another similarly organized network.

15

5. The method of claim 1, wherein at least one connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes comprises a wireless connection.

20

6. The method of claim 1, wherein at least one connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes comprises an encrypted connection.

25

7. The method of claim 1, wherein the data packages received by at least the first and second input managers contain address data identifying locations of one or more other transmitter peer nodes.

8. The method of claim 1, further comprising converting or transforming one or more of the data packages received by at least the first and second input managers.

30

9. The method of claim 1, further comprising changing or adding content to one or more of the data packages received by at least the first and second input managers.
- 5 10. The method of claim 1, wherein at least one connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes comprises an optimal connection selected in accordance with one or more of reliability and transmission speed, wherein the data packages received by at least the first and second input managers are transferred to the first and
10 second input managers in a sequential order.
11. The method of claim 1, further comprising evaluating a quality and reliability of a connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes.
15
12. The method of claim 1, wherein each of the one or more requests for at least a part of the item of content comprises a hypertext transfer protocol request.
13. The method of claim 1, further comprising setting up and closing down a
20 connection between one of the plurality of input managers and a corresponding one of the plurality of transmitter peer nodes.
14. The method of claim 13, wherein said setting up and closing down are performed in accordance with information received from one or more of the
25 transmitter peer nodes.
15. The method of claim 1, further comprising outputting of the incoming content made ready for processing and play-back.
- 30 16. The method of claim 1, wherein making at the receiver peer node the incoming content requested and received by the first and second input managers ready for

processing and play-back further comprises adding, at the receiver peer node, further content to the incoming content.

5 **17.** The method of claim **16**, wherein the further content added to the incoming content comprises at least one of advertising messages, local news, subtitles, and content generated internally at the receiver peer node.

10 **18.** The method of claim **1**, wherein the item of content is at least one of audio content or video content.

15 **19.** The method of claim **1**, further comprising using at least one buffer for storing the data packages received by at least the first and second input managers.

20 **20.** A peer-to-peer network system for providing receiver-driven streaming content, comprising:

 a plurality of transmitter peer devices; and

25 at least one receiving peer device that receives streaming content from the plurality of transmitter peer devices over a network, the streaming content received by the at least one receiving peer device corresponding to an item of content and including data packages, and the at least one receiving peer device comprising:

30 at least one data processing unit including software code comprising the following routines:

 a routine for providing a plurality of input managers at the receiving peer device, each of the plurality of input managers issuing one or more requests for at least a part of the item of content to the plurality of transmitter peer devices, wherein each input manager uses a connection

over the network to a corresponding one of the plurality of transmitter peer devices,

a routine for storing, in a buffer of the receiving peer device, incoming data packages transmitted by the transmitter peer devices and received by the plurality of input managers, and

a routine for making at least a part of the incoming data packages received by two or more input managers ready for processing and playback at the receiving peer device, including a routine for managing the data packages in the buffer of the receiving peer device, so that part of the item of content is streamed to a stream target at the receiving peer device while another part of the item of content is being received into the buffer of the receiving peer device;

wherein at least one of the plurality of transmitter devices that transmit the streaming content has a copy of said software code running thereon.

21. The system of claim **20**, wherein the item of content is at least one of audio content or video content.

22. The system of claim **20**, wherein all of the plurality of transmitter devices that transmit the streaming content to the at least one receiver device have a copy of said software code running thereon.

23. A computer-readable medium comprising computer executable instructions for providing receiver-driven streaming of an item of content to a receiver peer node from a plurality of transmitter peer nodes in a network, wherein said computer executable instructions, when executed by a processor, perform the following steps:

providing a plurality of input managers at the receiver peer node, wherein each input manager uses a connection to a corresponding one of said plurality of transmitter peer nodes;

5 sending one or more requests for data packages representing at least a part of the item of content from each input manager to a corresponding transmitter peer node in the network;

10 receiving, in response to the one or more requests, one or more data packages representative of at least part of the item of content at a first input manager of the plurality of input managers;

15 receiving, in response to the one or more requests, one or more data packages representative of at least part of the item of content at a second input manager of the plurality of input managers; and

20 making, at the receiver peer node, the data packages received by at least the first and second input managers ready for processing and play-back at the receiver peer node, including managing, at the receiver peer node, the data packages received by at least the first input manager and the second input manager, so that part of the item of content is streamed to a stream target at the receiver peer node while another part of the item of content is being received by the receiver peer node.

25 **24.** A method of growing a network and distributing data using the network, the network including one or more production nodes that send data, and a plurality of consumer nodes, wherein each consumer node receives data from one or more production nodes or at least one other consumer node, comprising:

30 (a) providing first software that resides on each of the consumer nodes, wherein the first software on each given consumer node:

- 5 (i) issues requests for data only to a production node or another consumer node that is directly connected to the given consumer node without any intermediate node logically positioned therebetween;
- 10 (ii) in response to a request for data issued by one other consumer node, the first software transmits data from the given consumer node to the one other consumer node only if the given consumer node can fulfill at least a portion of the request itself; and
- 15 (iii) in response to the request for data issued in step (a)(ii), the first software on the given consumer node takes no action to retrieve data from a node other than the given consumer node if the given consumer node is unable to fulfill the request itself;
- 20 (b) providing second software that resides on each of the one or more production nodes;
- 25 wherein, for each given production node, the second software transmits data from the given production node to a requesting consumer node in response to a request for data issued by said requesting consumer node only if the given production node can itself fulfill at least a portion of the request issued by the requesting consumer node;
- 30 (c) adding a new node to the network when the new node requests data from at least one consumer node or at least one production node;

- 5
- (d) using the first software residing on a first consumer node to issue a first request for data to the at least one consumer node or the at least one production node;
- (e) in response to receipt of the first request by the at least one consumer node or the at least one production node:
- 10
- (i) if the node receiving the first request is a consumer node, using the first software residing on the node receiving the first request to transmit at least a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion of the first request itself; and
- 15
- (ii) if the node receiving the first request is a production node, using the second software residing on the node receiving the first request to transmit at least a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion of the first request itself;
- 20
- (f) after step (e), and independent of said first request, using the first software residing on a second consumer node to issue a second request to the first consumer node for data; and
- 25
- (g) in response to receipt of the second request, using the first software residing on the first consumer node to transmit to the second consumer node at least a portion of data requested by the second request only if the first consumer node can fulfill at least a portion of the second request itself.
- 30

25. A network that distributes data, the network including one or more production nodes that send data, and a plurality of consumer nodes, wherein each consumer node receives data from one or more production nodes or at least one other consumer node, comprising:

5

(a) a first software that resides on each of the consumer nodes, wherein the first software on each given consumer node:

10

(i) issues requests for data only to a production node or another consumer node that is directly connected to the given consumer node without any intermediate node logically positioned therebetween;

15

(ii) in response to a request for data issued by one other consumer node, the software transmits data from the given consumer node to the other consumer node only if the given consumer node can fulfill at least a portion of the request itself; and

20

(iii) in response to the request for data, the first software on the given consumer node takes no action to retrieve data from a node other than the given consumer node if the given consumer node is unable to fulfill the request itself;

25

(b) second software that resides on each of the one or more production nodes;

30

wherein for each given production node, the second software transmits data from the given production node to a requesting consumer node in response to a request for data issued by said

requesting consumer node only if the given production node can itself fulfill at least a portion of the request issued by the requesting consumer node;

- 5 (c) wherein a new node is added to the network when the new node requests data from at least one consumer node or at least one production node;
- 10 (d) a first consumer node, having the first software residing thereon, that issues a first request for data to the at least one consumer node or the at least one production node;
- 15 (e) a node receiving the first request by the at least one consumer node or the at least one production node, wherein in response to receipt of the first request:
- 20 (i) if the node receiving the first request is a consumer node, the first software residing on the node receiving the first request transmits at least a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion of the first request itself; and
- 25 (ii) if the node receiving the first request is a production node, the second software residing on the node receiving the first request transmits at least a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion of the first request itself;

(f) wherein, independent of said first request, the first software residing on a second consumer node issues a second request to the first consumer node for data; and

5 (g) in response to receipt of the second request, the first software residing on the first consumer node transmits to the second consumer node at least a portion of data requested by the second only if the first consumer node can fulfill at least a portion of the second request itself.

10

26. At least one tangible medium that includes computer code for growing a network and distributing data using the network including one or more production nodes that send data, and a plurality of consumer nodes, wherein each consumer node receives data from one or more production nodes or at least one other consumer node, wherein the computer code, when executed by one or more processors causes the one or more processors to perform the following steps:

15

(a) providing first software that resides on each of the consumer nodes, wherein the first software on each given consumer node:

20

(i) issues request for data only to a production node or another consumer node that is directly connected to the given consumer node without any intermediate node logically positioned therebetween;

25

(ii) in response to a request for data issued by one other consumer node, the first software transmits data from the given consumer node to the one other consumer node only if the given consumer node can fulfill at least a portion of the request itself; and

30

(iii) in response to the request for data issued in step (a)(ii), the first software on the given consumer node takes no action to retrieve data from a node other than the given consumer node if the given consumer node is unable to fulfill the request itself;

(b) providing second software that resides on each of the one or more production nodes;

wherein, for each given production node, the second software transmits data from the given production node to a requesting consumer node in response to a request for data issued by said requesting consumer node only if the given production node can itself fulfill at least a portion of the request issued by the requesting consumer node;

(c) adding a new node to the network when the new node requests data from at least one consumer node or at least one production node;

(d) using the first software residing on a first consumer node to issue a first request for data to the at least one consumer node or at least one production node;

(e) in response to receipt of the first request by the at least one consumer node or the at least one production node:

(i) if the node receiving the first request is a consumer node, using the first software residing on the node receiving the first request to transmit at least a portion of the requested

data to the first consumer node receiving the first request can fulfill at least a portion of the first request itself; and

(ii) if the node receiving the first request is a production node, using the second software residing on the node receiving the first request to transmit at least a portion of the requested data to the first consumer node only if the node receiving the first request can fulfill at least a portion of the first request itself;

(f) after step (e), and independent of said first request, using the first software residing on a second consumer node to issue a second request to the first consumer node for data; and

(g) in response to receipt of the second request, using the first software residing on the first consumer node to transmit to the second consumer node at least a portion of data requested by the second request only if the first consumer node can fulfill at least a portion of the second request itself.

27. A device for generating or maintaining a data network, said device at a first node in the network and comprising:

a data processing unit;

at least one data connection to said data network, and software having:

a receiving routine for receiving streaming media comprising data packages from at least one transmitting device at a second node in said data network;

a request routine for sending a first request for one or more data packages of said streaming media to said second node in the network;

5 a request handling routine for handling a second request for one or more data packages of said streaming media from at least one receiving device at a third node in the network, wherein the first node takes no action to receive from another node the one or more data packages that are the subject of the second request if the one or more data packages that are the subject of the second request were not previously requested by the
10 first node when the second request is received by the first node;

a transmission routine for transmitting at least one of said one or more requested data packages subject of the first request, received from said at least one transmitting device at said second node in said data network,
15 to said at least one receiving device at said third node in response to said second request;

wherein said software, when running on said device at said first node, allows said device at said first node to receive and transmit streaming
20 media and:

transmit at least said first request for said one or more data packages to at least one other device at the second node;

25 receive at least one of said one or more data packages transmitted by said at least one other device at said second node in reply to said first request, said other device thus becoming a transmitting device at the second node;

after transmitting said first request, receive at least said second request from at least one further device at said third node for at least a portion of said one or more data packages;

5 in reply to said second request, transmit at least one data package of said one or more data packages previously received from said second node to said at least one further device at said third node, while at least one data package of said streaming media is being transmitted from the second node to the first node, said further device thus becoming a receiving
10 device at said third node, and wherein the first, second and third nodes are part of said data network.

28. A method for generating or maintaining a data network using a device at a first node in the network, and comprising:

15 providing a device at the first node, said device having a data processing unit, at least one data connection to said data network, and software having a receiving routine, a request routine, a request handling routine, and a transmission routine;

20 using said receiving routine on the device for receiving streaming media comprising data packages from at least one transmitting device at a second node in said data network;

25 using said request routine on the device for sending a first request for one or more data packages of said streaming media to said second node in the network;

30 using said request handling routine on the device for handling a second request for one or more data packages of said streaming media from at least one receiving device at a third node in the network, wherein the first

node takes no action to receive from another node the one or more data packages that are the subject of the second request if the one or more data packages that are the subject of the second request were not previously requested by the first node when the second request is received by the first node;

using said transmission routine on the device for transmitting at least one of said one or more requested data packages subject of the first request, received from said at least one transmitting device at said second node in said data network, to said at least one receiving device at said third node in response to said second request;

wherein said software, when running on said device at said first node, allows said device at said first node to receive and transmit streaming media;

transmitting at least said first request for said one or more data packages to at least one other device at the second node;

receiving on the device at least one of said one or more data packages transmitted by said at least one other device at said second node in reply to said first request, said other device thus becoming a transmitting device at the second node;

after transmitting said first request, receiving on the device at least said second request from at least one further device at said third node for at least a portion of said one or more data packages;

in reply to said second request, transmitting from the device at least one data package of said one or more data packages previously received from said second node to said at least one further device at said third node, while at

least one data package of said streaming media is being transmitted from the second node to the first node, said further device thus becoming a receiving device at said third node, and wherein the first, second and third nodes are part of said data network.

5

- 29.** A system for distributing media content from a first media player to other media players that include a second media player, comprising:

the first media player configured to:

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receive a first play-back request for an item of media content from a component of the first media player, wherein the first media player includes a first stream target,

15

in response to the first play-back request, initiate a first process to retrieve at least a part of the item of media content from at least one device selected from the group consisting of the first media player and one or more further devices,

20

output at least said part of the item of media content retrieved as a result of said first process to the first stream target to provide streaming of media content,

25

receive, from a plurality of the other media players, a plurality of further requests for the item of media content that are sent in an uncoordinated order with respect to one another from the plurality of other media players to the first media player, the further requests being received by the first media player after receiving the first play-back request, and

30

in reply to the further requests for the item of media content, transmit one or more parts of the item of media content, retrieved as a result of said first process, to the requesting other media players; and

5

the second media player configured to:

10

receive a second play-back request for the item of media content from a component of the second media player, wherein the second media player includes a second stream target,

15

in response to the second play-back request, initiate a second process to retrieve at least a part of the item of media content from the first media player, the second process including sending a request for at least said part of the item of media content to the first media player,

20

receive at least said part of the item of media content retrieved as a result of said second process, and

output at least said part of the received media content to the second stream target to provide streaming of media content;

25

wherein the first media player is adapted to output at least a part of the media content to the first stream target while the second media player outputs at least a part of the media content to the second stream target.

30

- 30.** A computer-readable medium having computer executable instructions for sharing streaming media content comprising data packages, from a first media player playing the media content to a plurality of other media players requesting at least a part of the media content, said computer executable instructions when

running on the first media player comprising instructions that cause the first media player to:

5 receive a play-back request for an item of media content from a component of the first media player, wherein the first media player includes a stream target,

10 in response to the play-back request, initiate a first process to retrieve at least a part of the item of media content from at least one device selected from the group consisting of the first media player and one or more further devices,

retrieve at least said part of the item of said media content,

15 pass at least said part of the retrieved media content to the stream target in reply to the play-back request for the item of media content,

20 after the first media player has received the play-back request, receive from the plurality of other media players a plurality of further requests for the item of media content that are sent in an uncoordinated order with respect to one another from the plurality of other media players to the first media player, and

25 in reply to each of the plurality of further requests for the item of media content, transmit from the first media player to a corresponding requesting other media player one or more parts of the item of media content retrieved at the first media player in response to the play-back request, wherein the one or more parts of the item of media content are transmitted from the first media player to the corresponding requesting
30 other media player while the first media player passes at least said part of

the retrieved media content to the stream target to provide streaming of media content.

- 5 **31.** A media player for playing streaming media content comprising data packages and transmitting at least a part of the media content to a plurality of other devices, comprising:

 a data processing unit that executes software having:

 a routine for:

10

- (i) receiving a play-back request for an item of media content from a component of the media player, wherein the media player includes a stream target, and

15

- (ii) in response to the play-back request, initiate a first process to retrieve at least a part of the item of media content from at least one device selected from the group consisting of the media player and one or more further devices,

20

 a retrieving routine for retrieving said item of media content,

 a management routine for managing retrieved media content,

25

 a routine for making at least a part of the retrieved media content ready for play-back and providing the media content made ready for play-back to the stream target,

30

 a request handling routine for handling, after receiving the play-back request, a plurality of further requests for at least a part of the item of media content, wherein the plurality of further requests are

sent from a plurality of other devices in an uncoordinated order with respect to one another to the media player, and

a transmitting routine for streaming at least a part of the item of media content to each of the plurality of other devices;

wherein the media player includes software that, when running on the media player allows the media player to:

receive at least the play-back request for the item of media content from the component of the media player;

in response to the play-back request, initiate the first process to retrieve at least a part of the item of media content from at least one device selected from the group consisting of the media player and the one or more further devices;

retrieve at least a part of the item of media content from at least one device selected of the group consisting of the media player and the one or more further devices;

manage the retrieved media content;

make the retrieved media content ready for play-back;

provide at least a part of the retrieved media content made ready for play-back to the stream target;

receive, from the plurality of other devices in any order, a plurality of requests for the item of media content after having retrieved at least a part of the item of media content at the media player;

in reply to a request for the item of media content from a first of the plurality of other devices, stream from the media player to the first device at least a part of the item of media content retrieved at the media player in response to the request from the component of the media player for the media content while the media player is providing media content made ready for playback to the stream target.

32. A computer-readable medium having computer executable instructions for sharing streaming media content comprising data packages, from a first media player playing the media content to a plurality of other media players requesting at least a part of the media content, said computer executable instructions when running on the first media player comprising instructions that cause the first media player to:

receive a play-back request for an item of media content from a component of the first media player, wherein the first media player includes a stream target,

in response to the play-back request, initiate a first process to retrieve at least a part of the item of media content from at least one stream source selected from the group consisting of the first media player and one or more further devices,

retrieve at least said part of the item of said media content from the stream source,

manage the retrieved media content by using a buffer,

get a part of the retrieved media content from the buffer and make that part ready for play-back and pass it to the stream target in reply to the

play-back request for the item of media content from the stream target, to provide streaming of media content,

5 after the first media player has received the playback request, receive from-the a plurality of other media players, a plurality of further requests, sent in an uncoordinated order with respect to one another, for the item of media content at one or more output managers, each output manager corresponding to one of the plurality of media players,

10 in reply to each of the plurality of further requests for the item of media content, transmit from the corresponding output manager one or more parts of the item of media content,

15 wherein the buffer is both used by the first media player to make a part of the retrieved media content ready for play-back and by at least one output manager to get a section of the retrieved media content in order to transmit the section of the retrieved media content to the corresponding requesting other media player.

20 **33.** A media player system for receiving streaming content from one or more other media player systems, the media player system comprising: at least one data processing unit that executes software including: a search routine for autonomously identifying one or more other media player systems running said software, the one or more other media player systems initially unknown to the
25 media player system, a request routine for requesting content to be streamed from at least one of the one or more identified other media player systems running said software, a receiving routine for receiving streaming content from the one or more identified other media player systems running the software, and a routine for making the incoming streaming content received as a result of the
30 receiving routine ready for play-back, wherein the search routine is configured to

be executed by the at least one data processing unit while the receiving routine is being executed.

- 5 **34.** A media player system for receiving streaming content at a media player from other media players comprising:

 a device storing the media player;

 software stored on a computer readable storage medium on the device, the software including: a search routine for autonomously identifying one or more other media players running said software, the one or more other media players initially unknown to the media player;

 a request routine for requesting content to be streamed from at least one of the one or more identified other media players running said software,

 a receiving routine for receiving streaming content from a media player running said software, and

 a routine for making incoming streaming content received as a result of the receiving routine ready for play-back, wherein the search routine is configured to be executed by the device while the receiving routine is being executed.

- 25 **35.** A computer-readable medium having computer executable instructions for receiving streaming content consisting of data packages from one or more other media players transmitting at least a part of the streaming content, said computer executable instructions comprising instructions for:

 issuing from the media player a request to the one or more other media players for the content to be streamed, wherein the one or more other media players have been identified by the media player searching

autonomously for media players including the computer executable instructions, the media players unknown to the media player prior to issuing the request,

5 receiving, as a result of the request, at least a part of the streaming content,

managing the received streaming content,

10 making the received streaming content ready for play-back, and

autonomously searching for additional media players while receiving at least part of the streaming content.

15 **36.** A method for receiving streaming content, comprising:

(a) storing media player software on a device, wherein the media player software:

20 (i) searches autonomously to identify other devices in a network running the media player software;

(ii) makes an inventory of other devices found as a result of step (i), running the media player software;

25 (iii) issues one or more requests for content to be streamed from the media player software of at least one device of said inventory, by using one or more connections, each connection corresponding to at least one device of said
30 inventory;

(iv) receives streaming content from the media player software of at least one device of said inventory in response to step (a)(iii); and

(v) makes at least one part of said streaming content of step (a)(iv), received from said media player software of at least one device of said inventory, ready for processing and playback; and

(b) searching for other devices in said network running the media player software, while receiving at least a part of said streaming content of step (a)(iv), by using the media player software residing on the device.

37. A method for receiving streaming content over a network, the network enabling communication between a first consumer node, a second consumer node, and a production node, the method comprising:

initiating, from the first consumer node, a first connection to the second consumer node;

receiving, in response to initiation of the first connection over the network to the second consumer node, one or more data packages corresponding to at least a part of the content;

selecting, from an inventory residing on the first consumer node, address data identifying a location of the production node;

initiating, from the first consumer node, a second connection over the network to the production node by using the address data;

receiving, in response to initiation of the second connection to the production node, one or more data packages corresponding to at least a part of the content; and

5

making incoming content received from the second consumer node ready for processing and play-back at the first consumer node, so that part of the content is streamed to a stream target at the first consumer node, while another part of the content is being received from the production node.

10

38. A method for receiver-driven streaming of content over a network, the network enabling communications between a first consumer node, a second consumer node, and a production node, the method comprising:

15

initiating, from the first consumer node, a first connection over the network to the second consumer node;

20

receiving, in response to initiation of the first connection to the second consumer node, one or more data packages corresponding to at least a part of the content;

initiating a second connection over the network between the first consumer node and a production node;

25

receiving, in response to initiation of the second connection to the production node, one or more data packages corresponding to at least a part of the content; and

30

making incoming content received from the second consumer node ready for processing and play-back at the first consumer node, so that part of

the content is streamed to a stream target at the first consumer node, while another part of the content is being received from the production node.

- 5 **39.** A device configured for receiving streaming content over a network, the network enabling communication with a consumer node and a production node, the device comprising:

a connection component configured for:

10

initiating a first connection over the network to the consumer node;

15

receiving, in response to initiation of the first connection to the consumer node, one or more data packages corresponding to at least a part of the content;

initiating a second connection over the network to the production node; and

20

receiving, in response to initiation of the second connection to the production node, one or more data packages corresponding to at least a part of the content; and

a processing component configured for:

25

making incoming content received from the consumer node ready for processing and play-back, so that part of the content is streamed to a stream target using the device, while another part of the content is being received from the production node.

30

- 40.** A method for receiver-driven streaming of content over a network, the network enabling communications between a first consumer node, a second consumer node, and a production node, the method comprising:

5

initiating, from the first consumer node, a first connection over the network to the production node;

10

receiving, in response to initiation of the first connection to the production node, one or more data packages corresponding to at least a part of the content;

15

initiating a second connection over the network between the first consumer node and the second consumer node;

20

receiving, in response to initiation of the second connection to the second consumer node, one or more data packages corresponding to at least a part of the content; and

25

making incoming content received from the production node ready for processing and play-back at the first consumer node, so that part of the content is streamed to a stream target at the first consumer node, while another part of the content is being received from the second consumer node.

- 41.** A method for receiver-driven streaming of content over a network, the network enabling communications between a first consumer node, a second consumer node, and a third consumer node, the method comprising:

initiating, from the first consumer node, a first connection over the network to the second consumer node;

receiving, in response to initiation of the first connection to the second consumer node, one or more data packages corresponding to at least a part of the content;

initiating a second connection over the network between the first consumer node and the third consumer node;

receiving, in response to initiation of the second connection to the third consumer node, one or more data packages corresponding to at least a part of the content; and

making incoming content received from the second consumer node ready for processing and play-back at the first consumer node, so that part of the content is streamed to a stream target at the first consumer node, while another part of the content is being received from the third consumer node.

42. A method for receiving data packages of a streaming item of content at a receiving media player, using at least two communication channels, the method comprising:

receiving one or more data packages corresponding to at least a part of the item of content over a first communication channel operationally coupled to the receiving media player;

initiating a request for at least a part of the item of content over a second communication channel operationally coupled to the receiving media player;

receiving, in response to initiating the request, one or more data packages corresponding to at least a part of the item of content, over the second communication channel; and

5 making incoming content received over the first communication channel ready for processing and play-back at the receiving media player, such that part of the item of content is streamed to a stream target at the receiving media player, while another part of the item of content is being received by the receiving media player over the second communication
10 channel.

43. A method for receiving data packages of a streaming item of content at a receiving media player, using at least two communication channels, the method comprising:

15 initiating a first request for receiving at least a part of the item of content over a first communication channel accessible by the receiving media player;

20 receiving, in response to initiating the first request, one or more data packages corresponding to at least a part of the item of content over the first communication channel;

25 initiating a second request for receiving at least a part of the item of content over a second communication channel accessible by the receiving media player;

30 receiving, in response to initiating the second request, one or more data packages corresponding to at least a part of the item of content over the second communication channel; and

making incoming content received over the first communication channel ready for processing and play-back at the receiving media player, such that part of the item of content is streamed to a stream target at the receiving media player, while another part of the item of content is being received by the receiving media player over the second communication channel.

44. A device for receiving data packages of a streaming item of content over at least two communication channels, the device comprising:

a connection component configured for:

receiving one or more data packages corresponding to at least a part of the item of content over a first communication channel accessible by to the device;

initiating a request for at least a part of the item of content over a second communication channel accessible by to the device; and

receiving, in response to initiating the request, one or more data packages corresponding to at least a part of the item of content, over the second communication channel; and

a processing component configured for:

making incoming content received over the first communication channel ready for processing and play-back at the device, such

that part of the item of content is streamed to a stream target using the device, while another part of the item of content is being received by the device over the second communication channel.

45. A media player system configured to request and receive streaming content from one or more production nodes or other media player systems, the media player system comprising:

5

at least one processing unit that executes software including:

a search routine for autonomously identifying one or more other media player systems running the software, the one or more other media player systems being initially unknown to the media player system;

10

a request routine for requesting content from at least one of the one or more identified other media player systems or from one or more production nodes;

15

a receiving routine for receiving streaming content from one or more of the identified media player systems or from the one or more production nodes; and

20

a routine for making incoming streaming content received as a result of the receiving routine ready for play-back,

wherein the search routine is configured to be executed by the at

least one data processing unit while the receiving routine is being executed.

5 **46.** A media player system for receiving streaming content from one or more production nodes or other media player systems, the media player system comprising:

at least one processor;

10 a set of instructions stored on a computer readable storage medium, the set of instructions being executable by the at least one processor and including:

15 a search routine for autonomously identifying one or more other media player systems running the set of instructions, the one or more other media player systems being initially unknown to the media player system;

20 a request routine for requesting content from at least one of the one or more identified other media player systems or from one or more production nodes:

a receiving routine for receiving streaming content from one

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0

15

20

managing the received streaming content;

making the received streaming content ready for play-back, and

while receiving at least part of the streaming content, executing a search to identify additional media players including the computer executable instructions, the additional media players being initially unknown to the media player.

5
48. A method for receiving streaming content from at least one production node to a media player in a network of media players, the method comprising:

10
(a) providing media player software that resides on a media player, wherein the media player software is configured to:

15
(i) search autonomously to identify other media players in the network running the media player software;

(ii) make an inventory of found other media players running the media player software;

20
(iii) issue one or more requests for streaming content to at least one production node, by using one or more connections, each connection corresponding to one production node;

(iv) receive streaming content from the at least one production node in response to step (a)(iii); and

(v) make at least one part of the streaming content of step (a)(iv), received from the at least one production node, ready for processing and play-back;

(b) issuing one or more requests for streaming content to a first production node, and receiving streaming content from the first production node, by using the media player software on a first media player, and making at least a part of the received streaming content ready for play-back; and

(c) searching for a second media player in the network running the media player software, while receiving at least a part of the streaming content of step (b), by using the media player software residing on the first media player.

49. A method for using software stored on a processing unit of a media player system for requesting and receiving streaming content from one or more production nodes or other media player systems, the method comprising:

autonomously identifying one or more other media player systems running the software, the one or more other media player systems being initially

unknown to the media player system;

requesting content from at least one of the one or more identified other media player systems or from one or more production nodes;

5

receiving streaming content from one or more of the identified other media player systems or from the one or more production nodes; and

10

making incoming streaming content received as a result of the receiving routine ready for play-back,

wherein the step of autonomously identifying is executed by the data processing unit while receiving streaming content.

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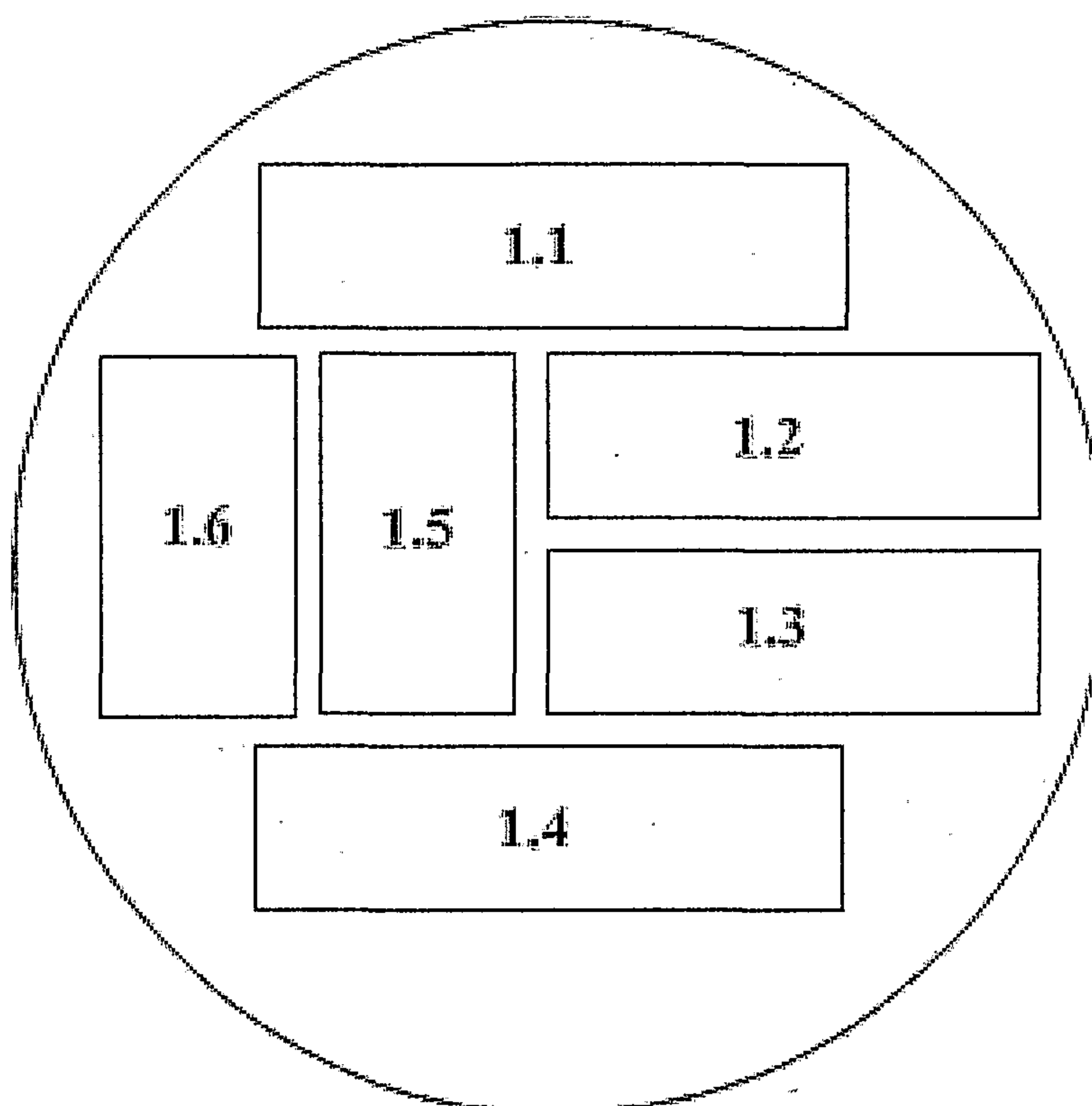


Fig. 1

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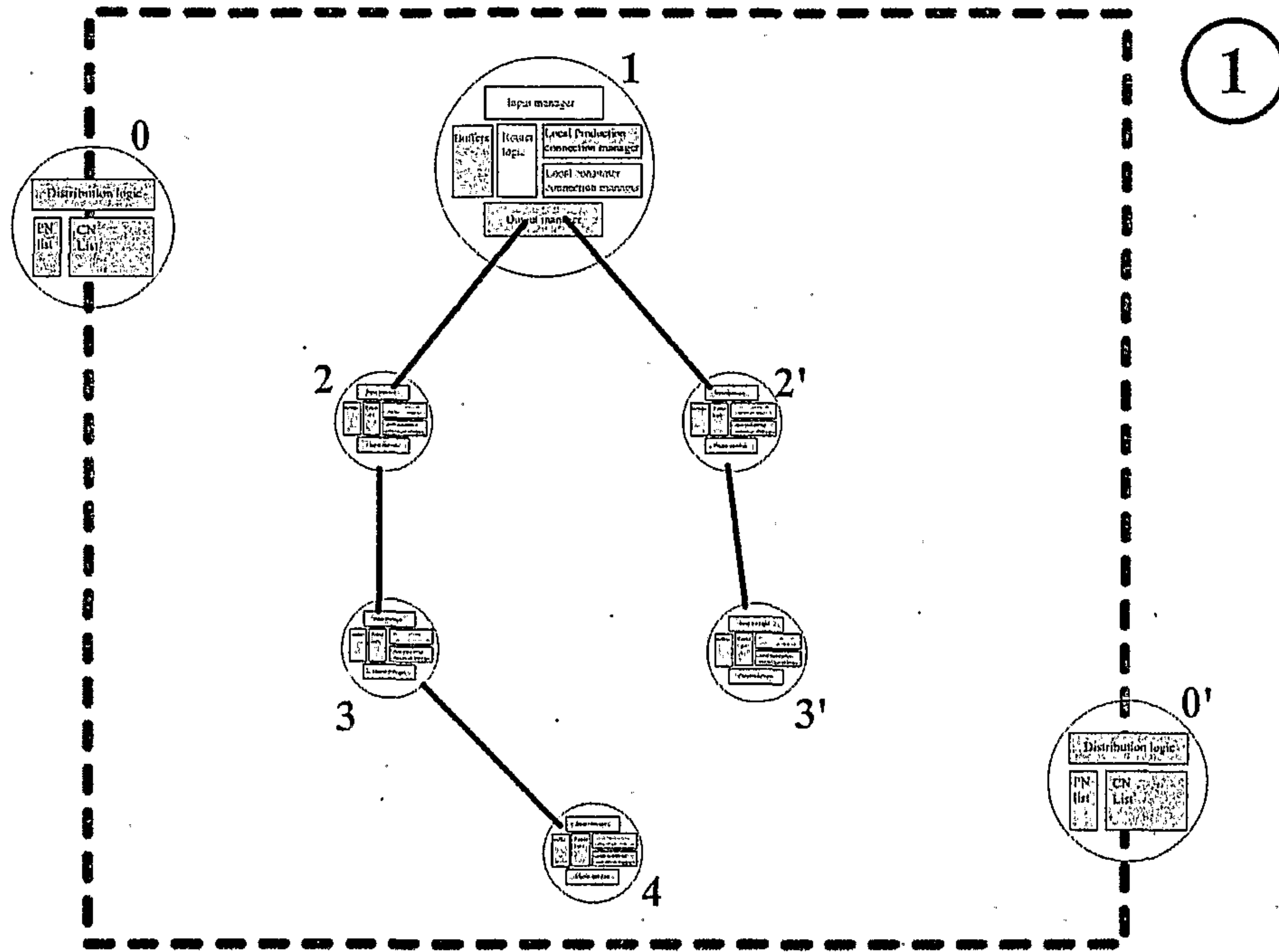


Fig. 2A

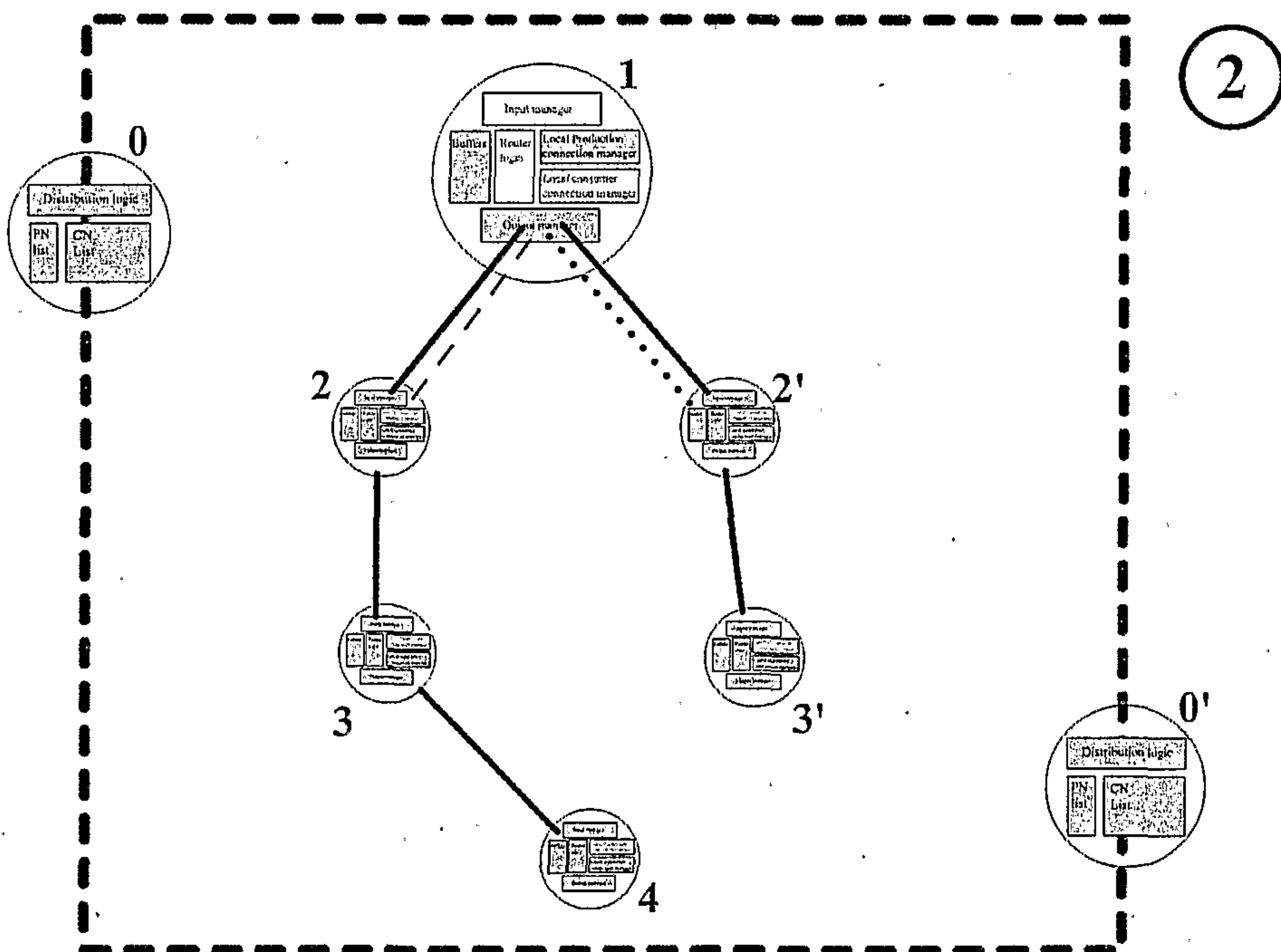


Fig. 2B

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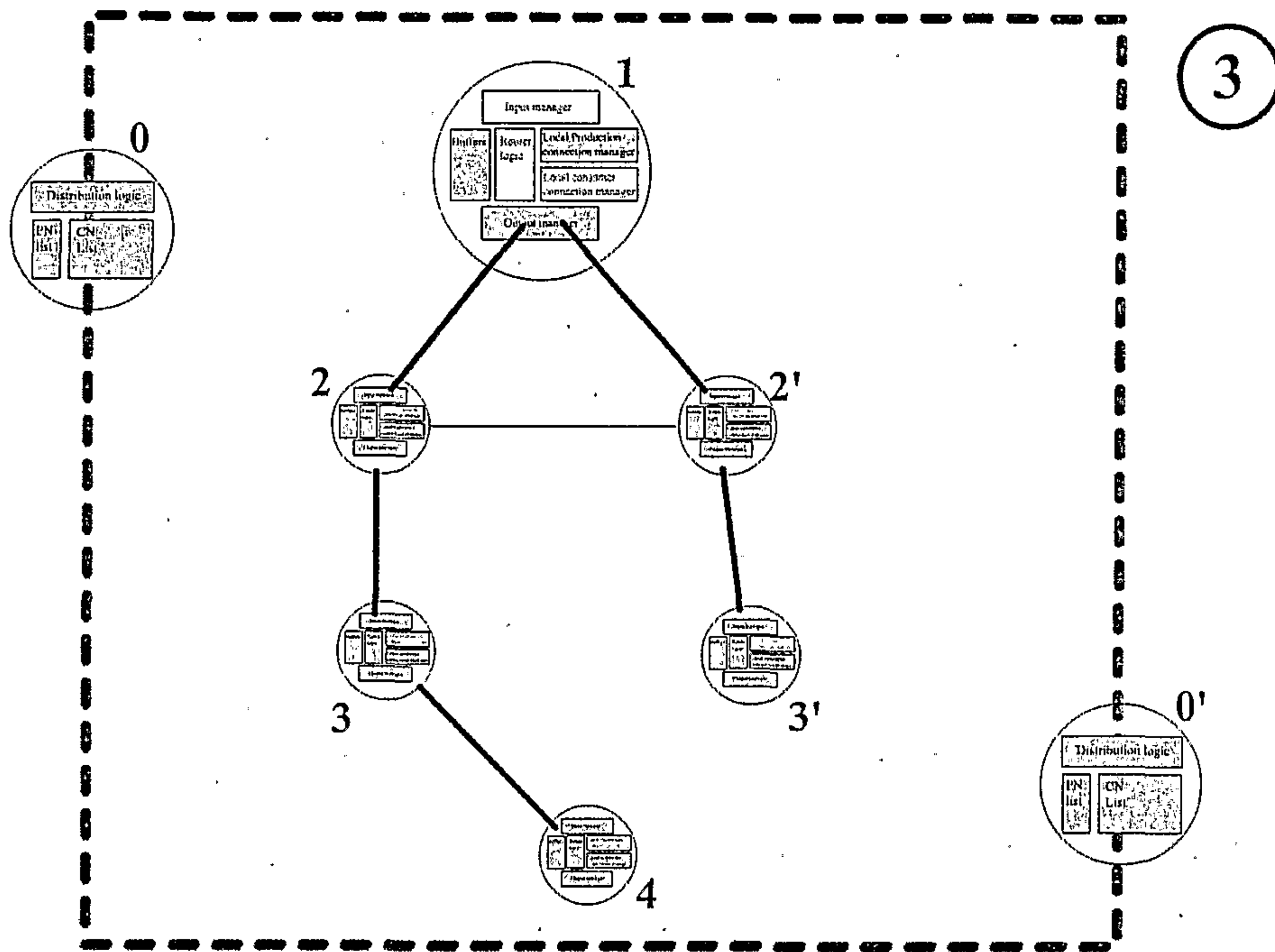


Fig. 2C

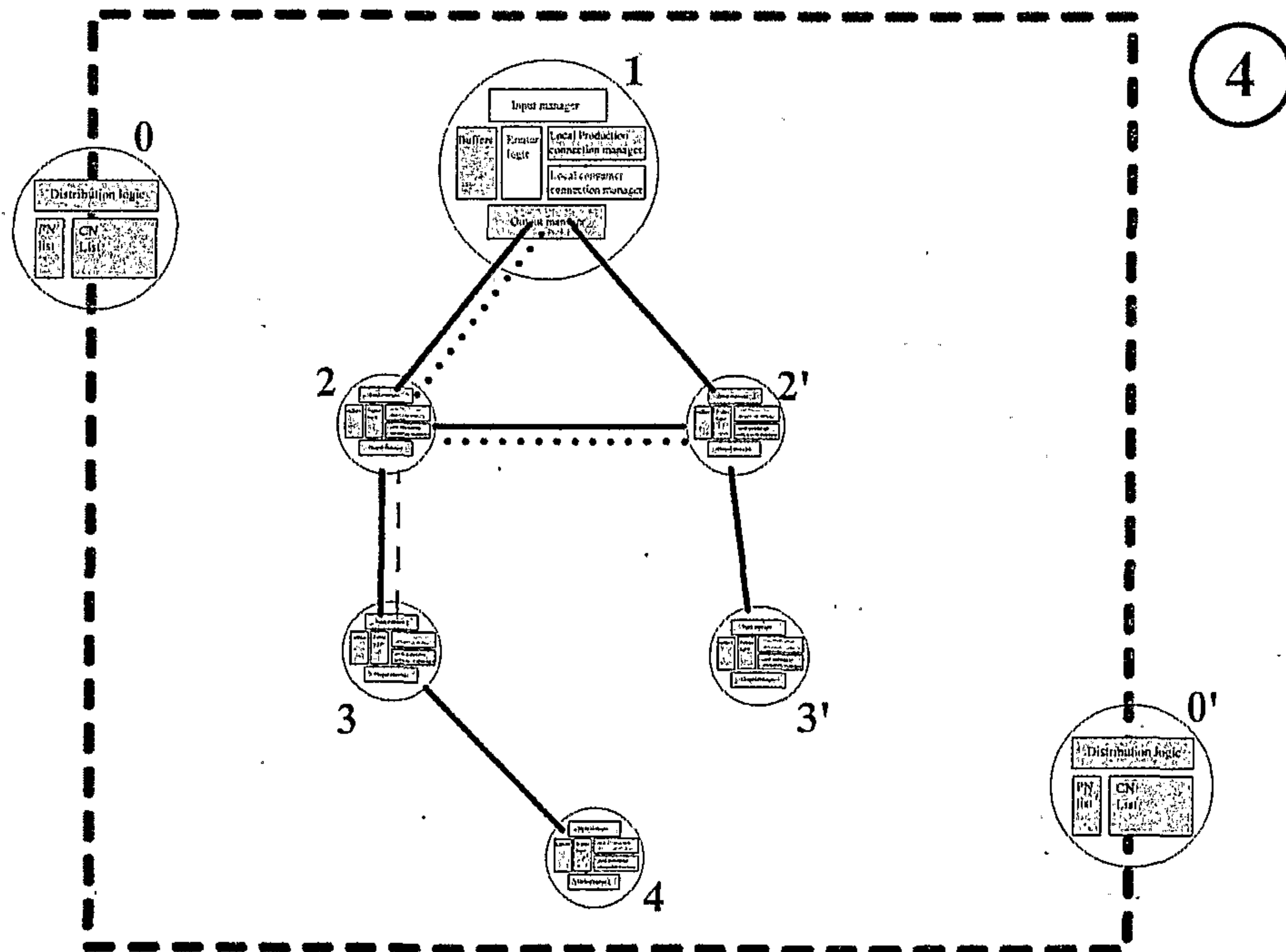


Fig. 2D

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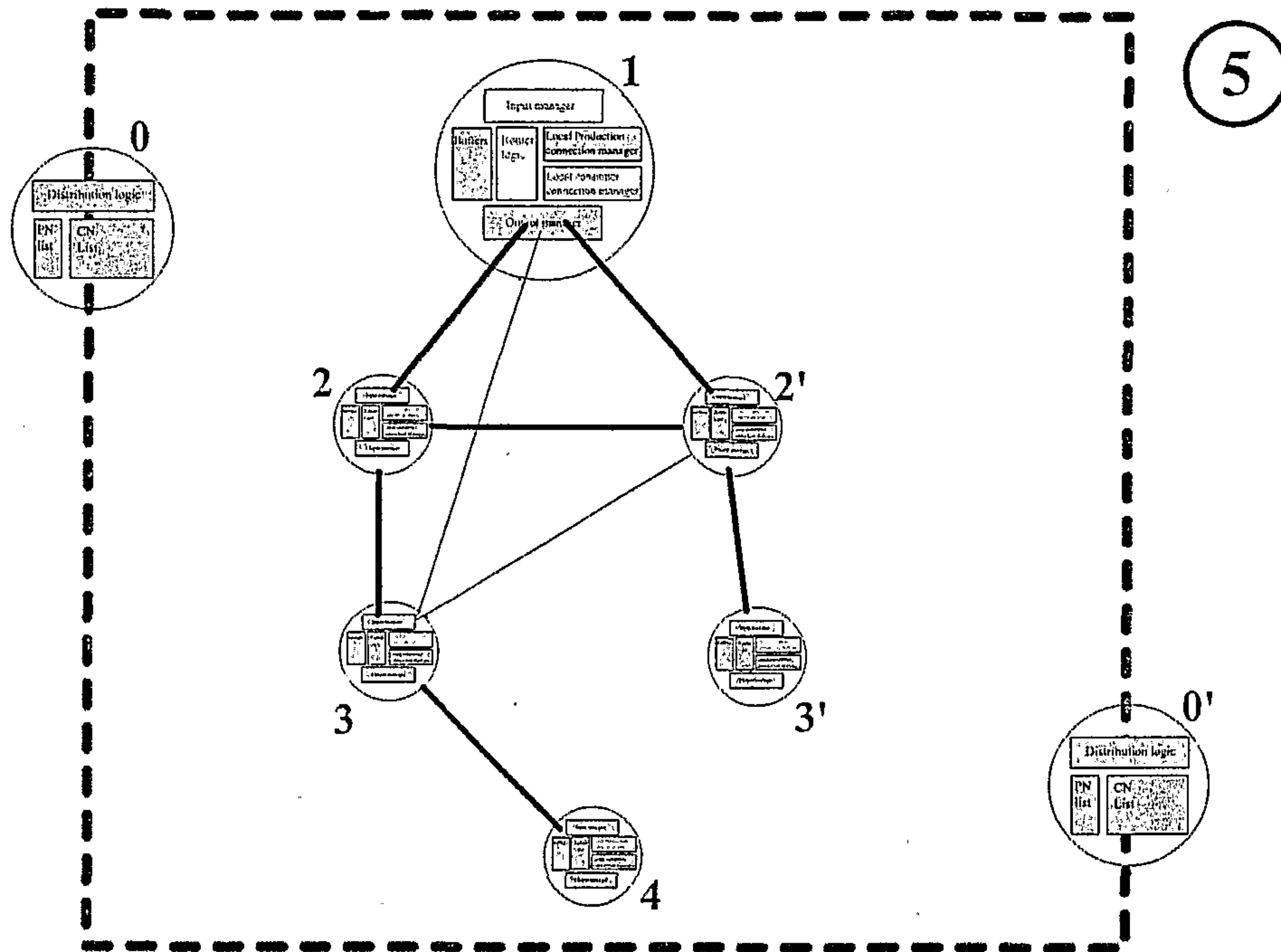


Fig. 2E

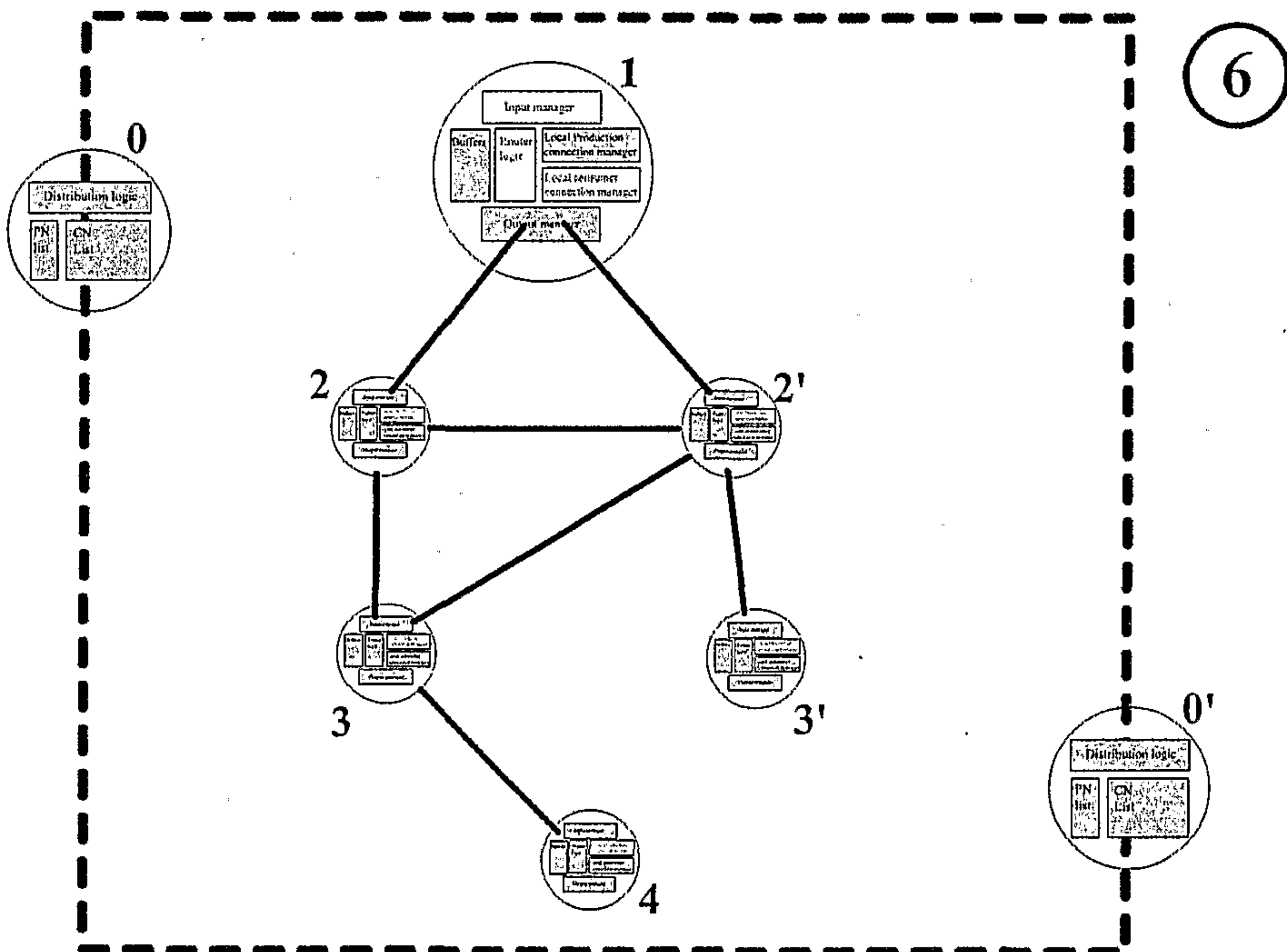


Fig. 2F

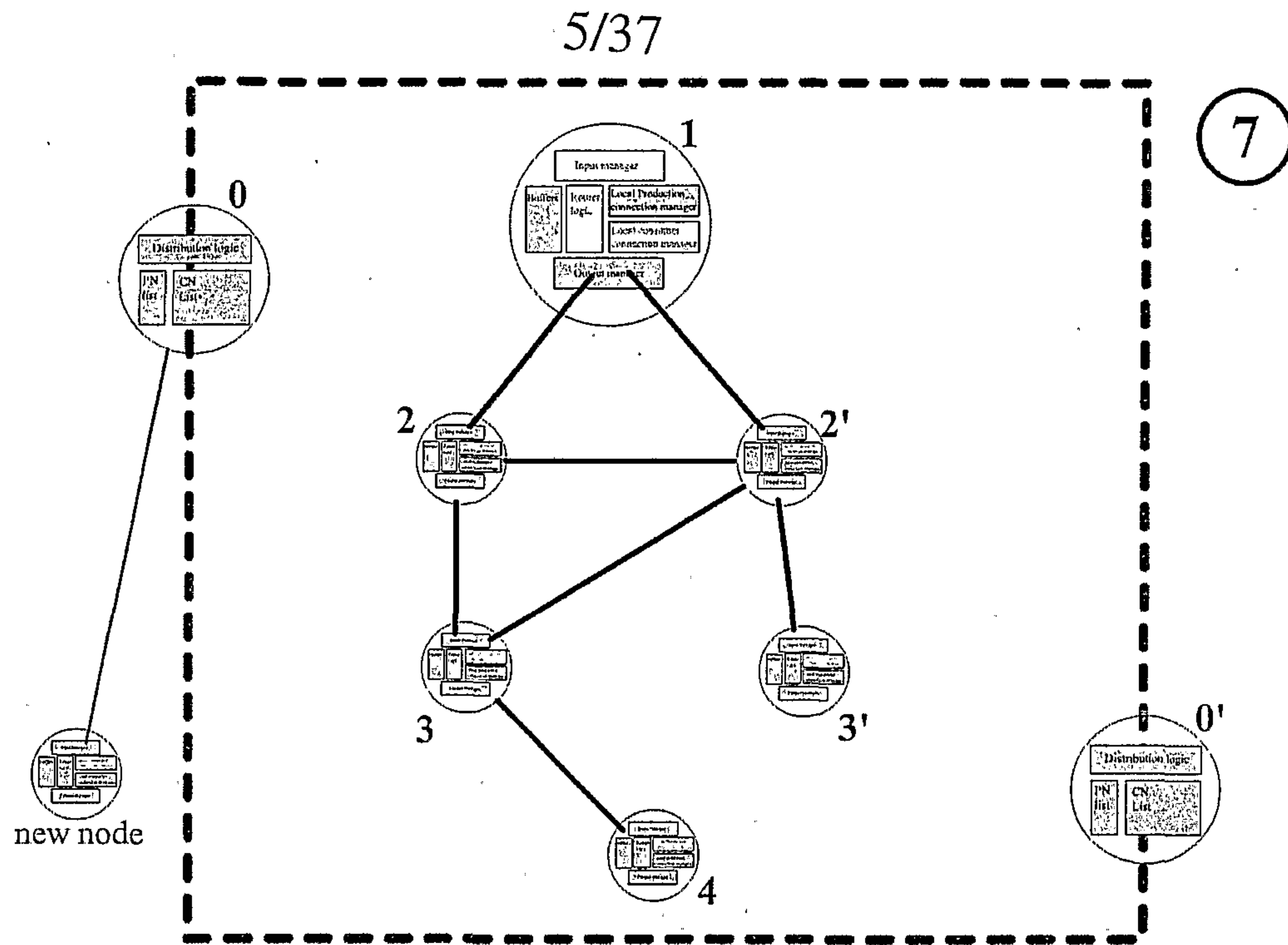


Fig. 2G

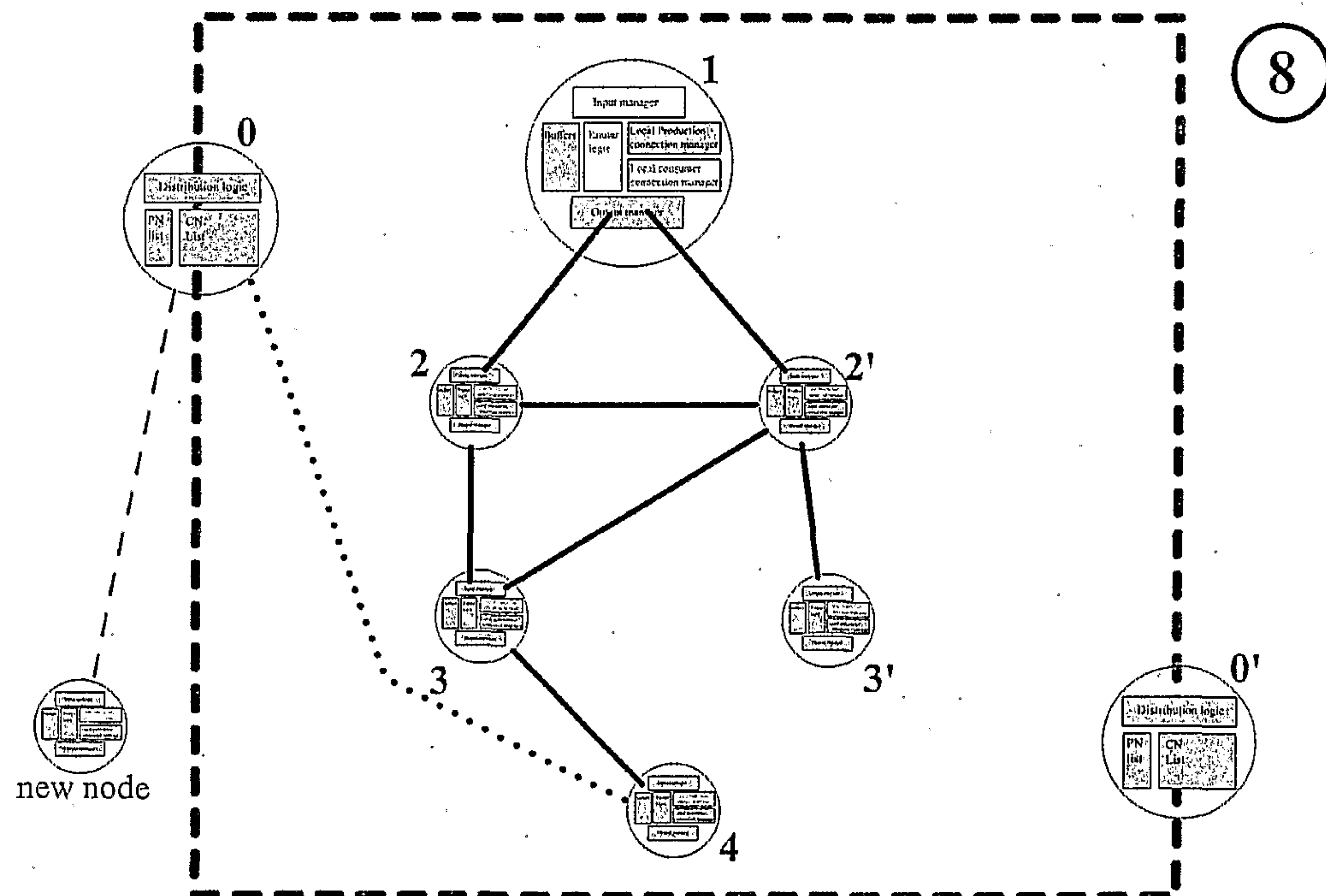
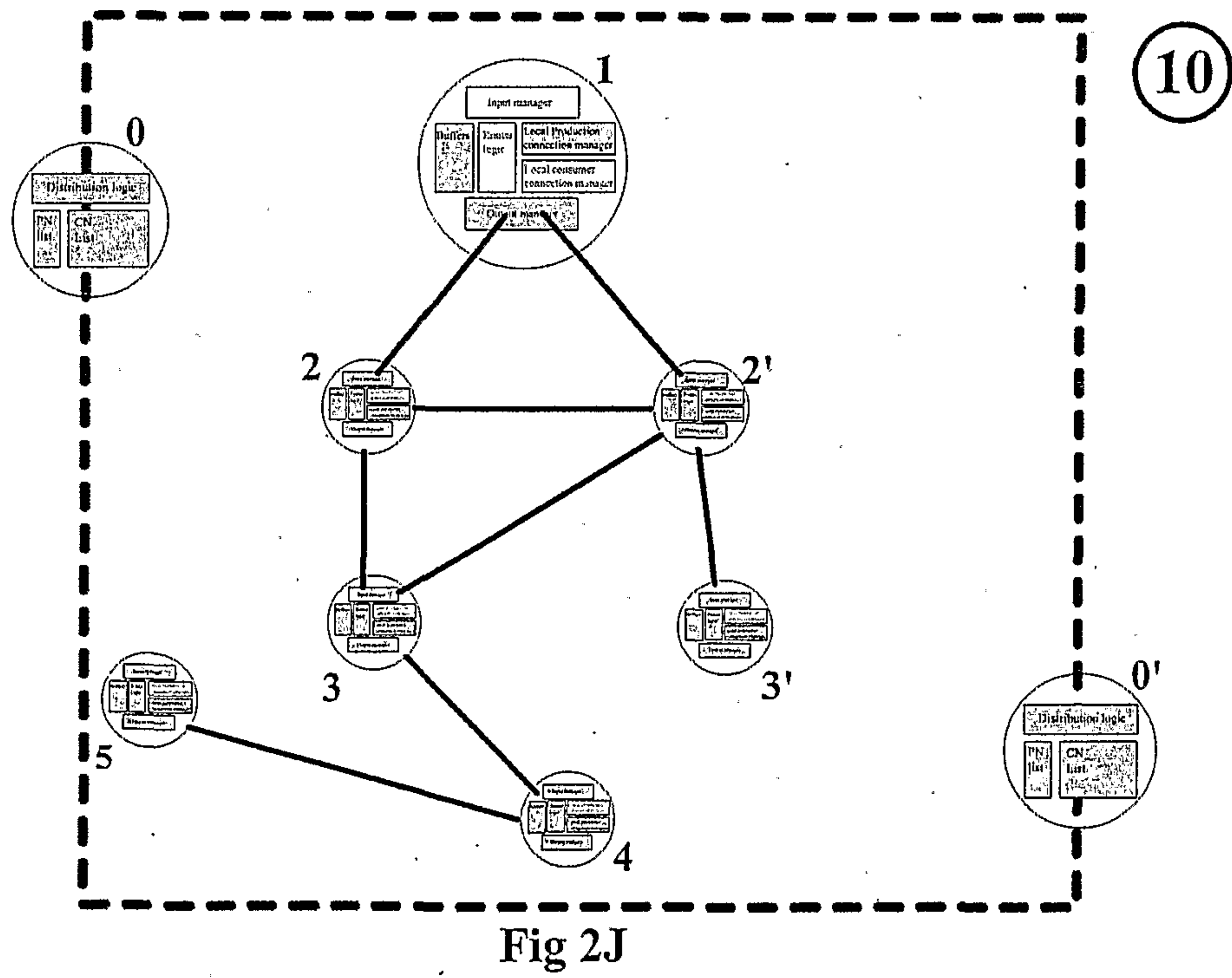
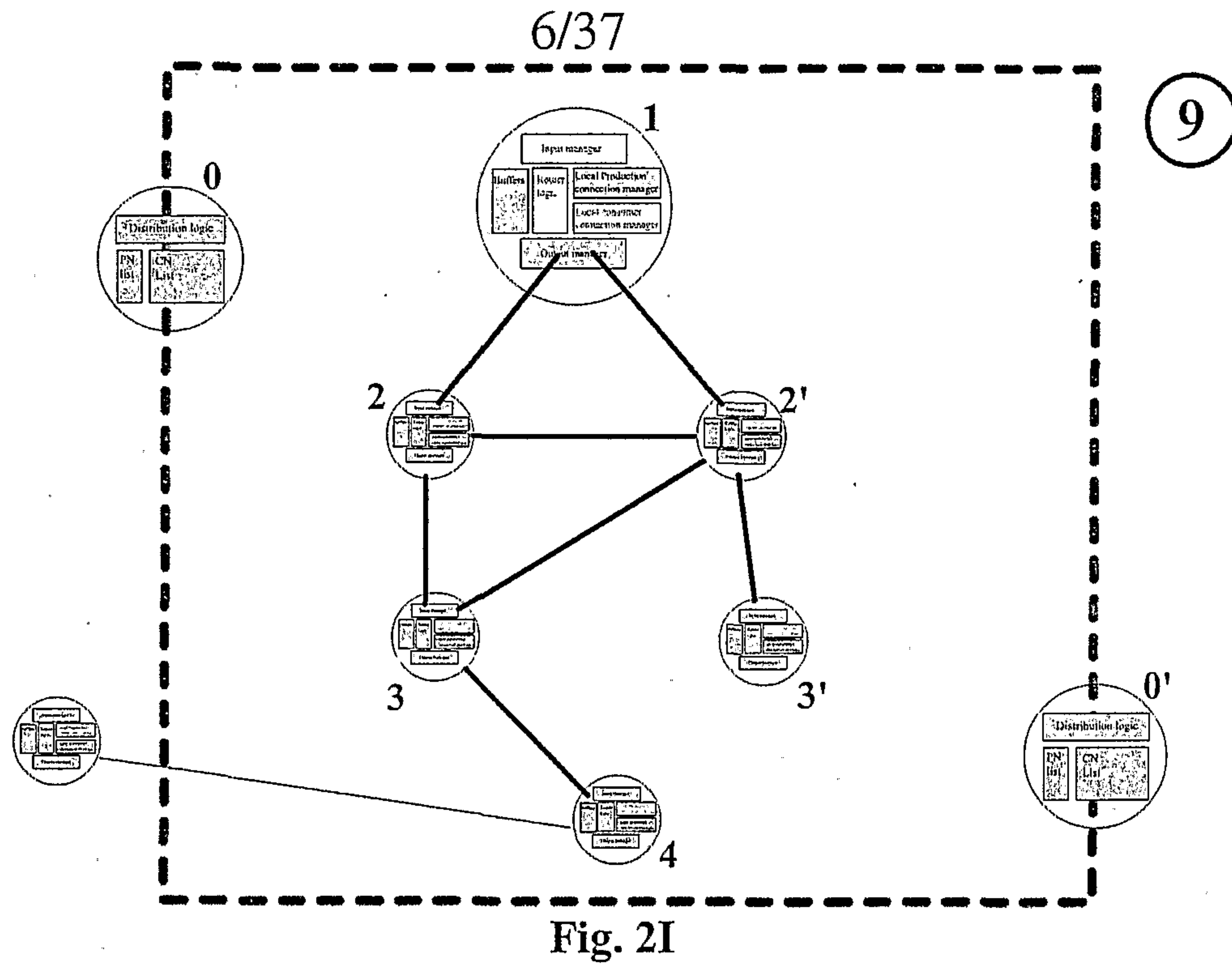


Fig. 2H



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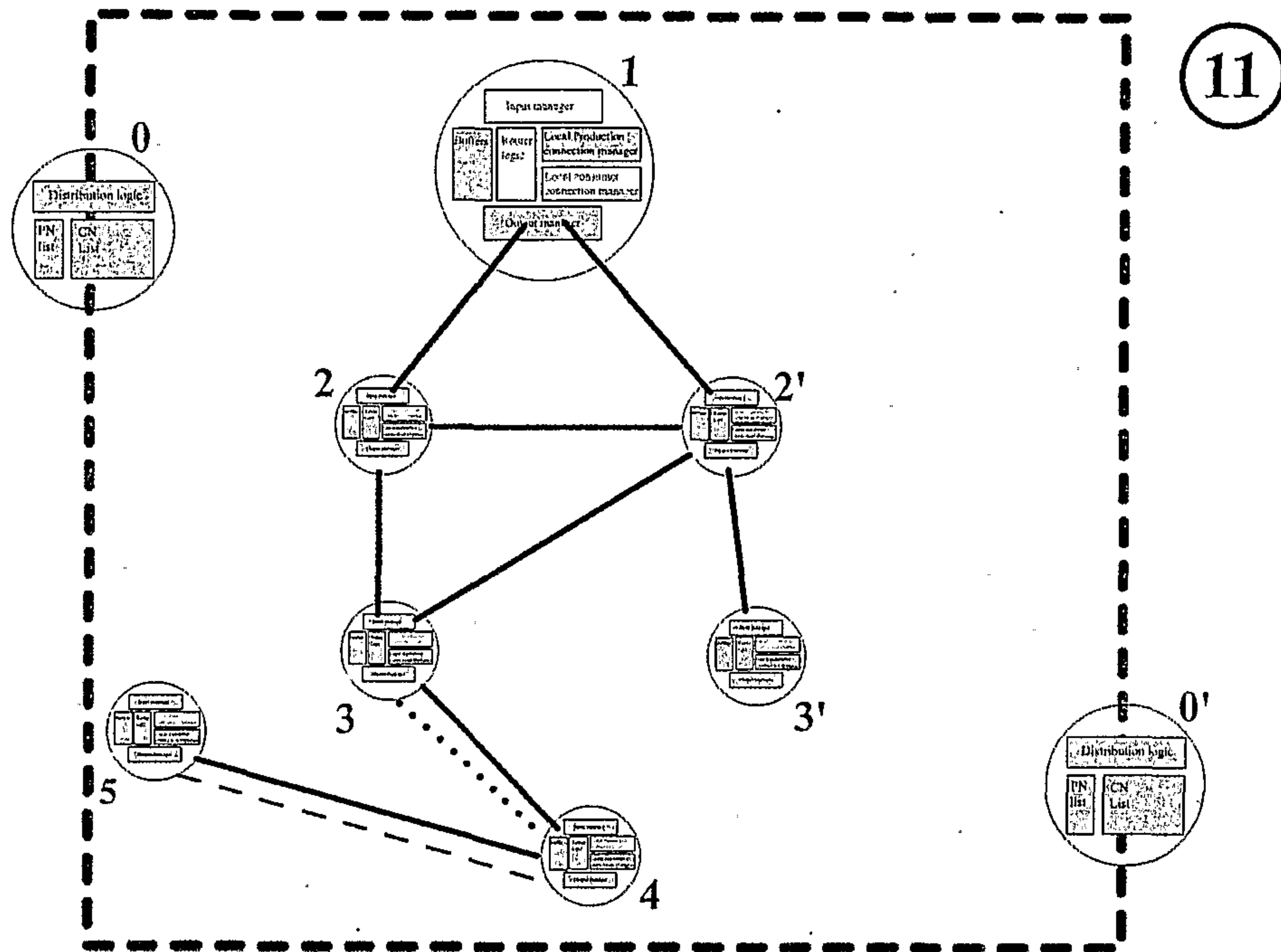


Fig. 2K

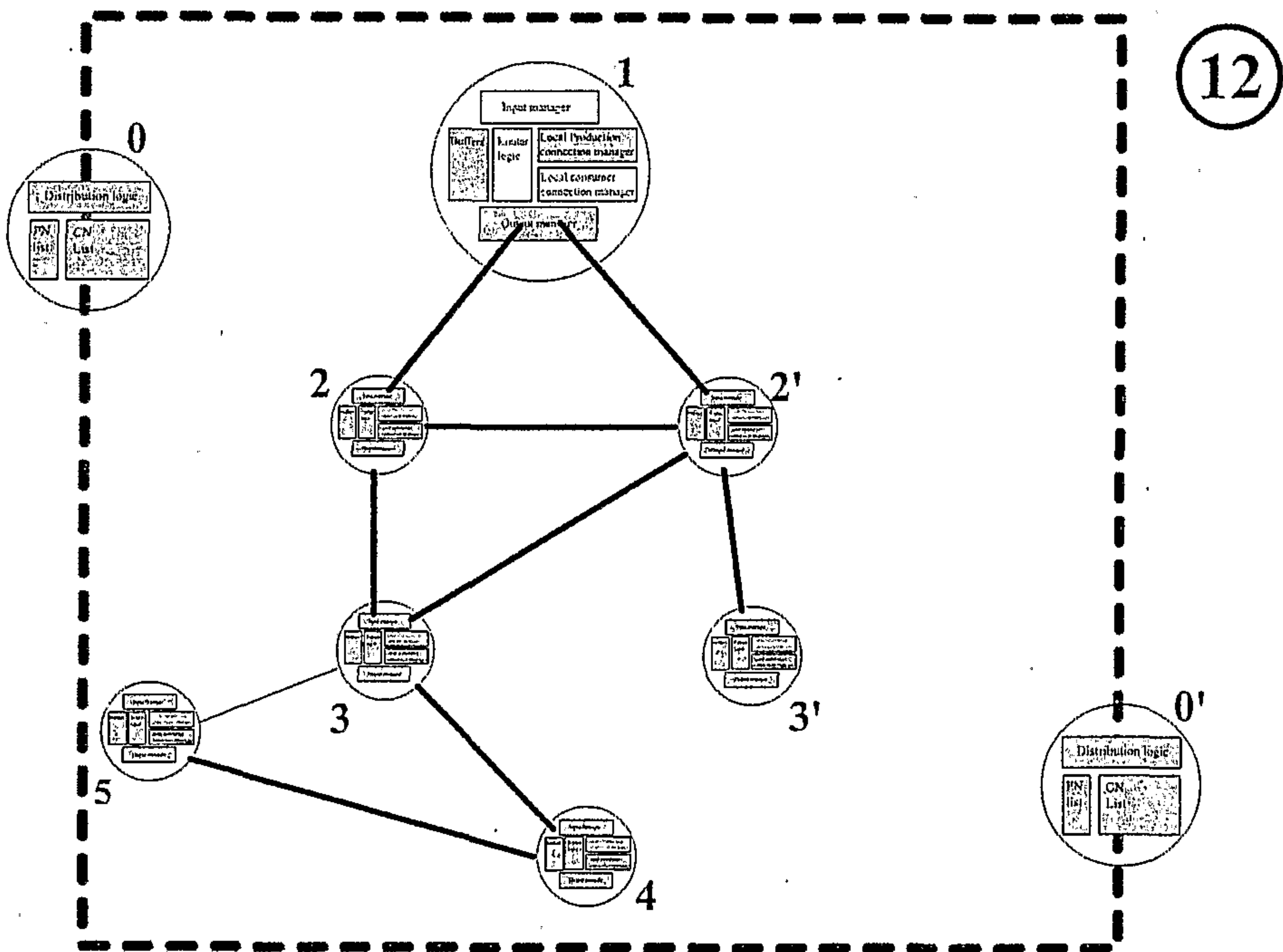


Fig 2L

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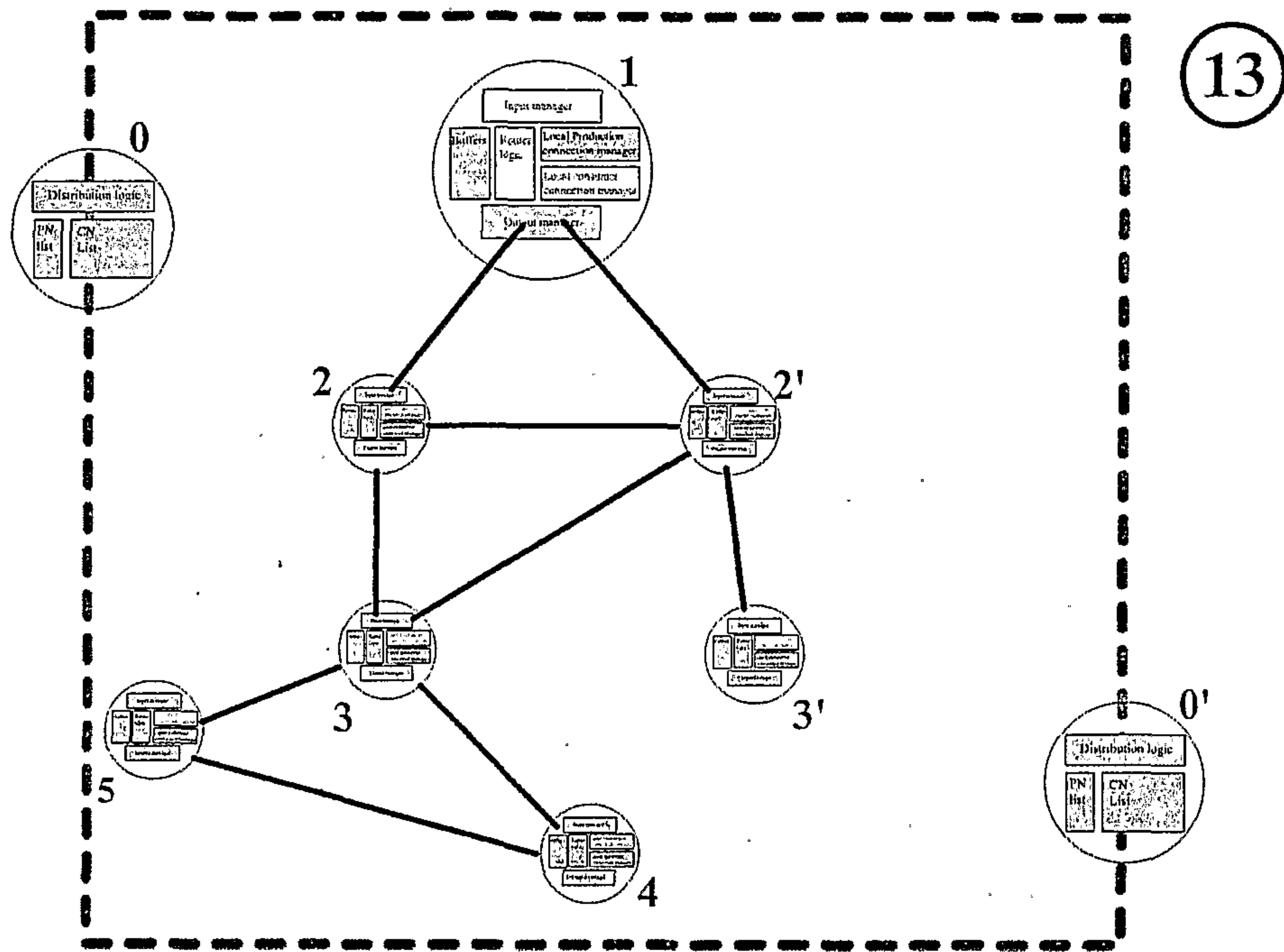


FIG. 2M

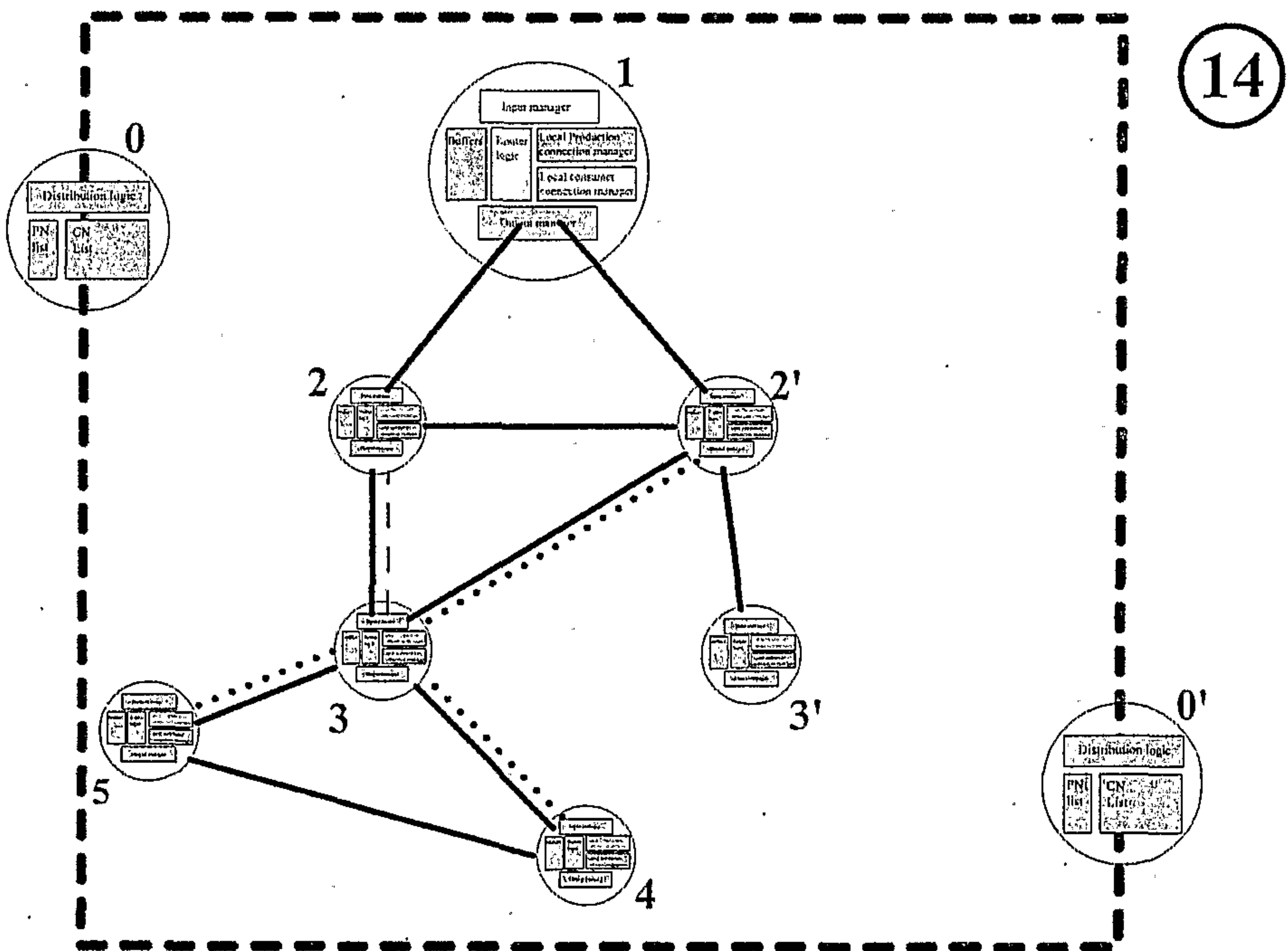


FIG 2N

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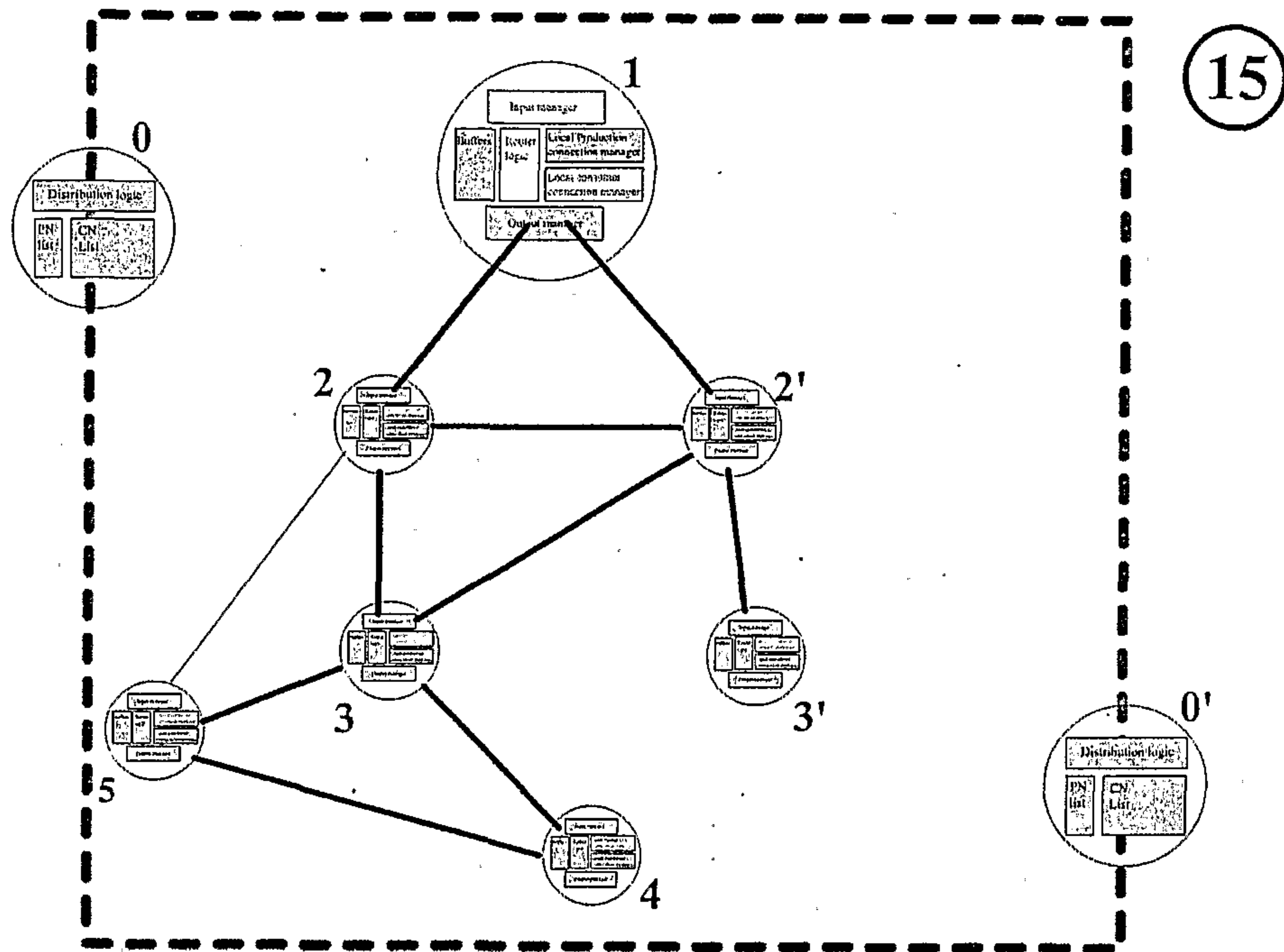


Fig. 2O

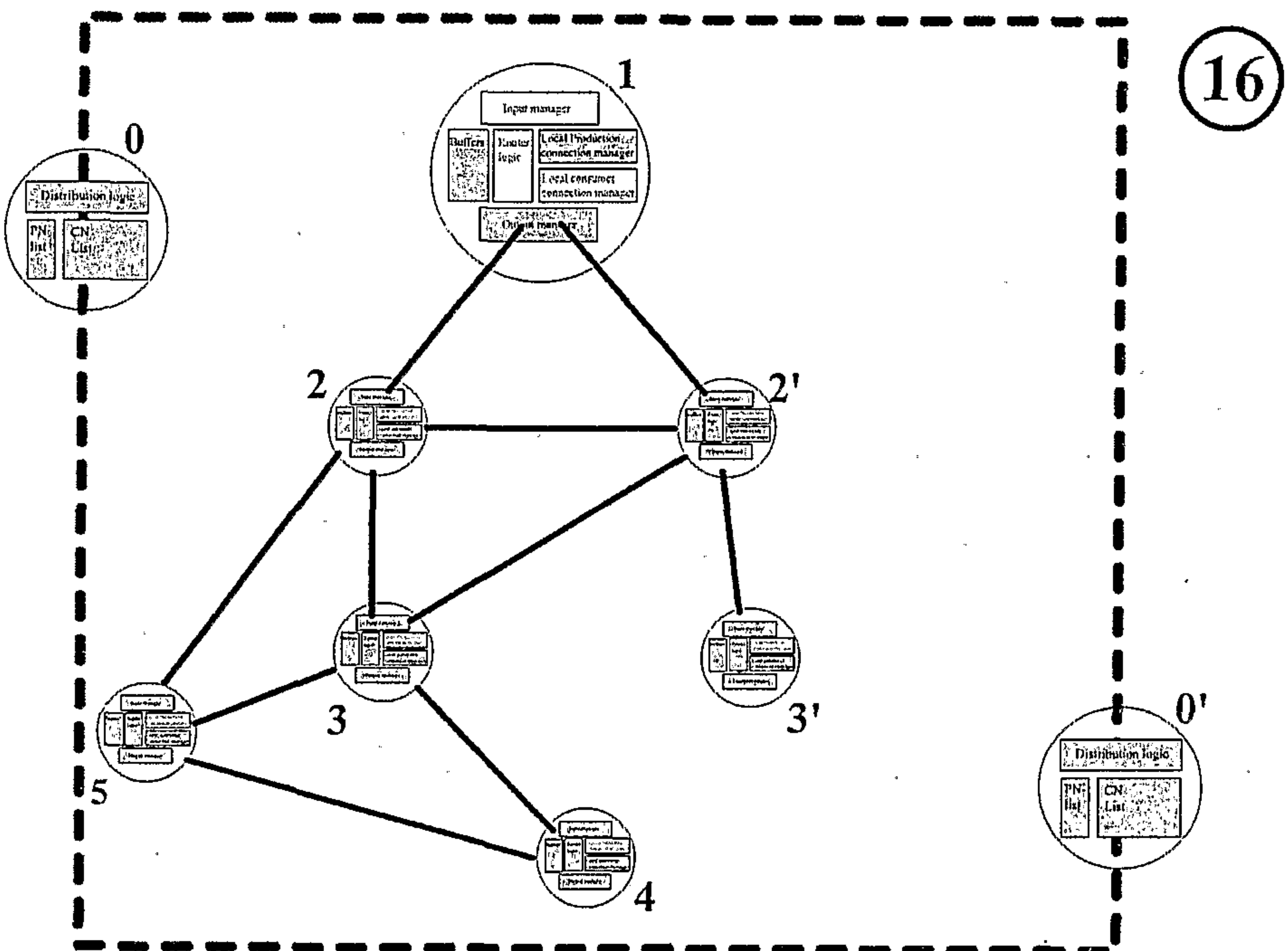
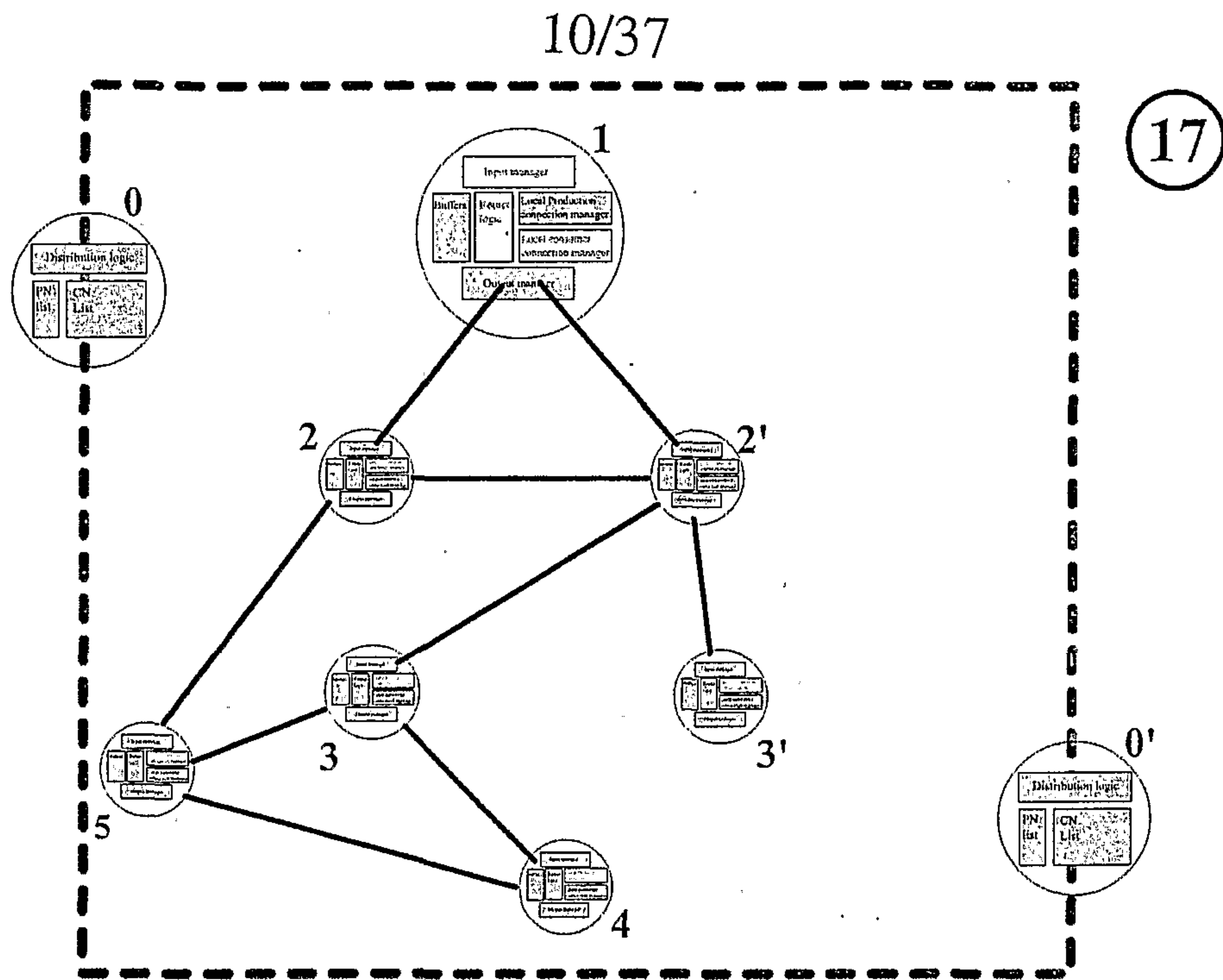


FIG. 2P



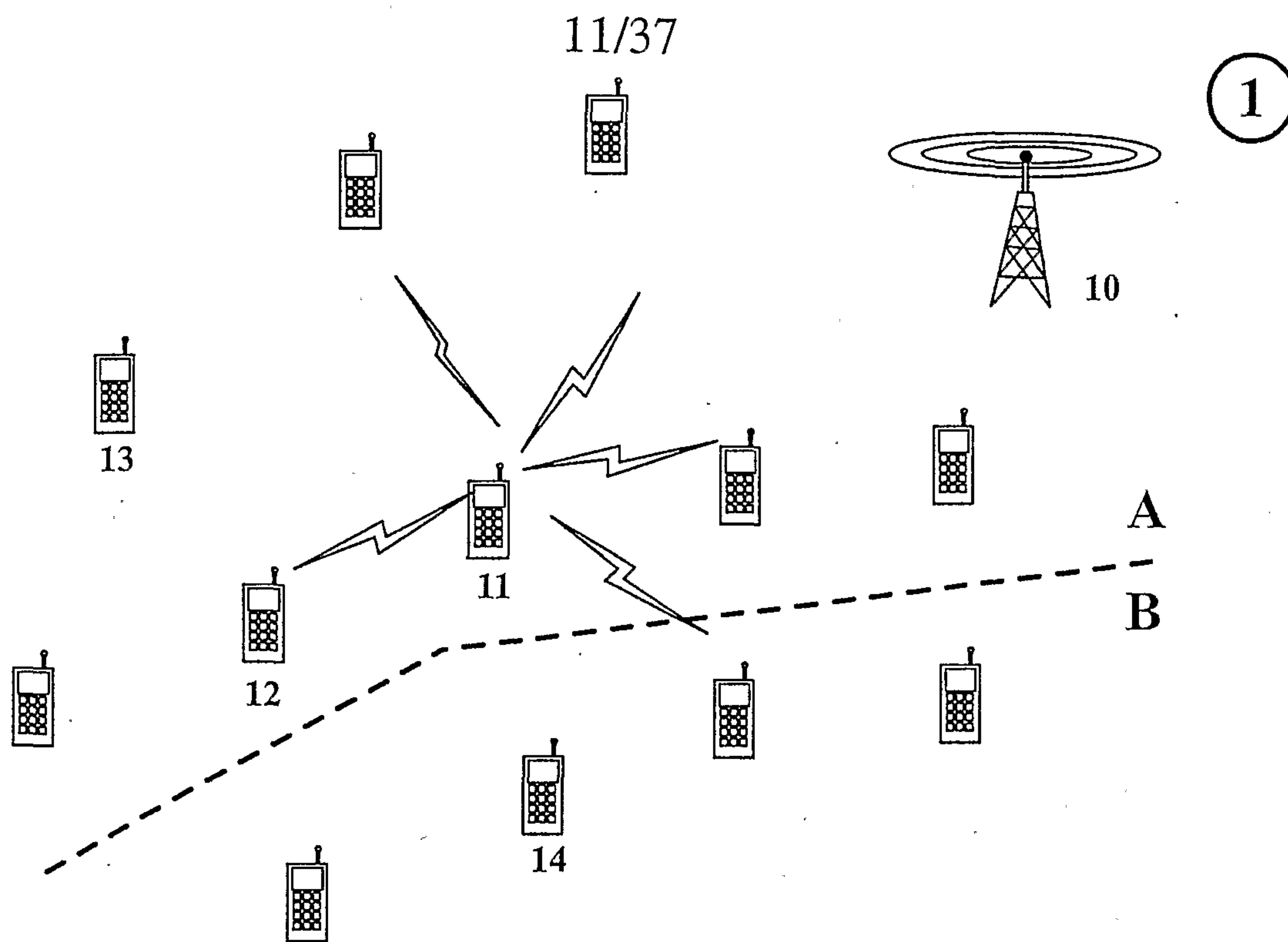


Fig. 3A

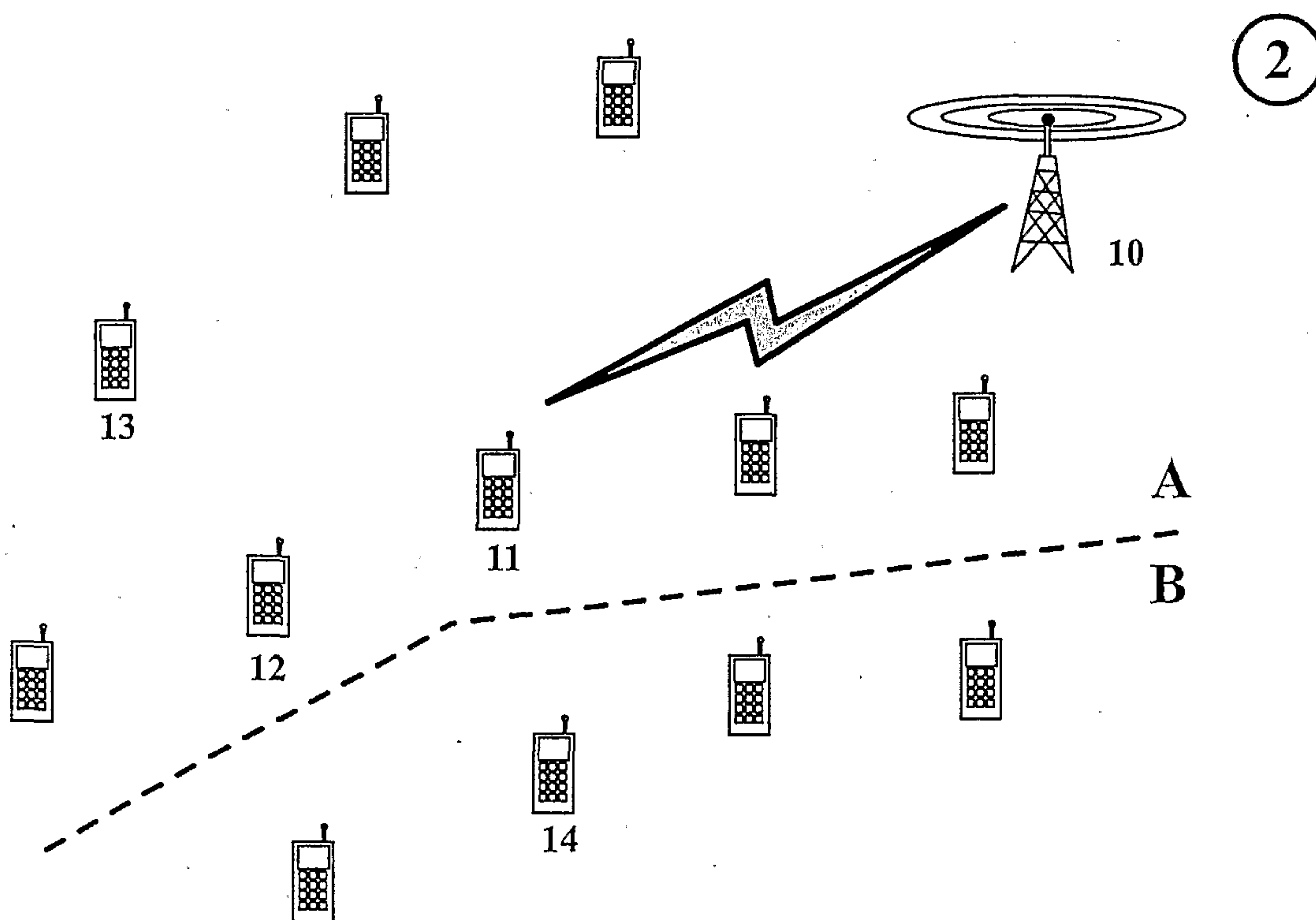


Fig. 3B

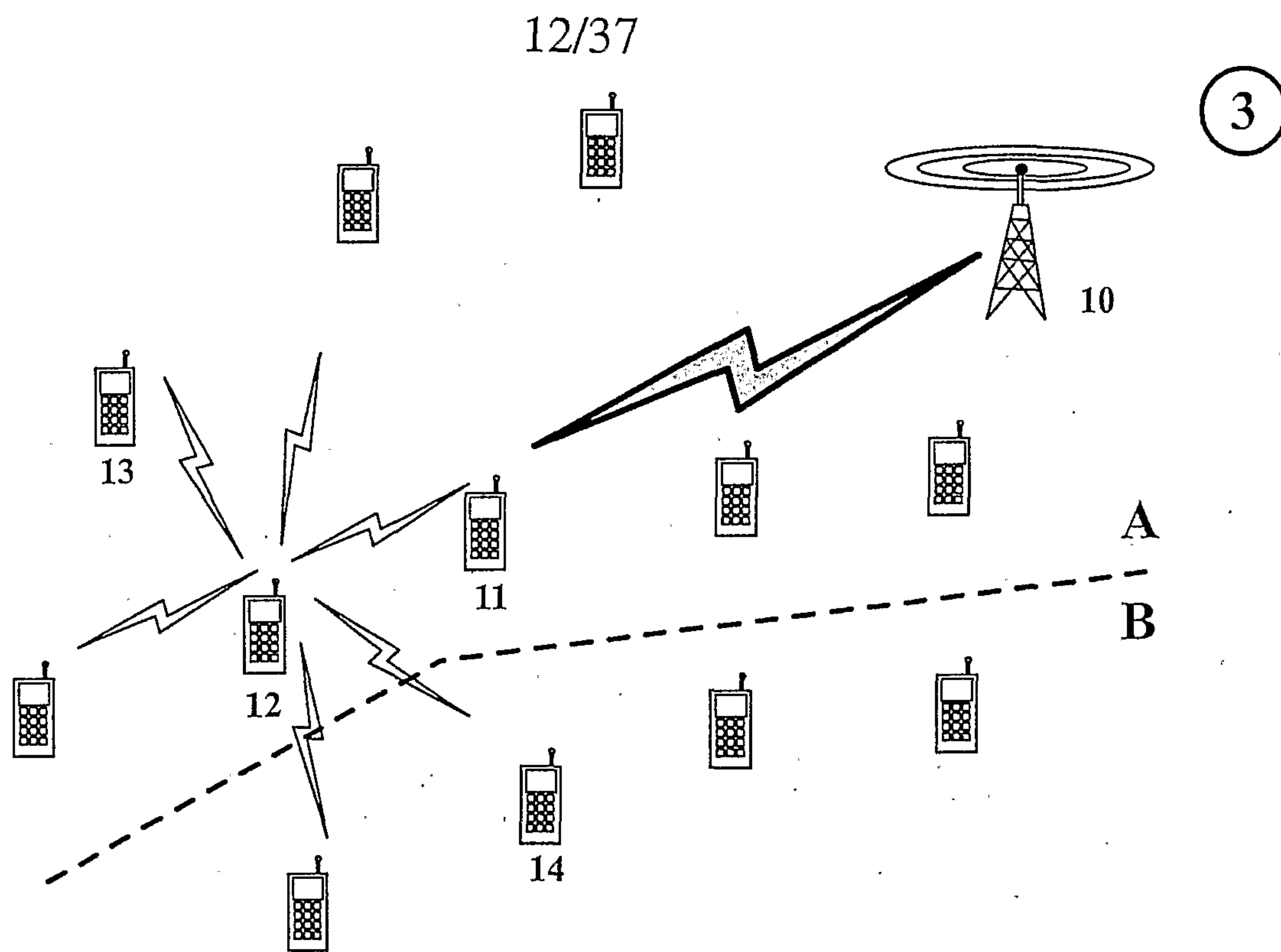


Fig. 3C

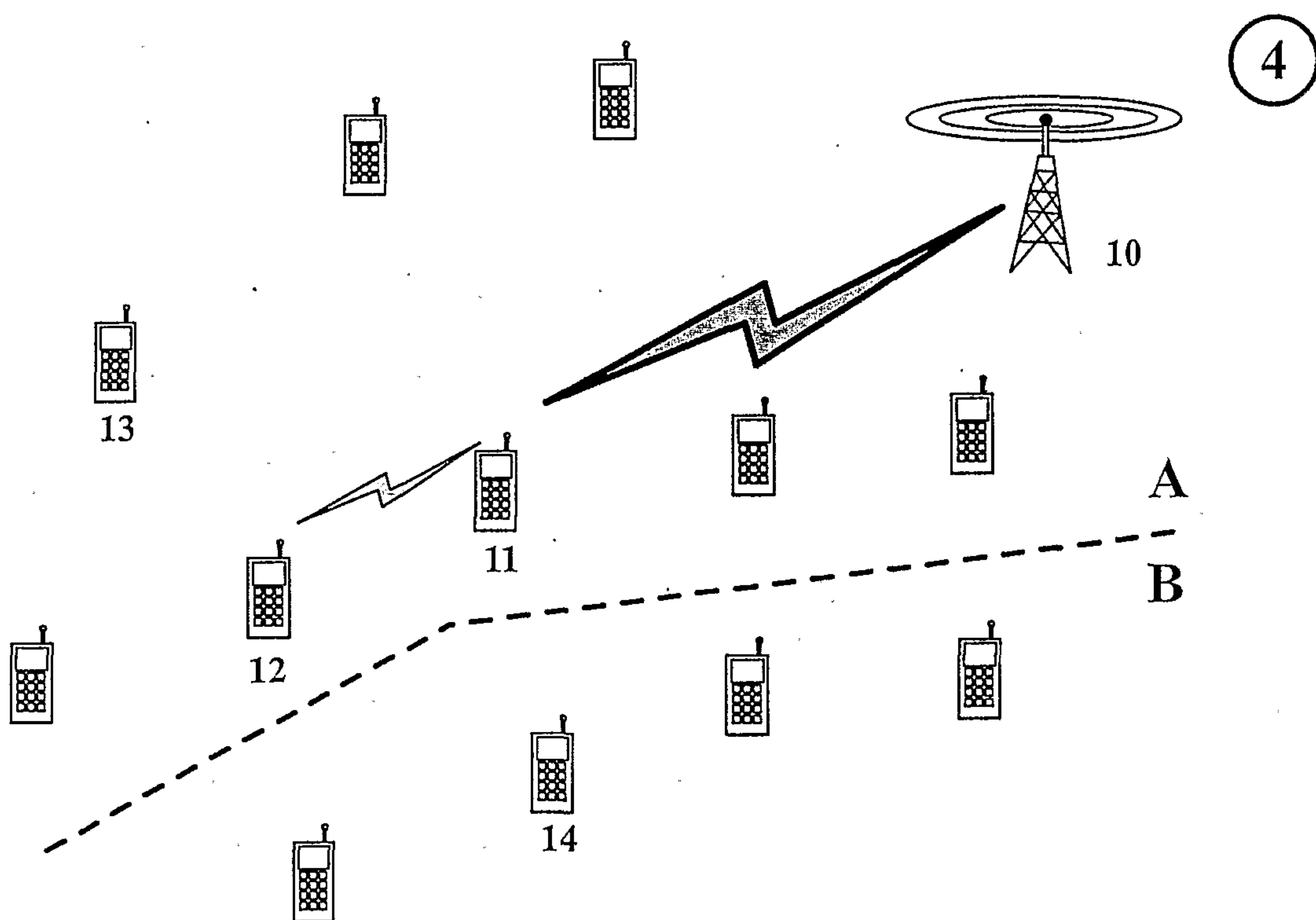


Fig. 3D

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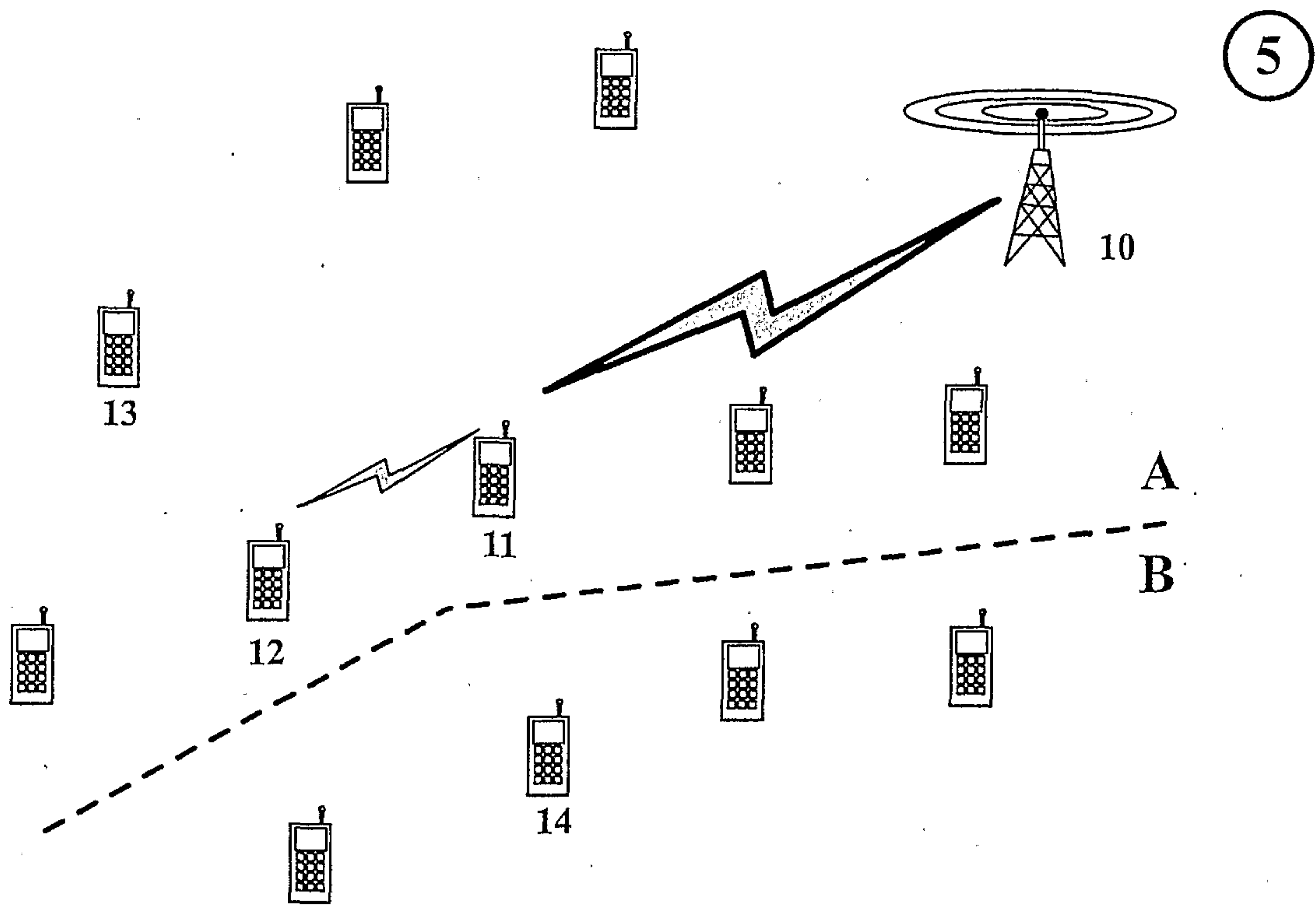


Fig. 3E

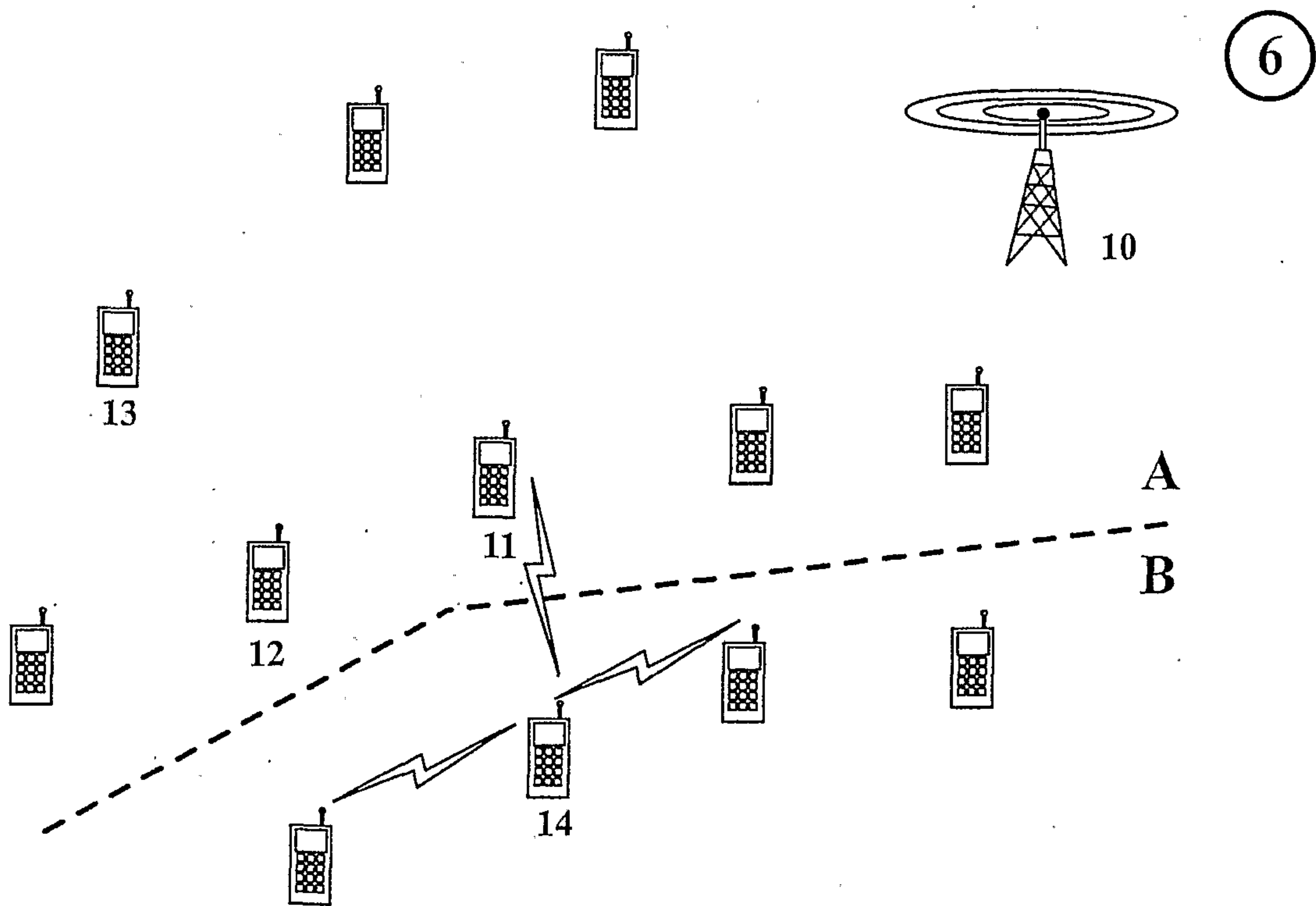


Fig. 3F

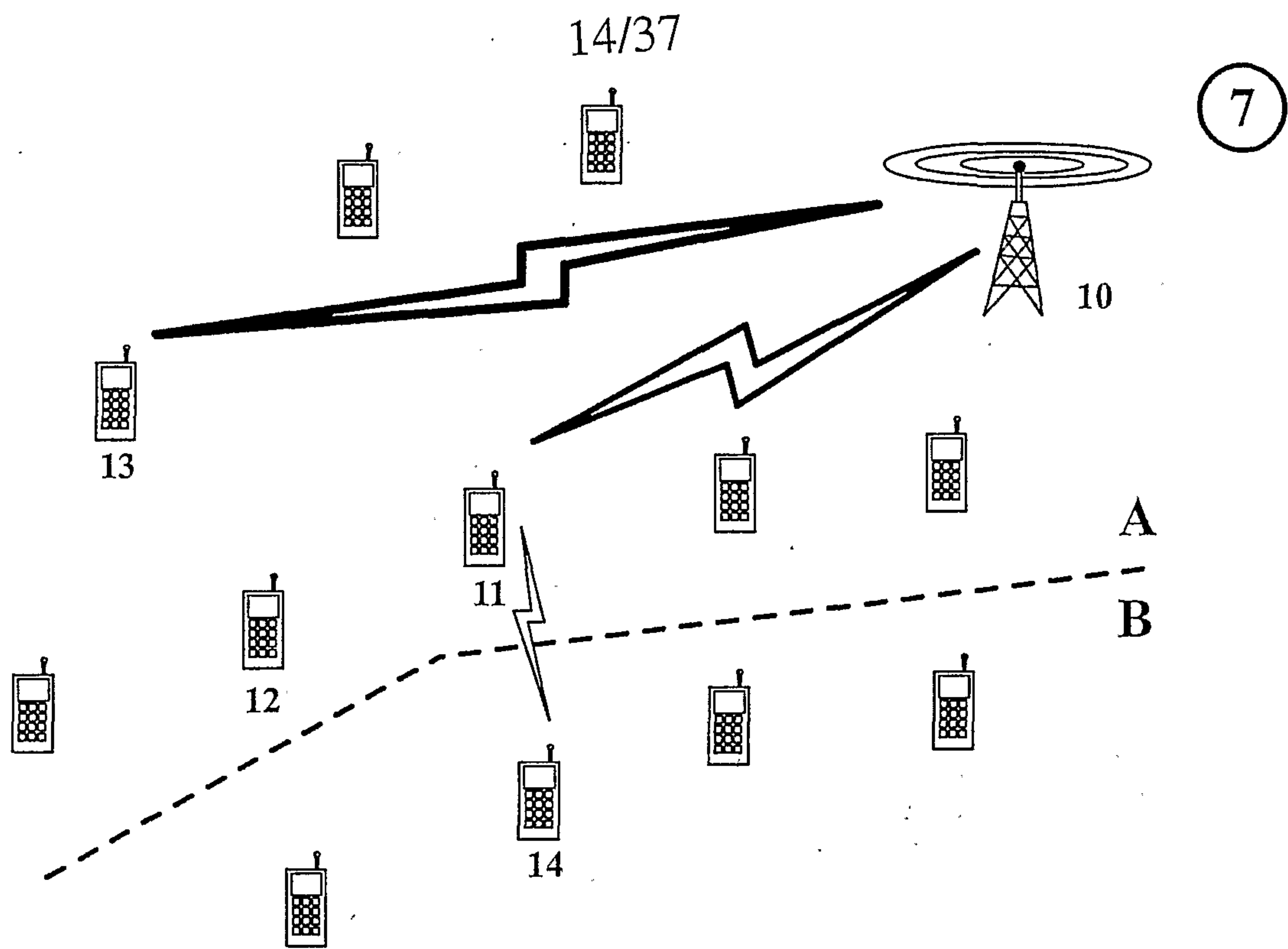


Fig. 3G

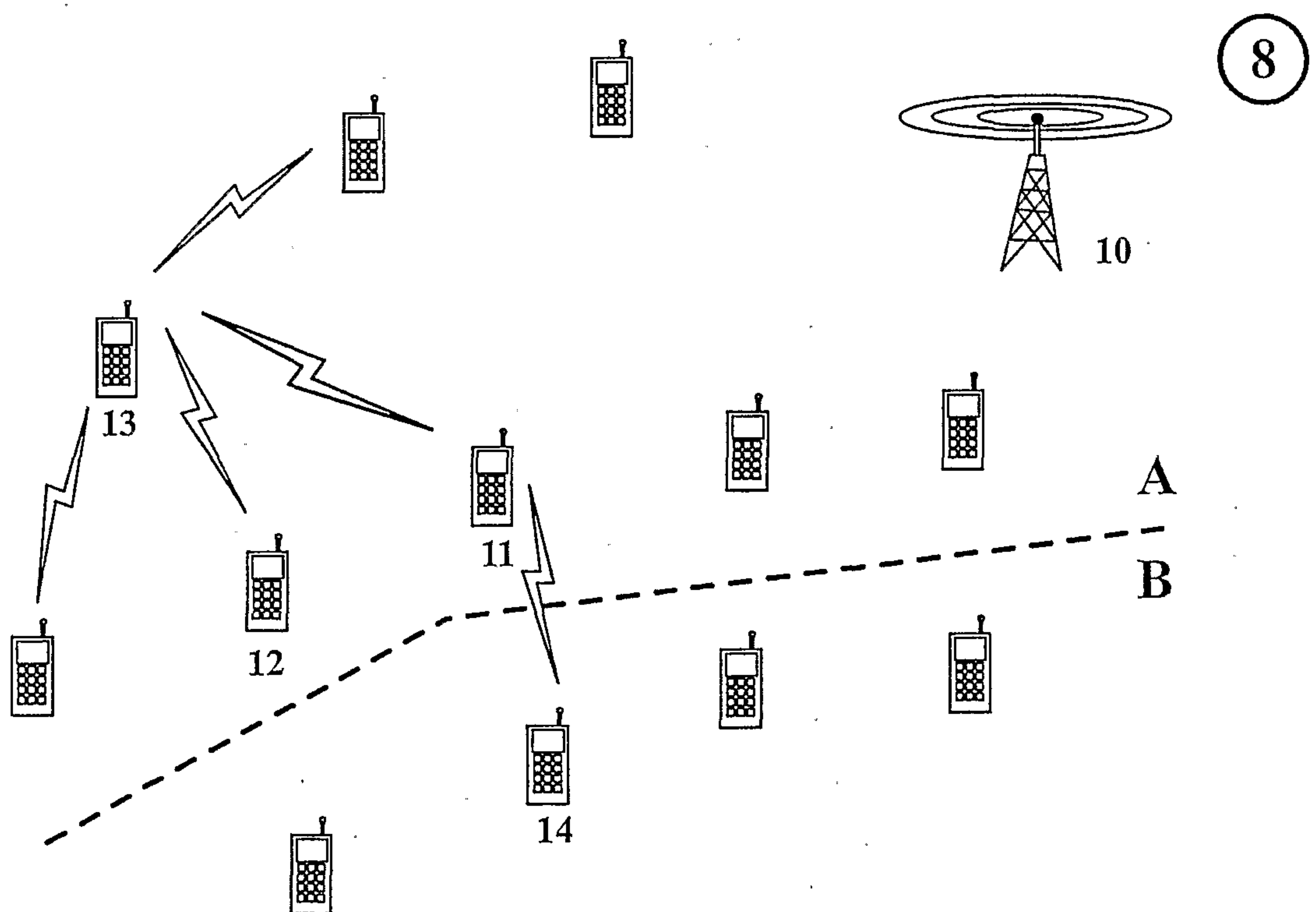


Fig. 3H

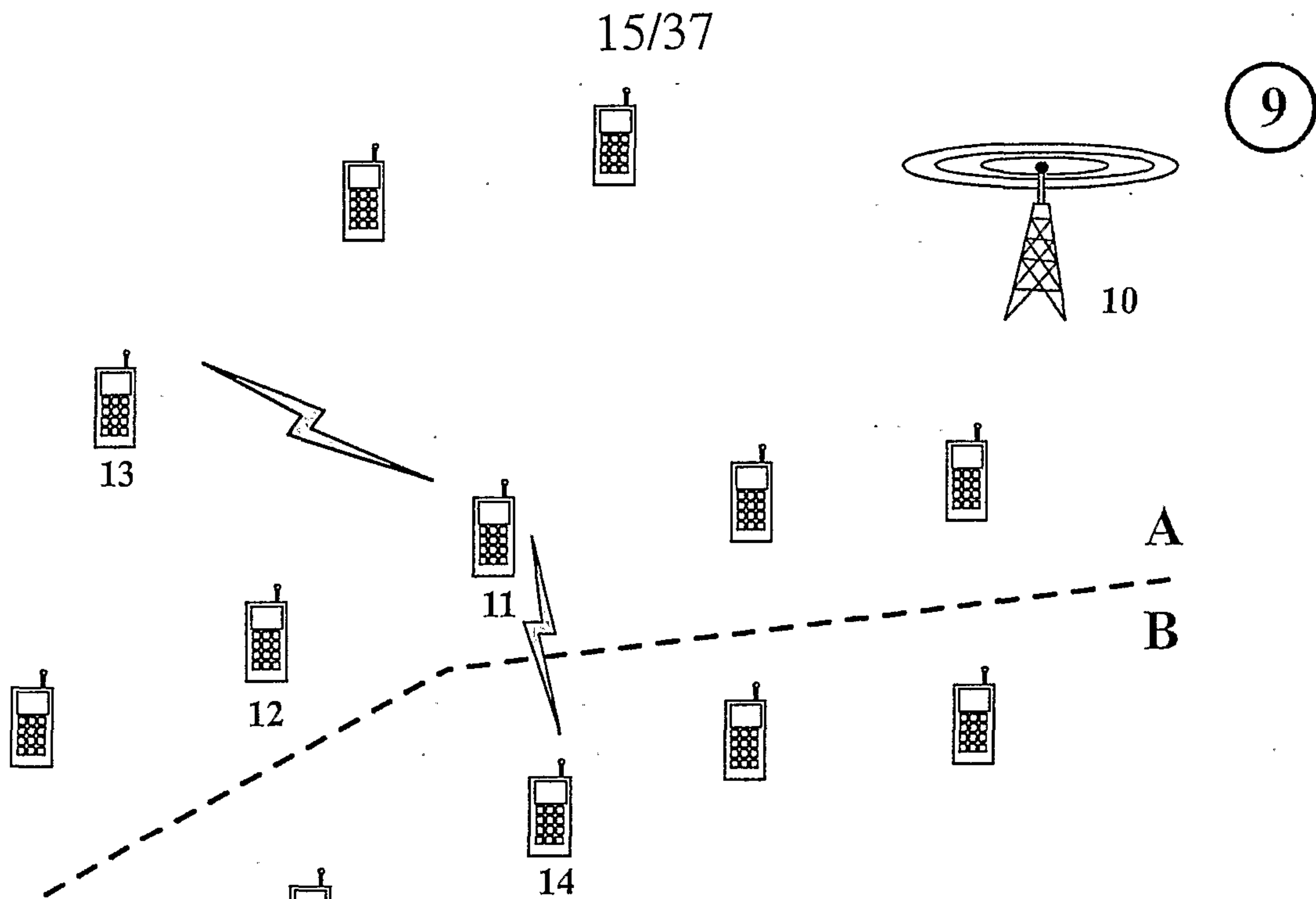


Fig. 3I

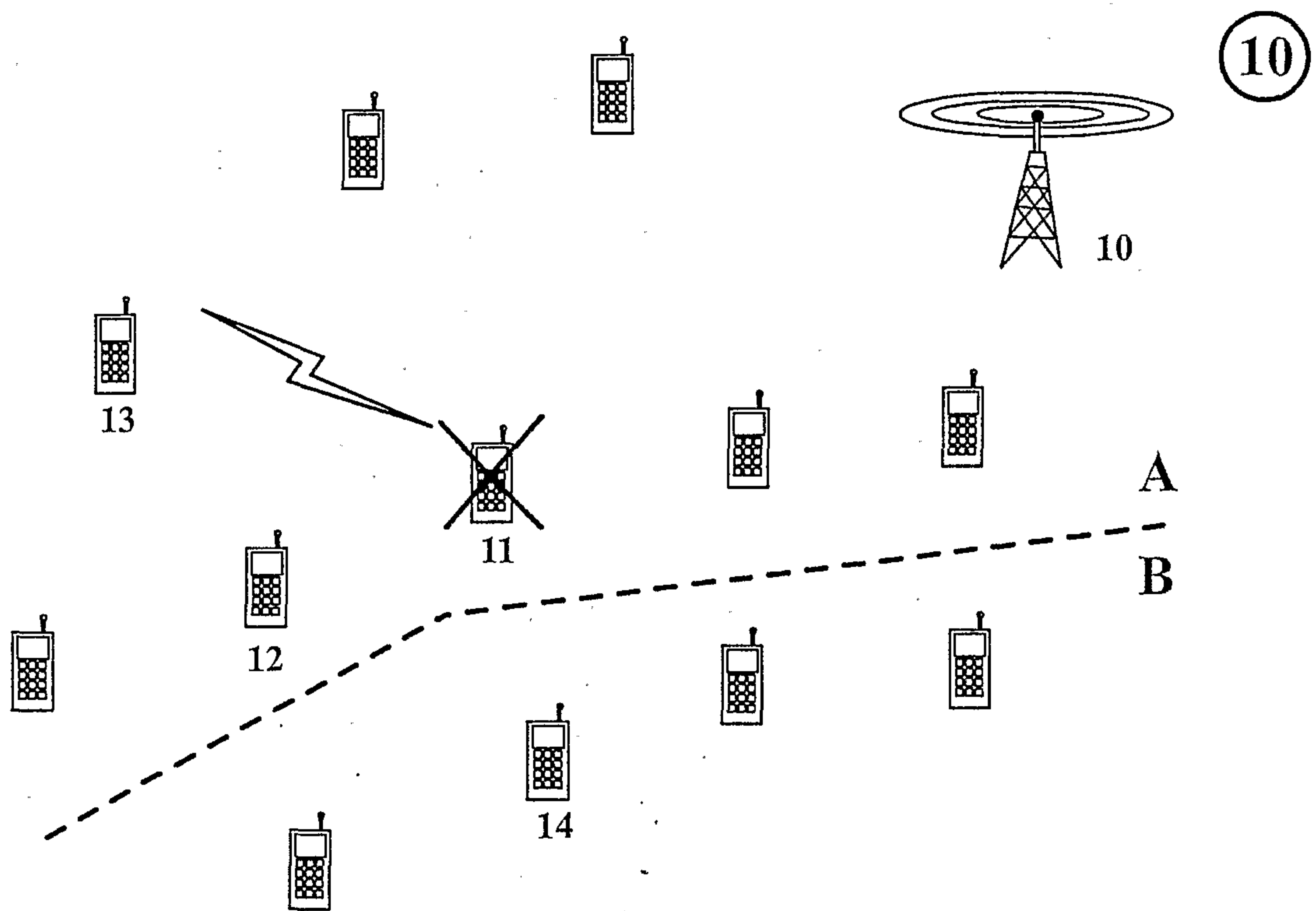
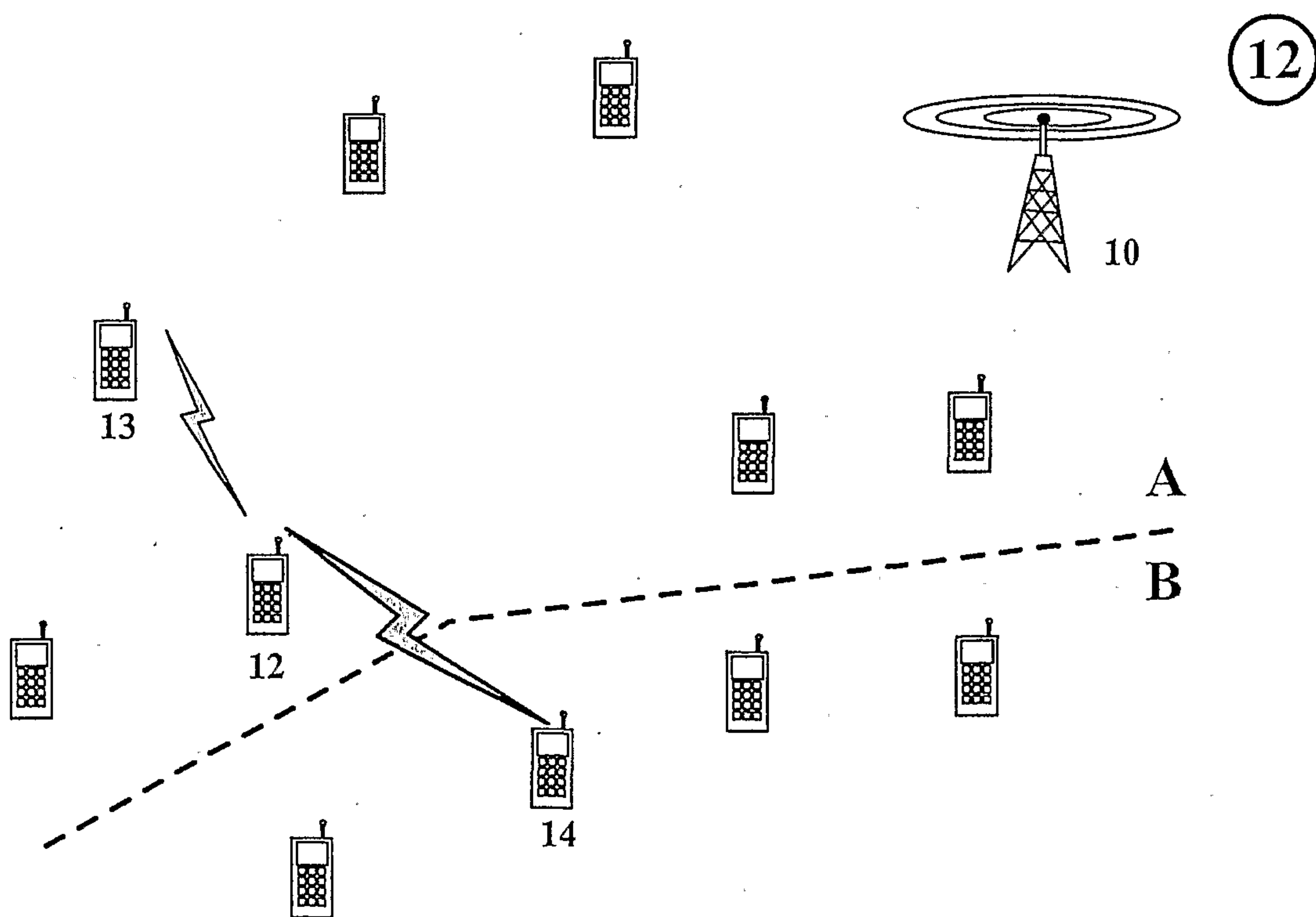
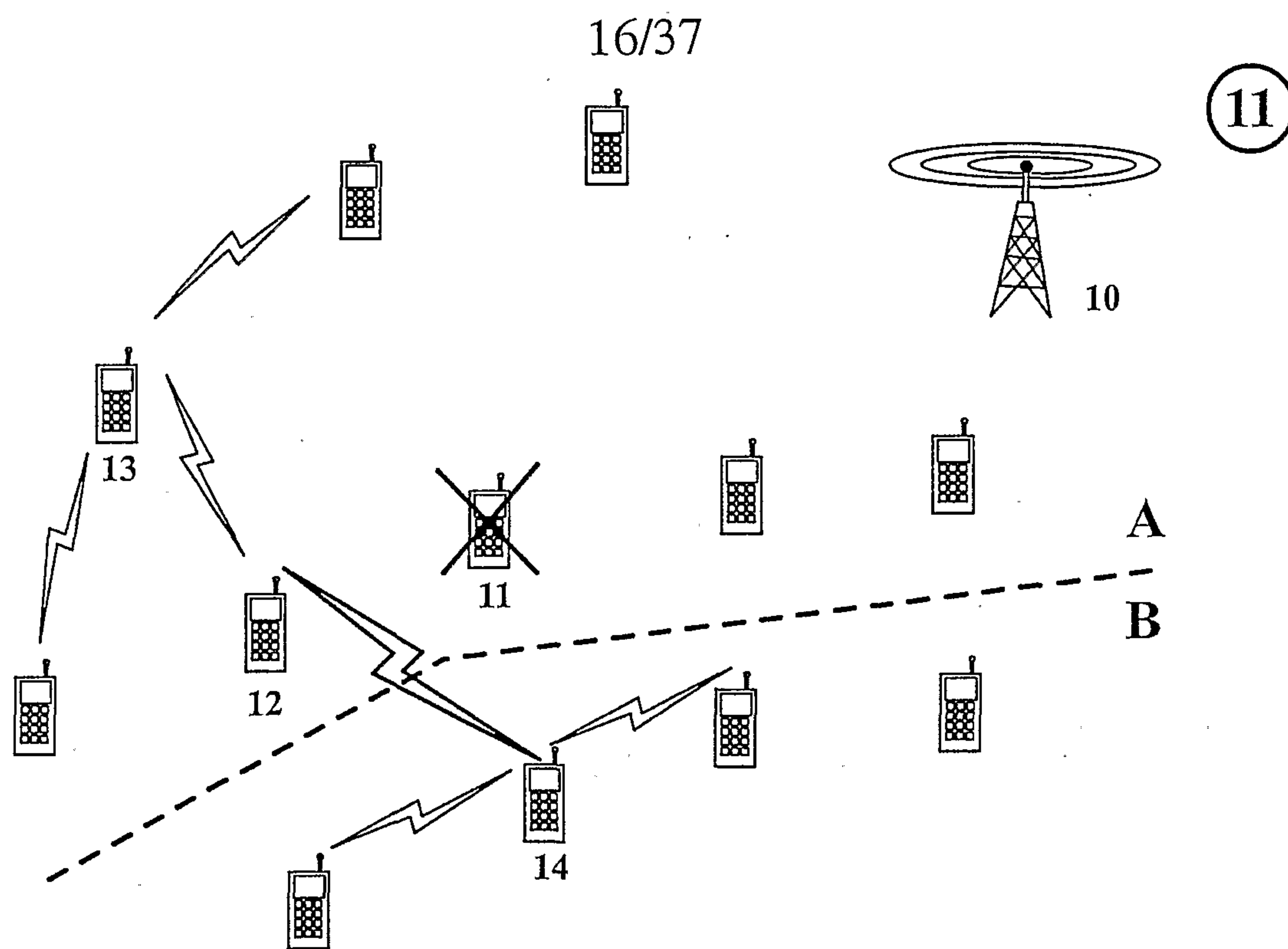


Fig. 3J



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①

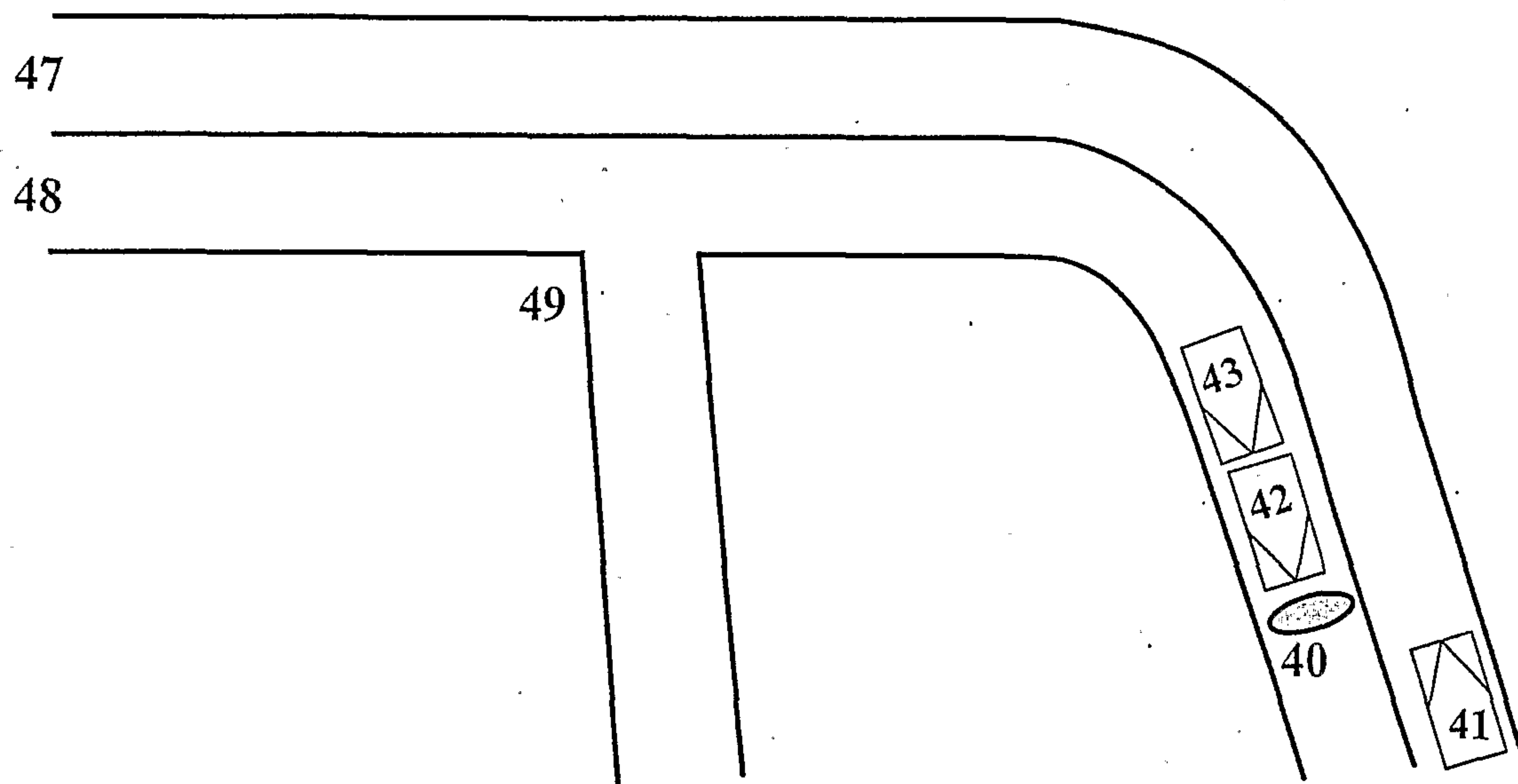


Fig. 4A

②

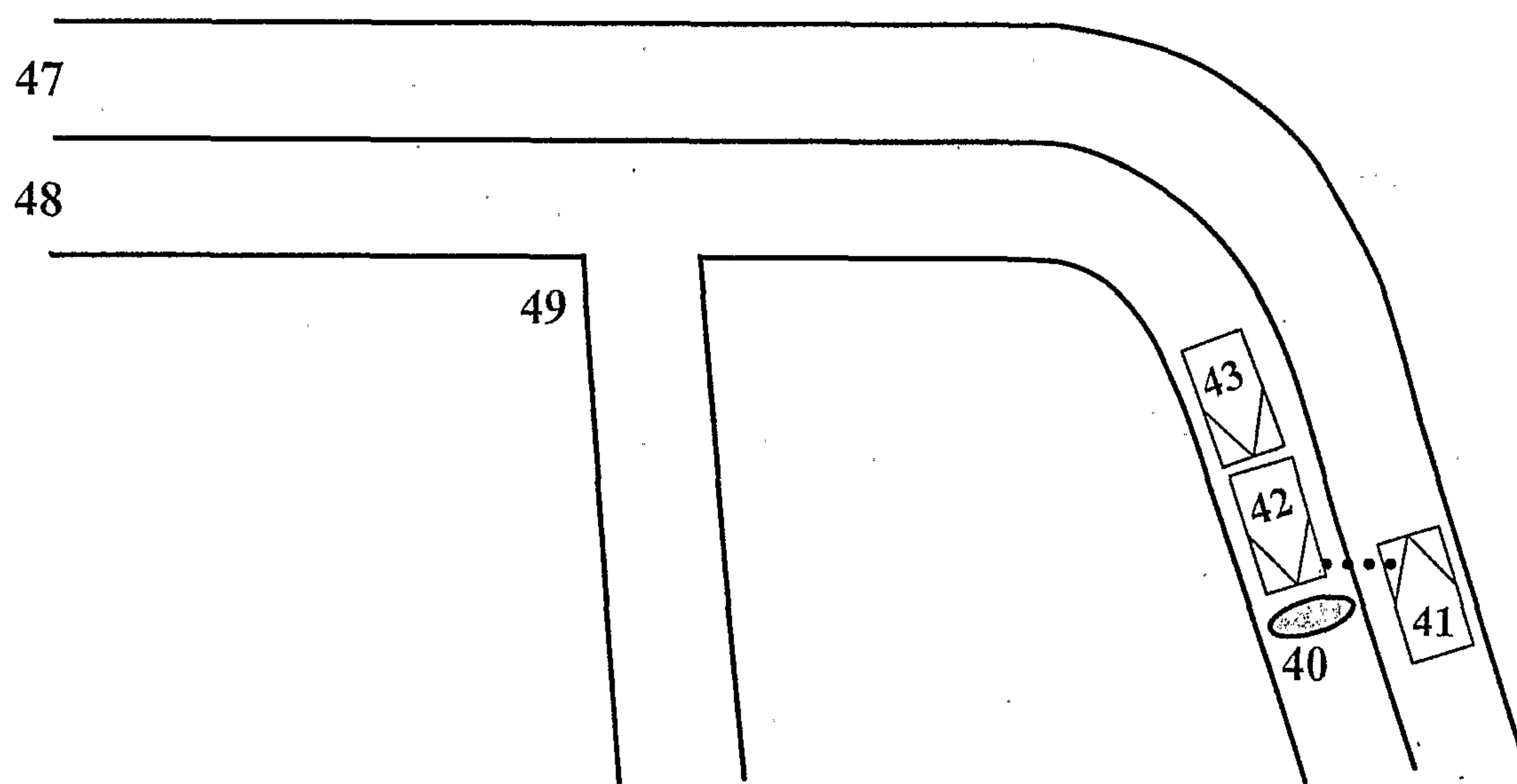


Fig. 4B

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3

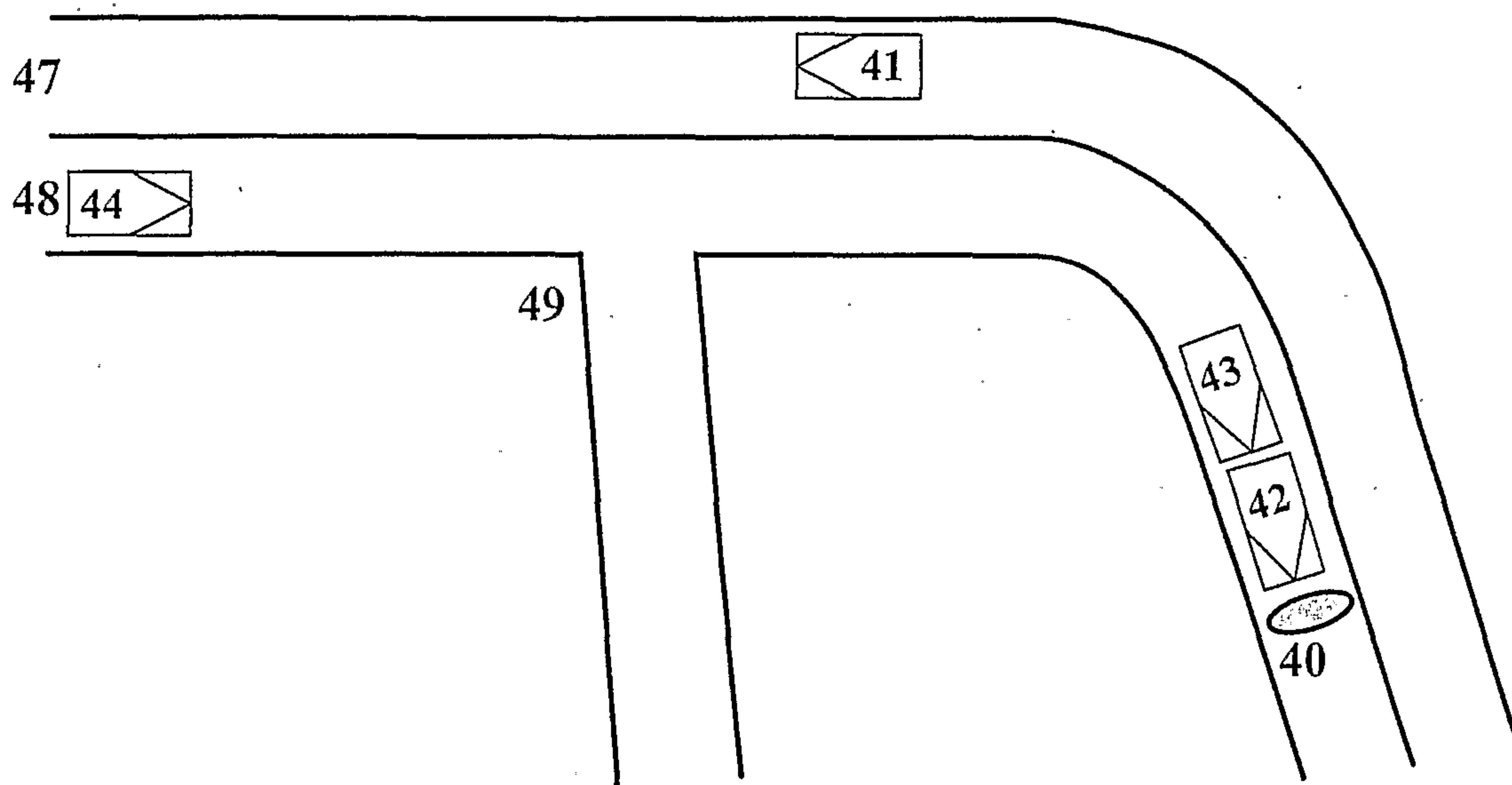


Fig. 4C

4

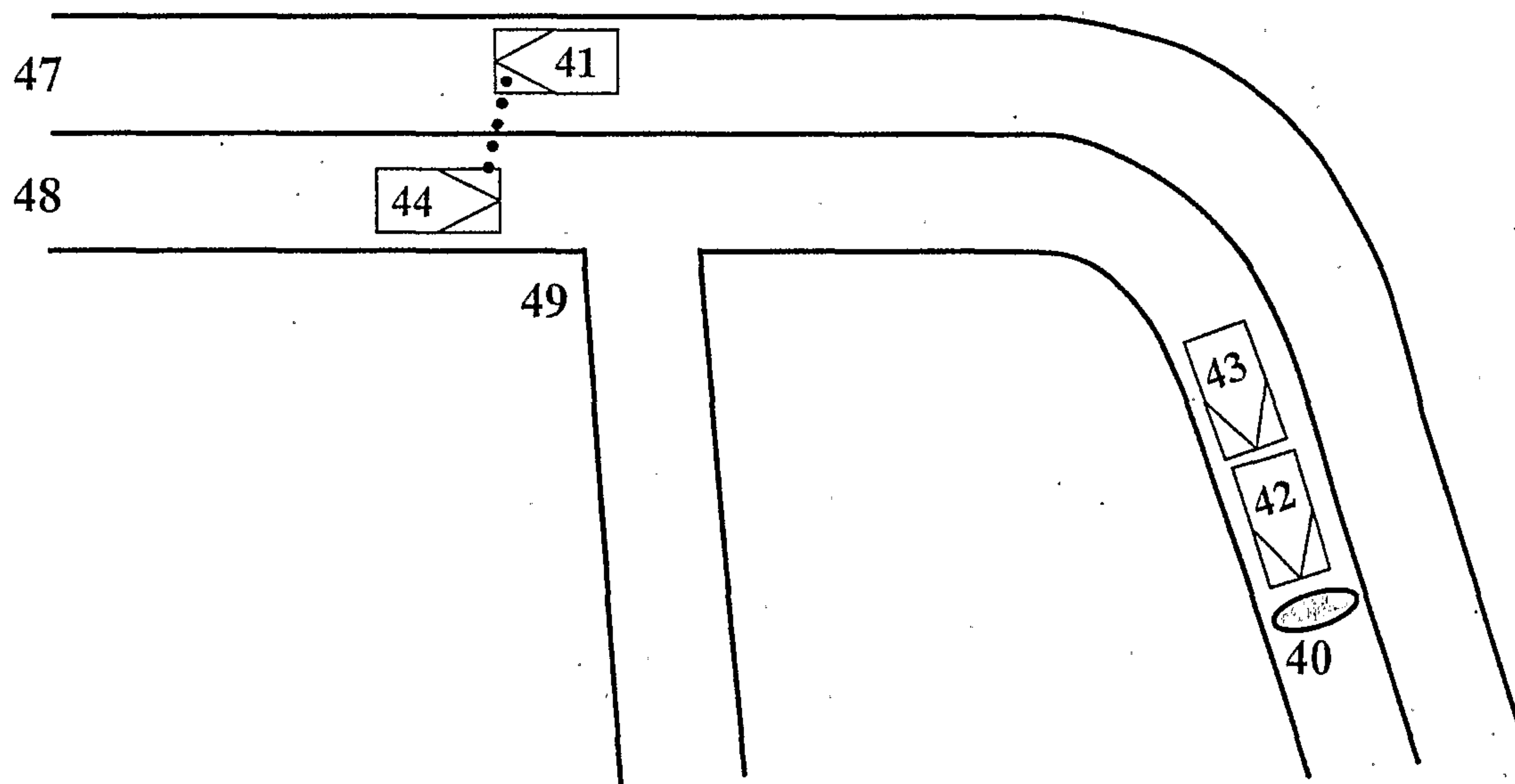


Fig. 4D

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5

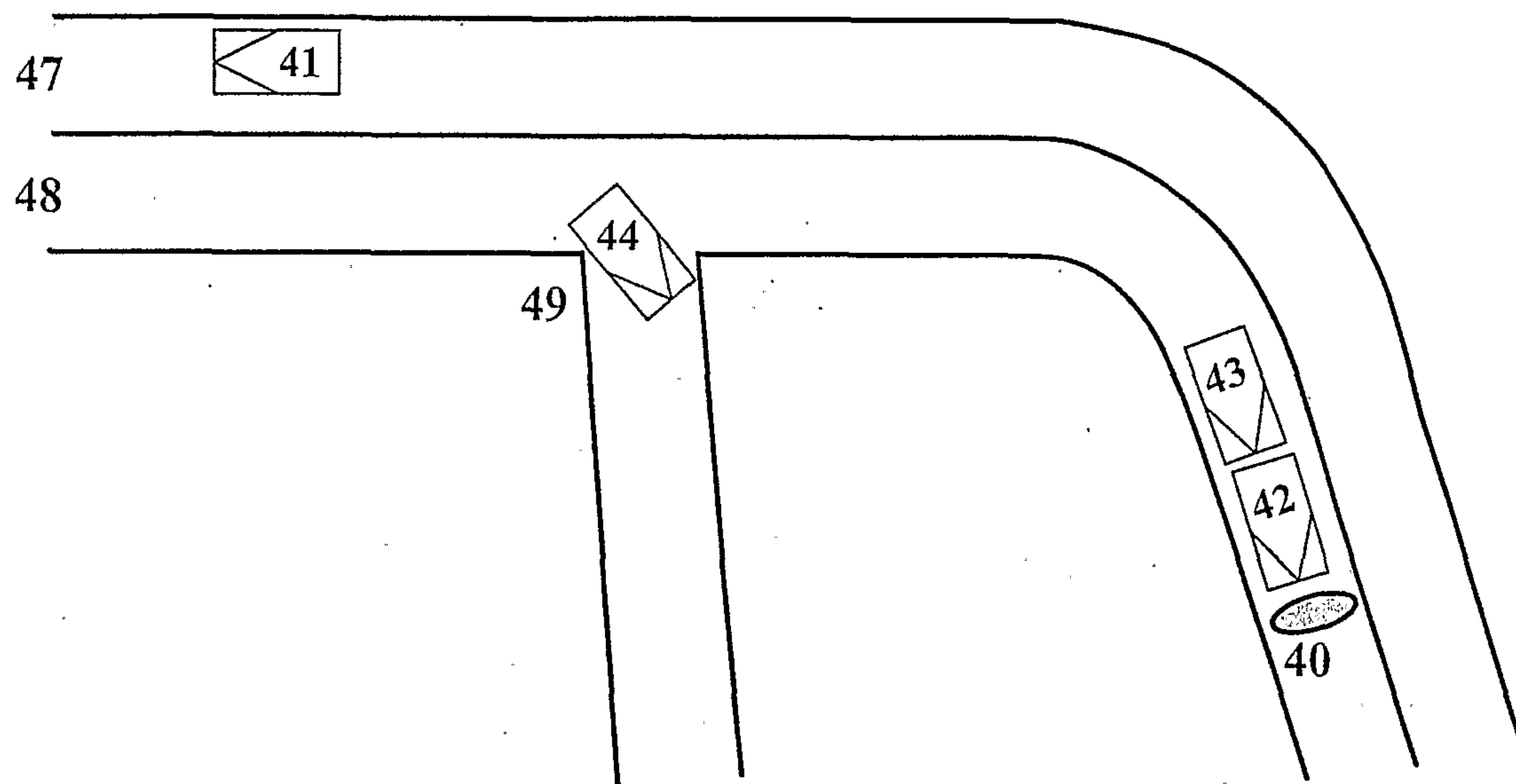


Fig. 4E

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①

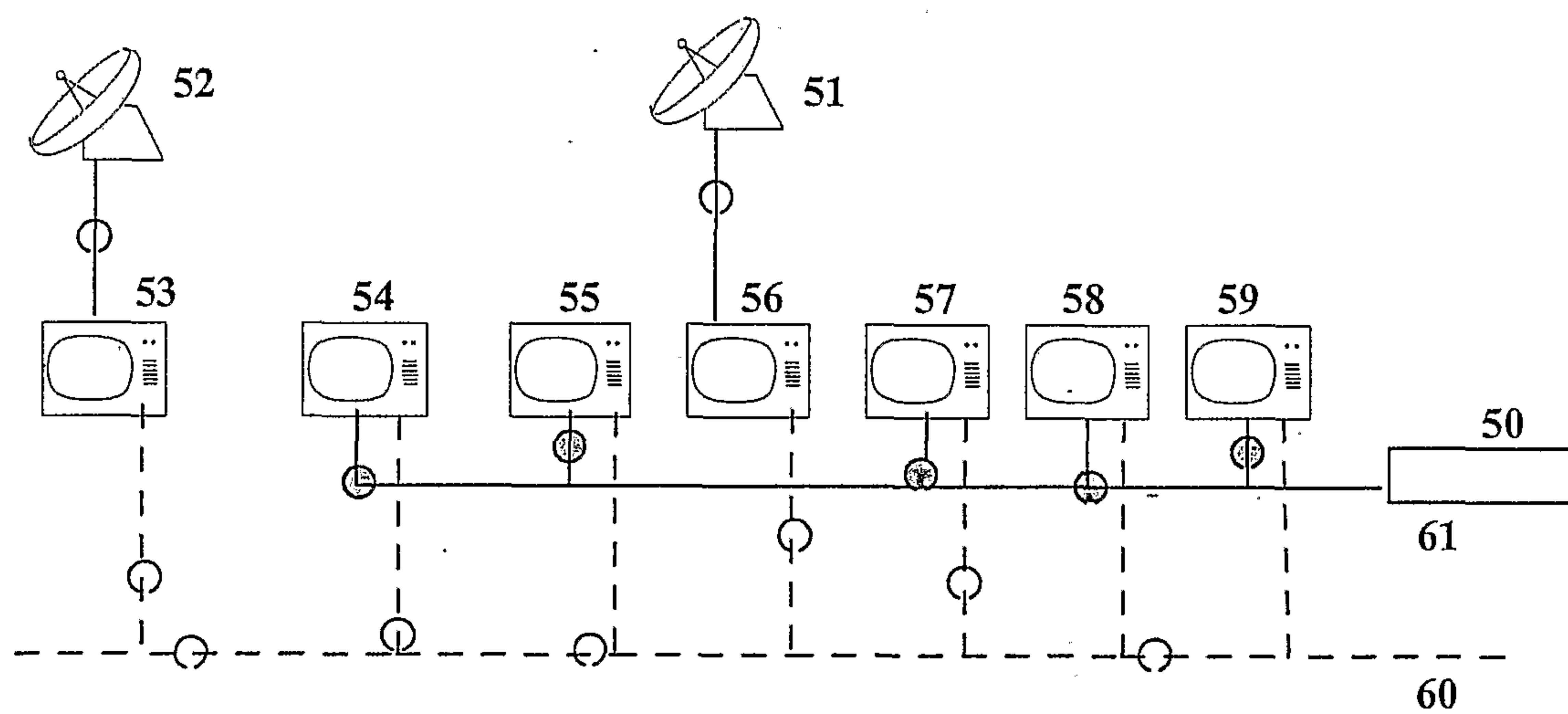


Fig. 5A

②

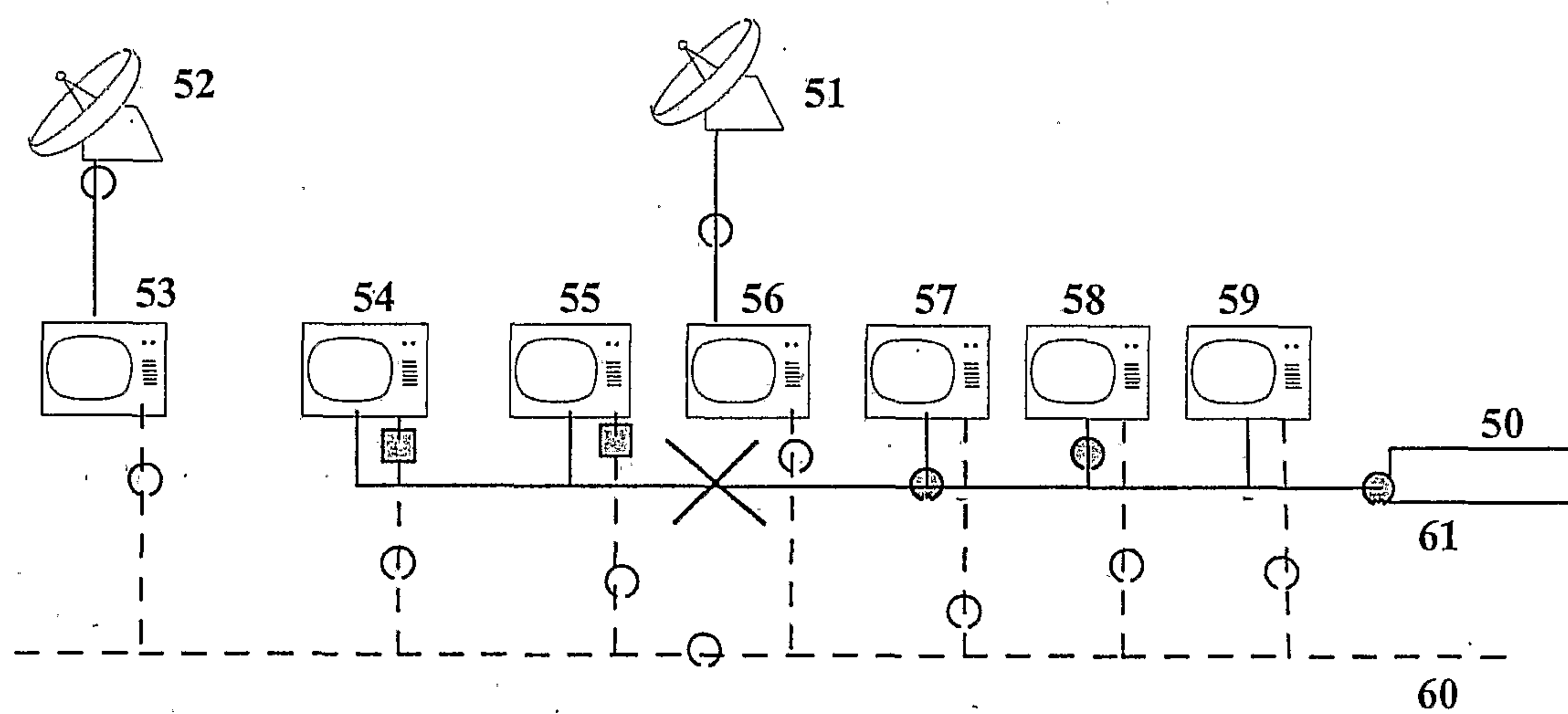


Fig. 5B

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3

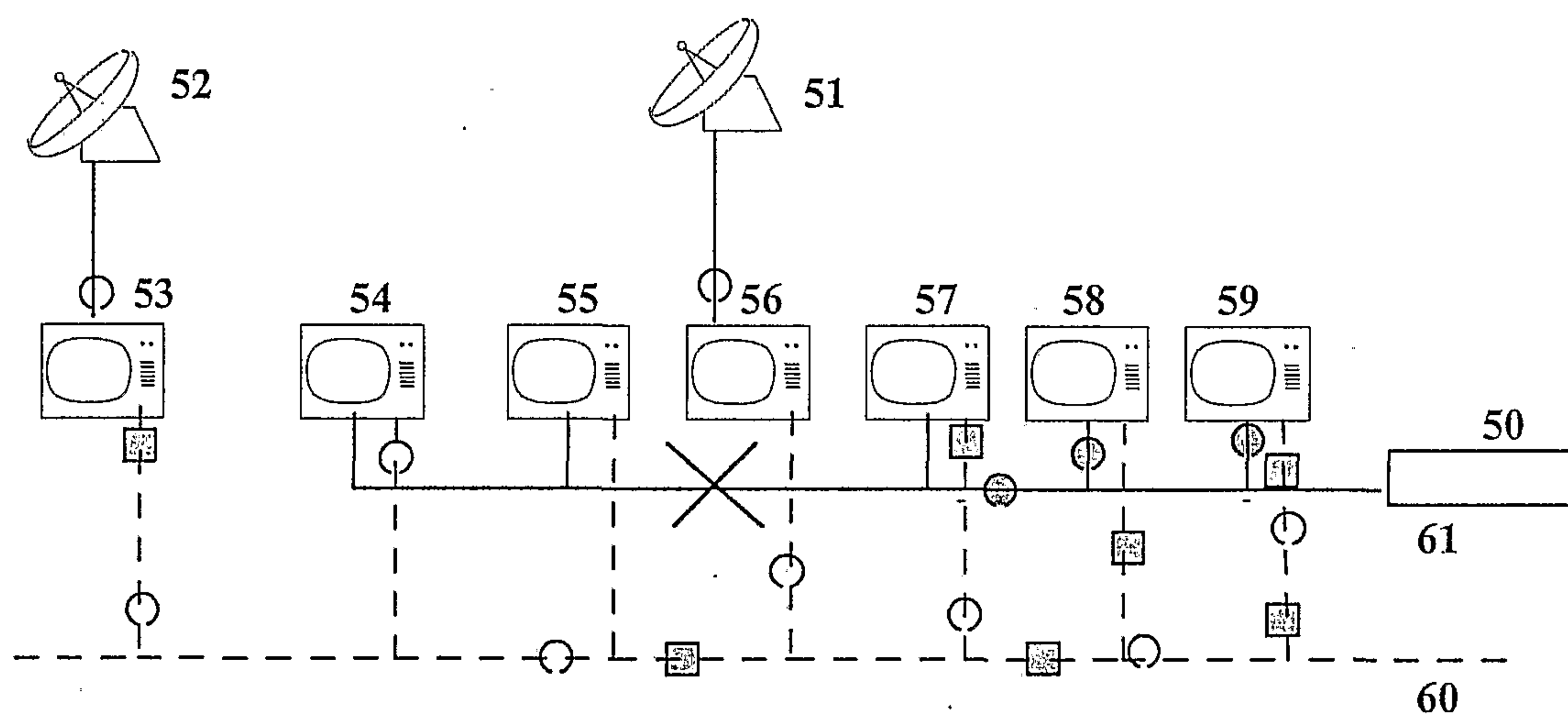


Fig. 5C

4

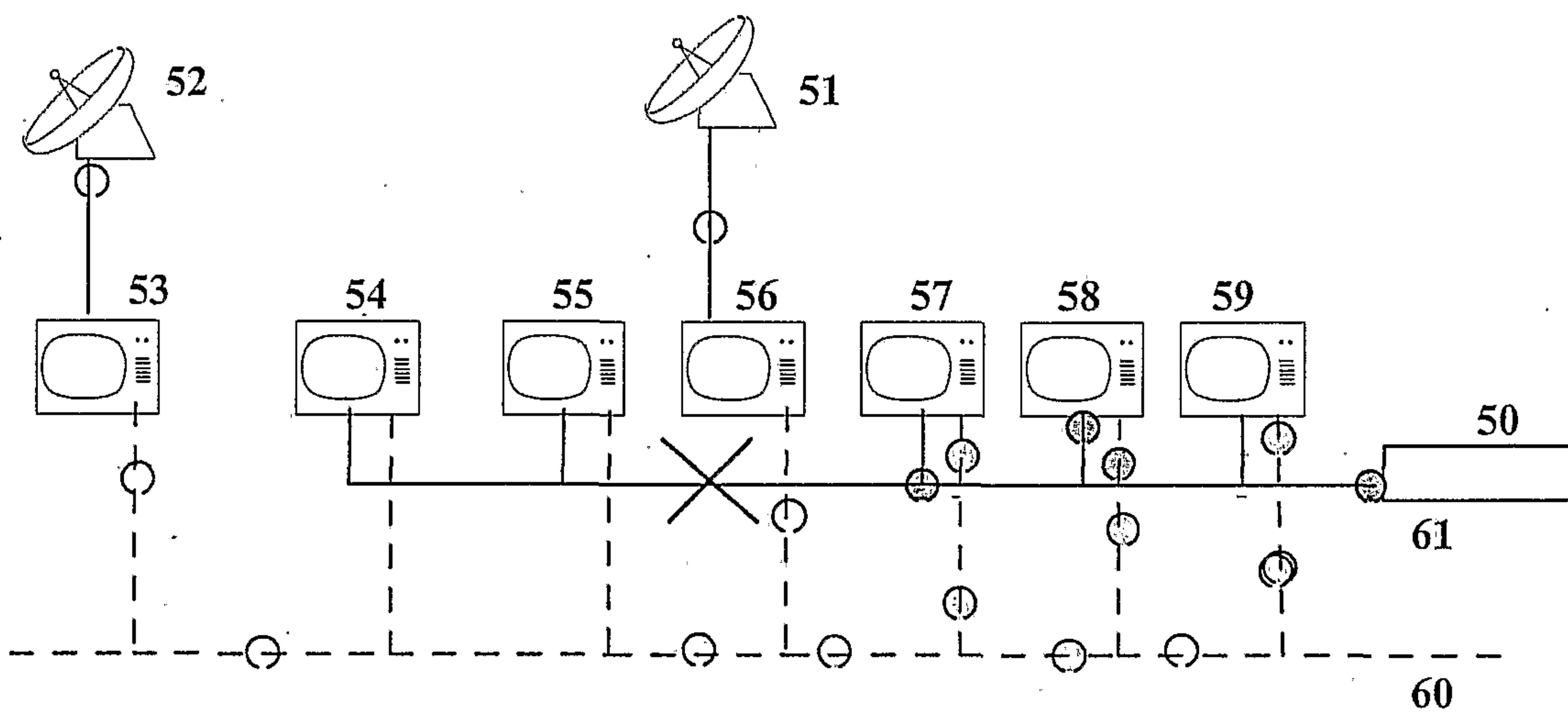


Fig. 5D

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5

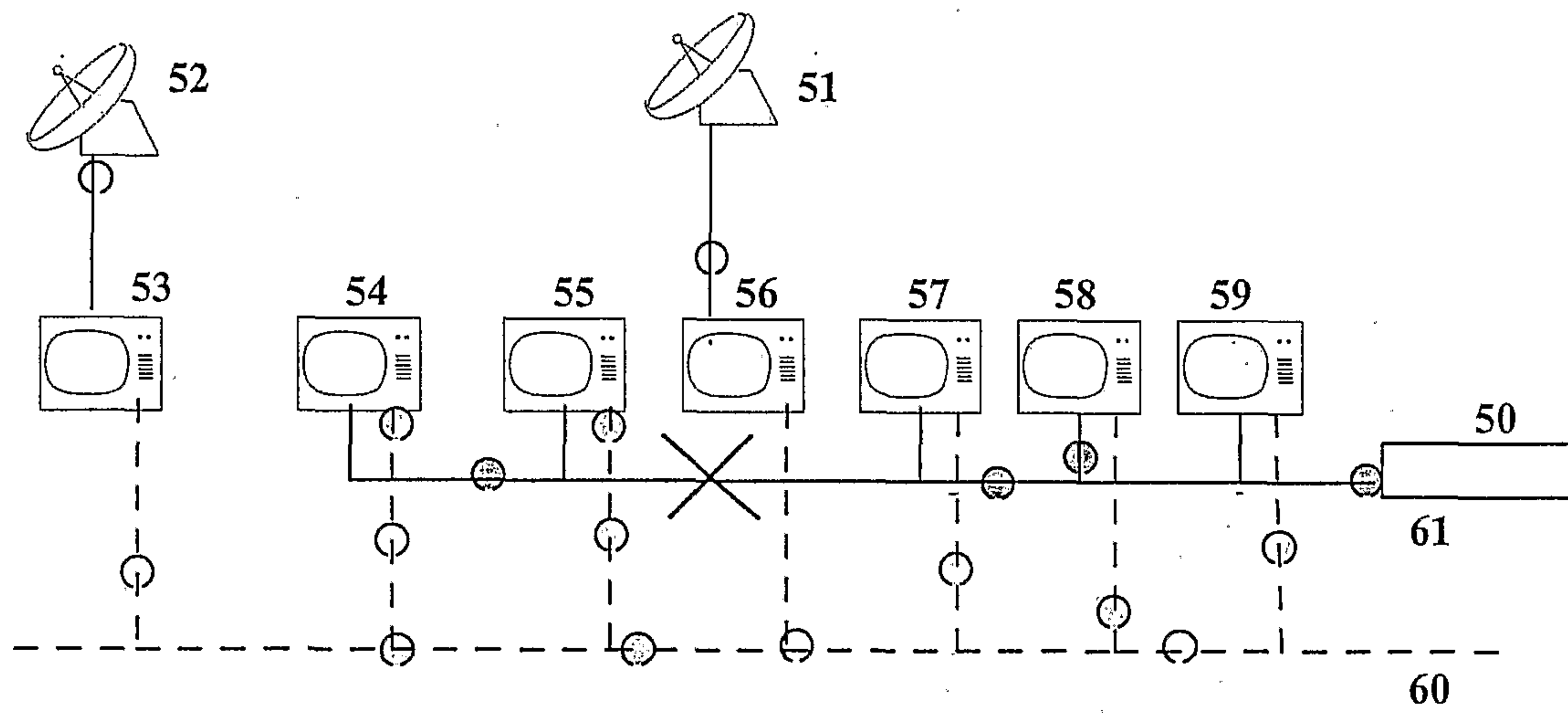


Fig. 5E

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①

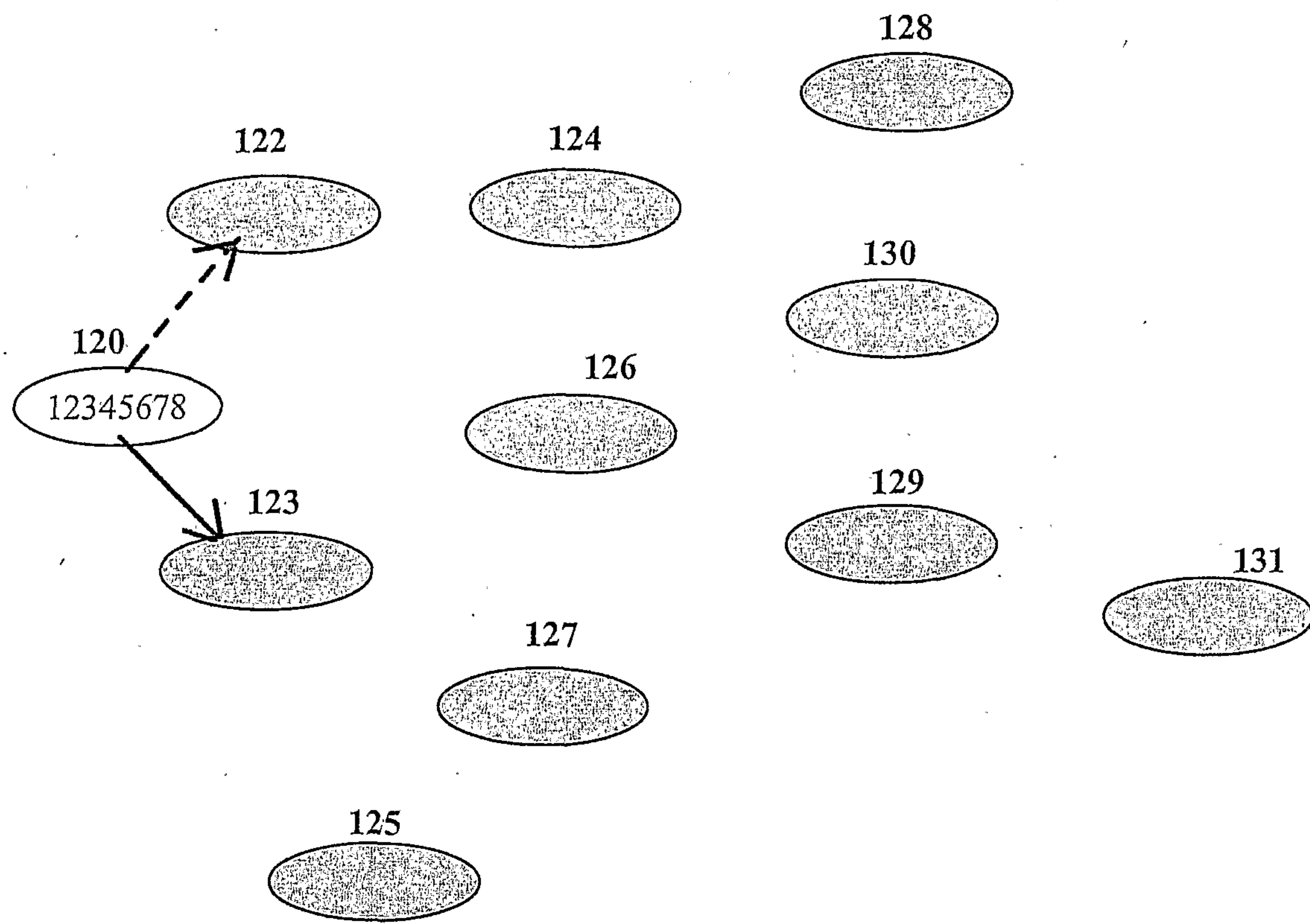


Fig. 6A

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2

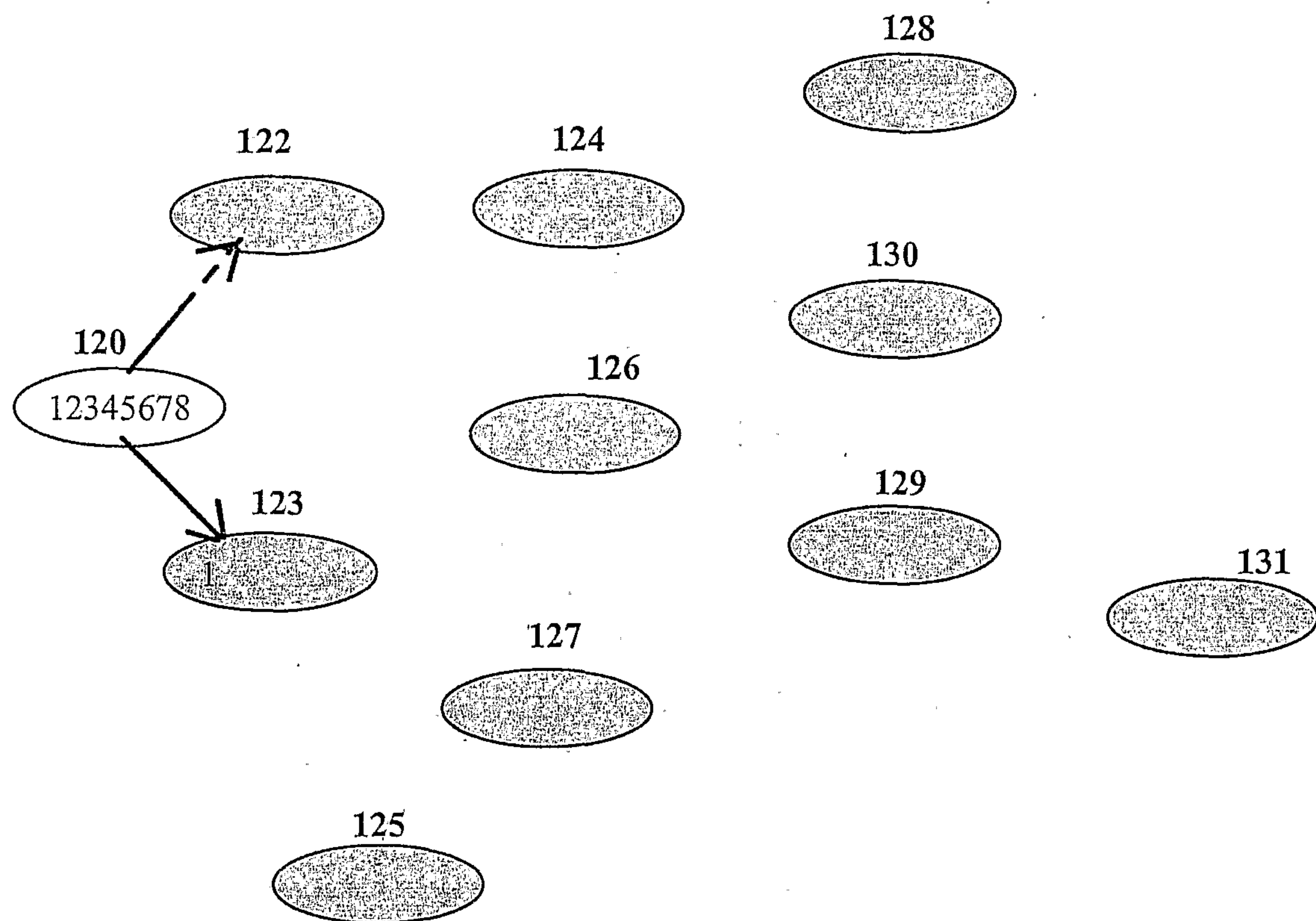


Fig. 6B

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3

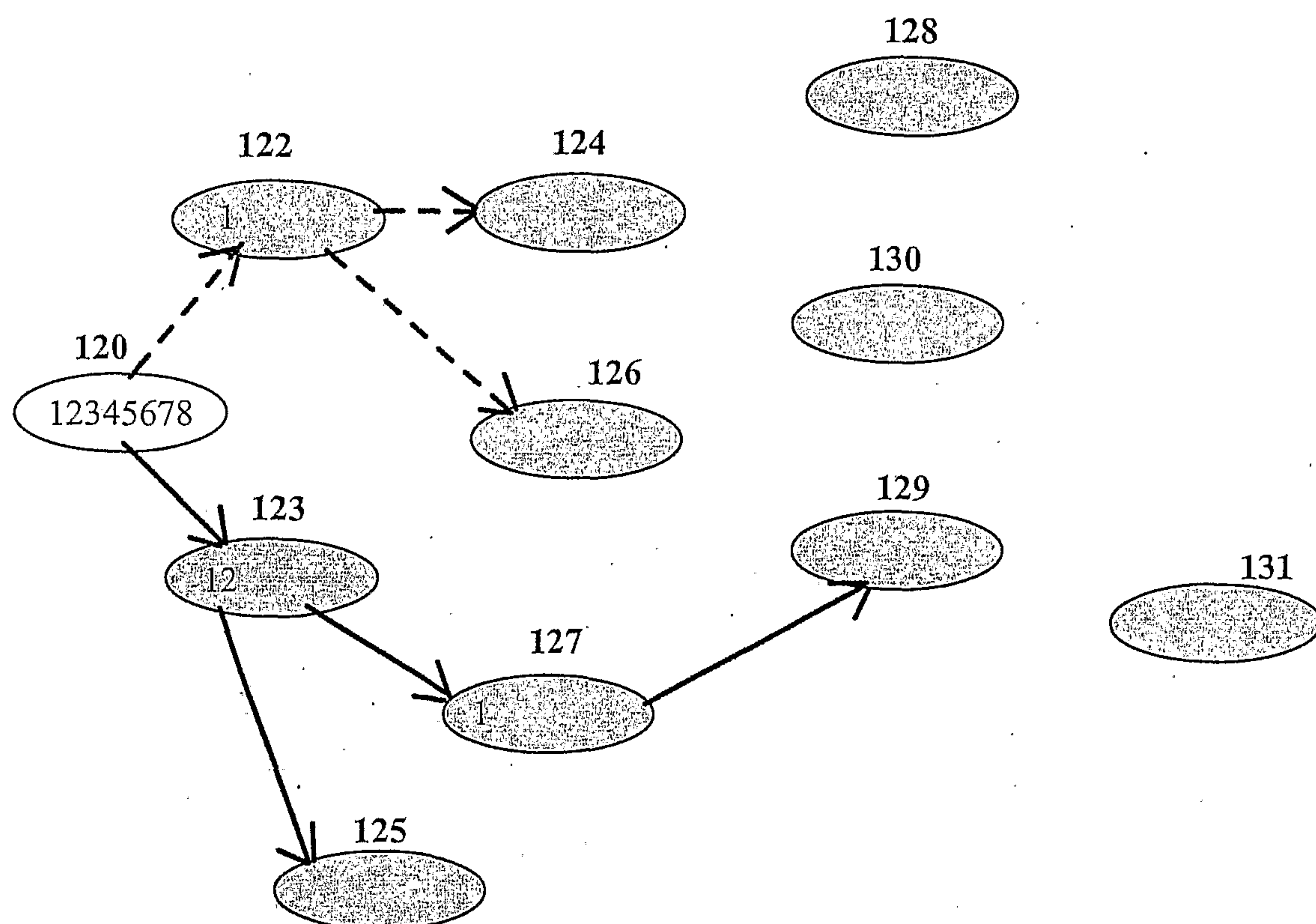


Fig. 6C

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4

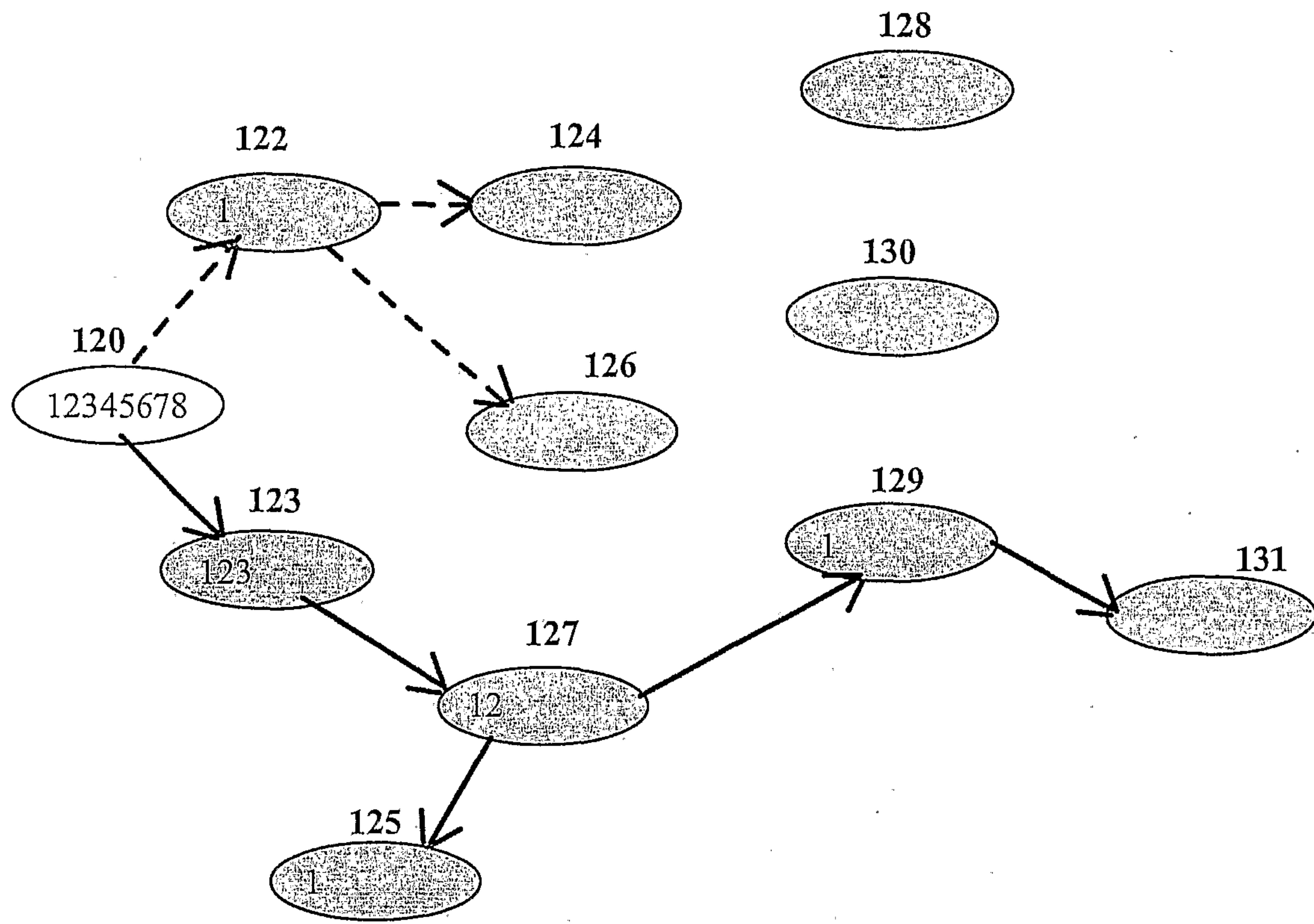


Fig. 6D

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5

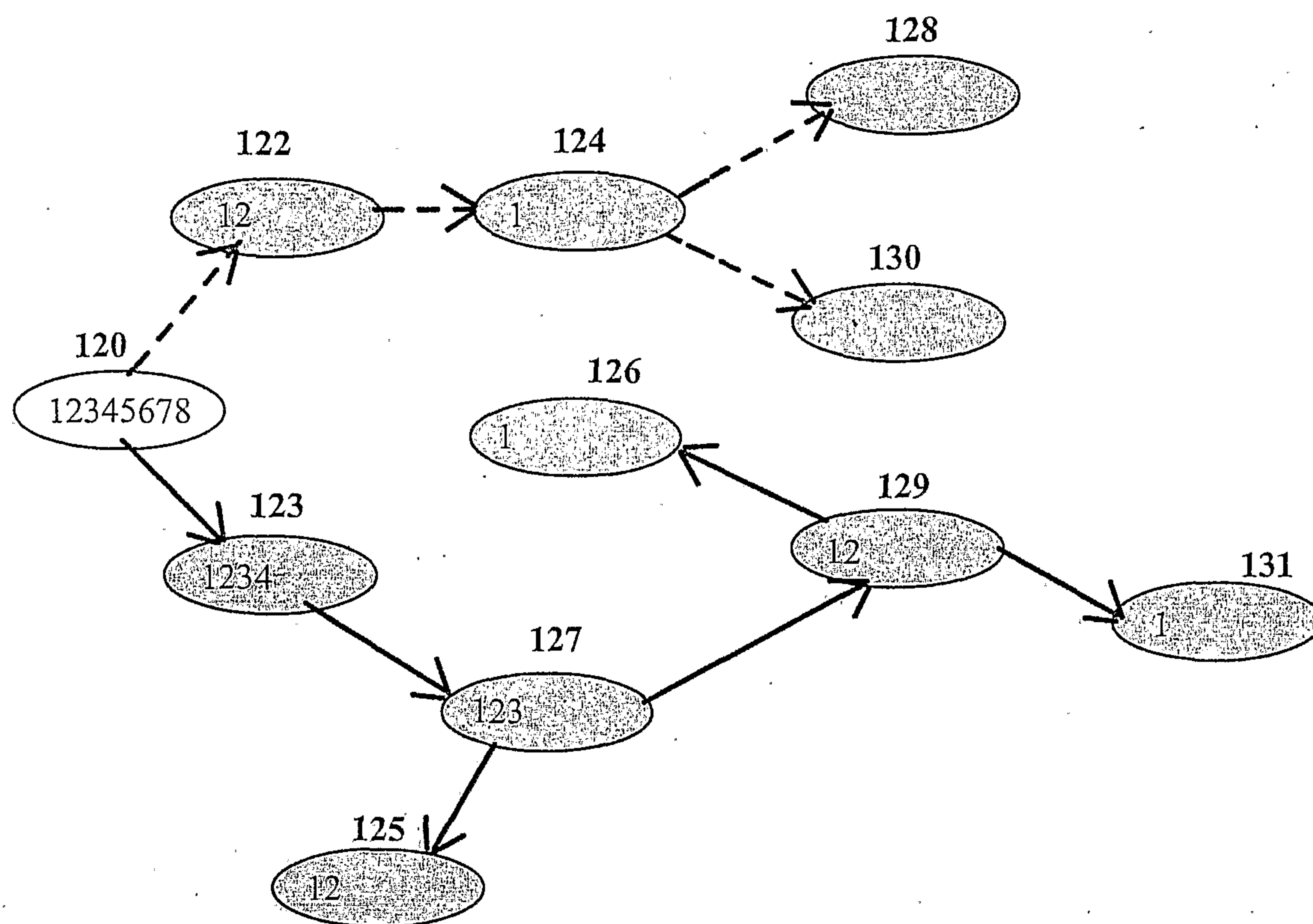


Fig. 6E

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6

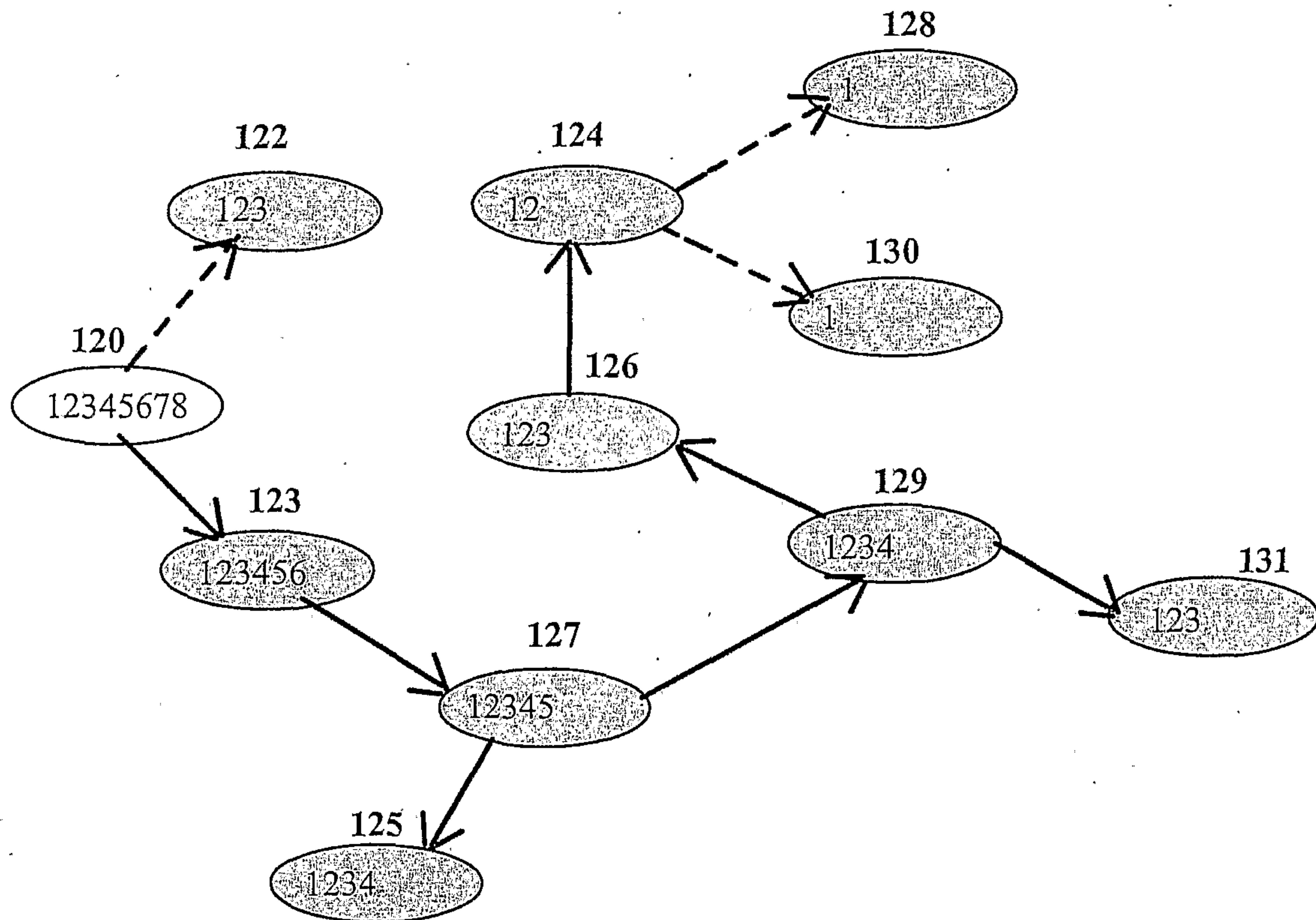


Fig. 6F

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7

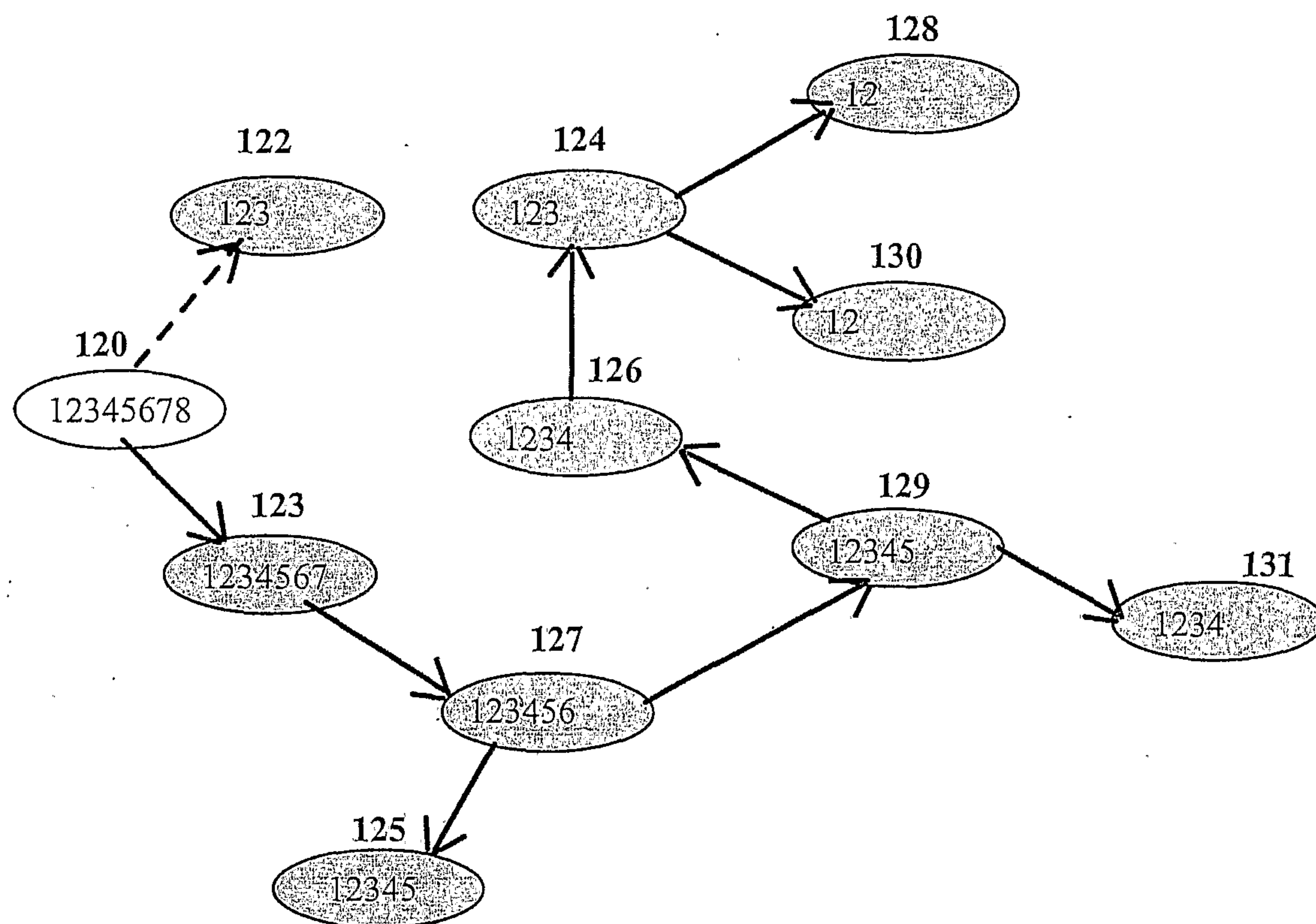


Fig. 6G

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8

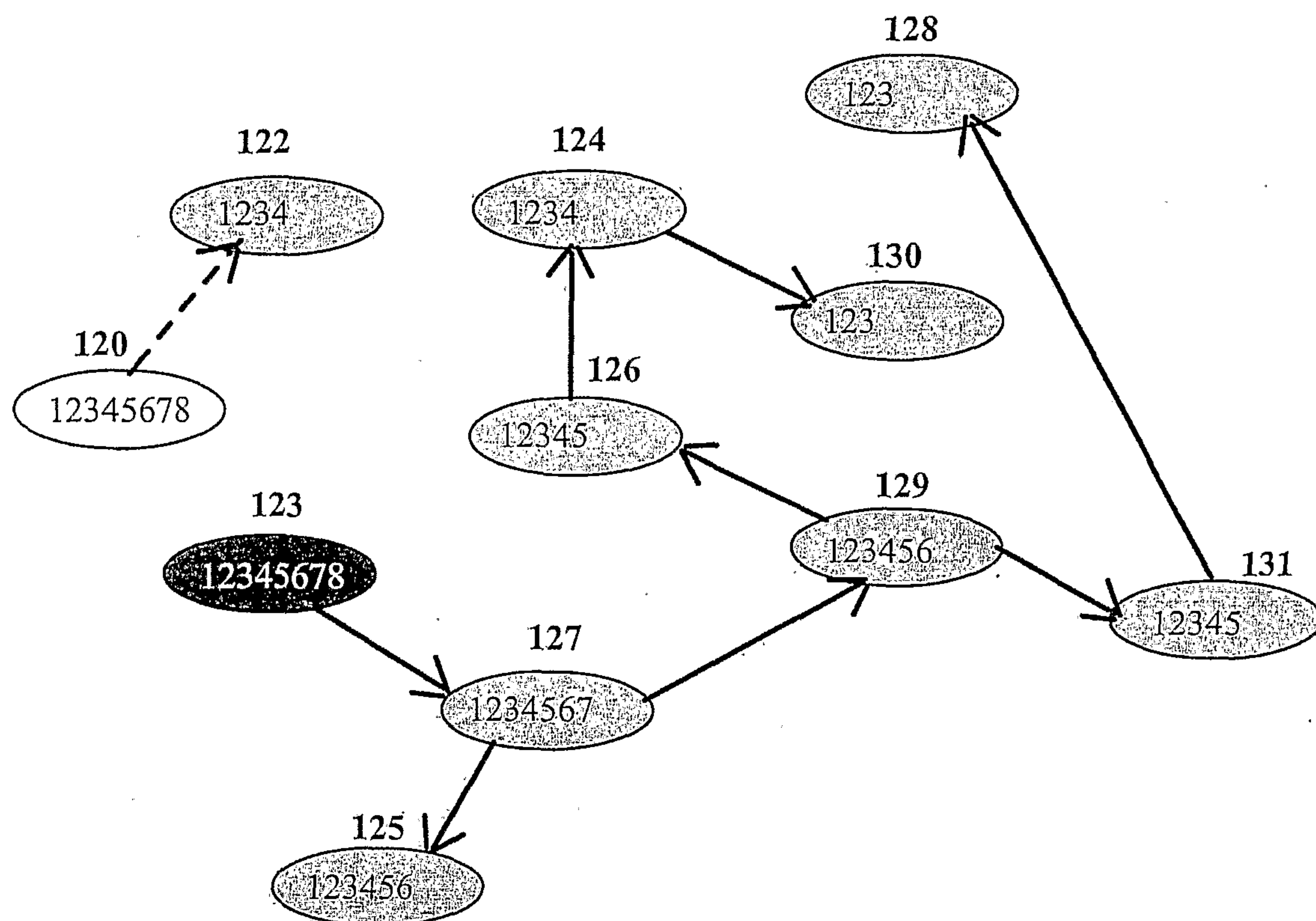


Fig. 6H

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9

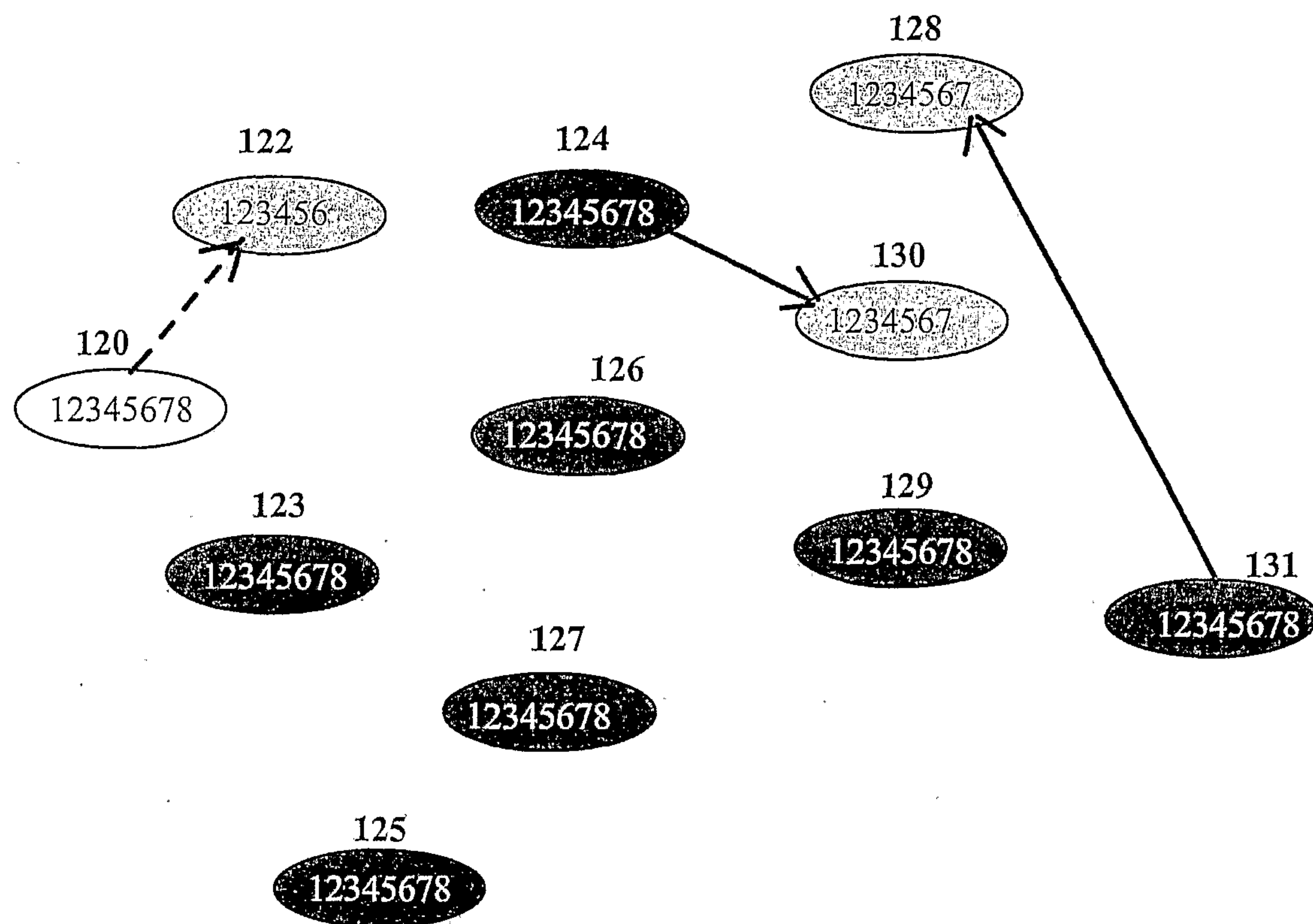


Fig. 6I

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10

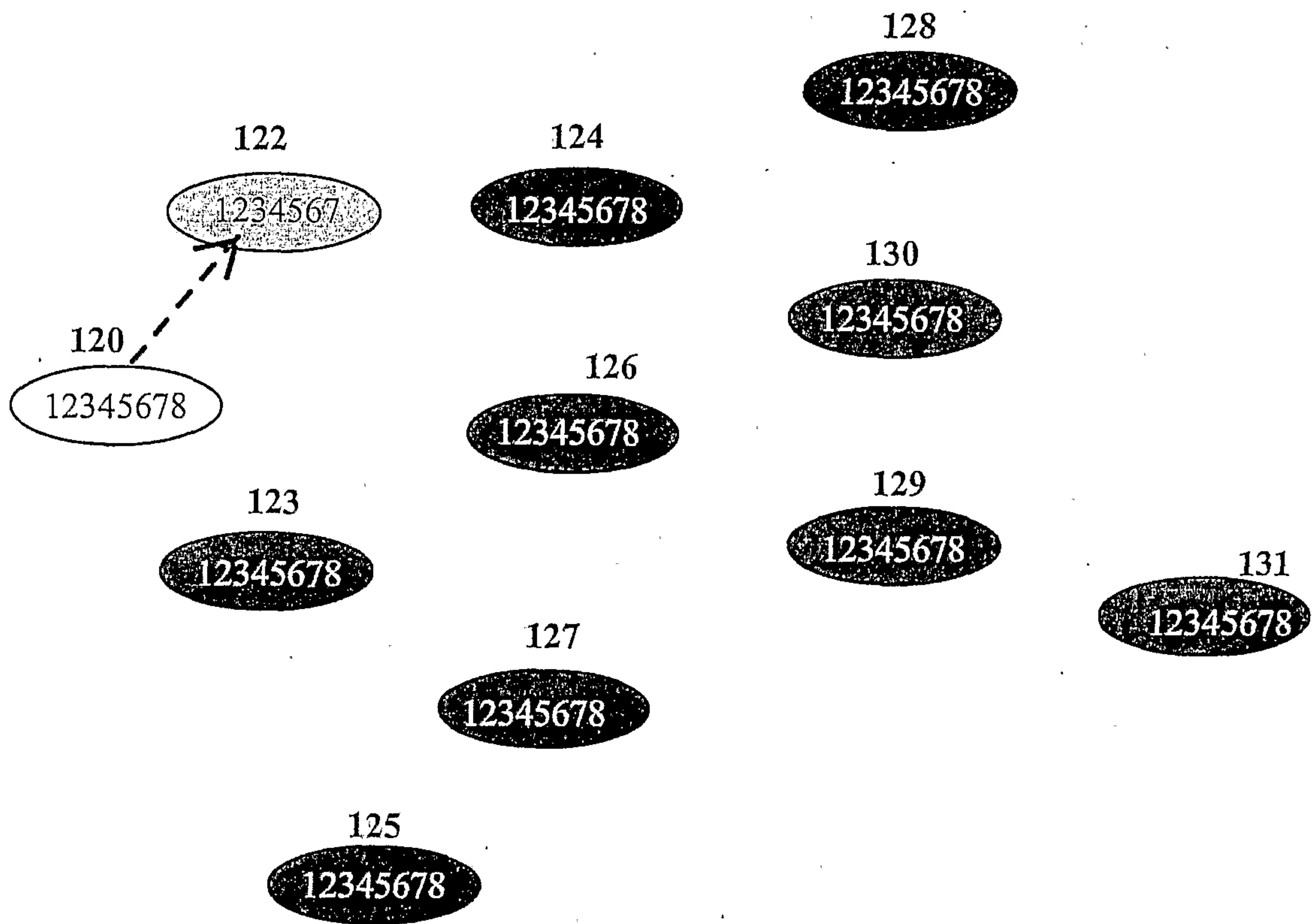


Fig. 6J

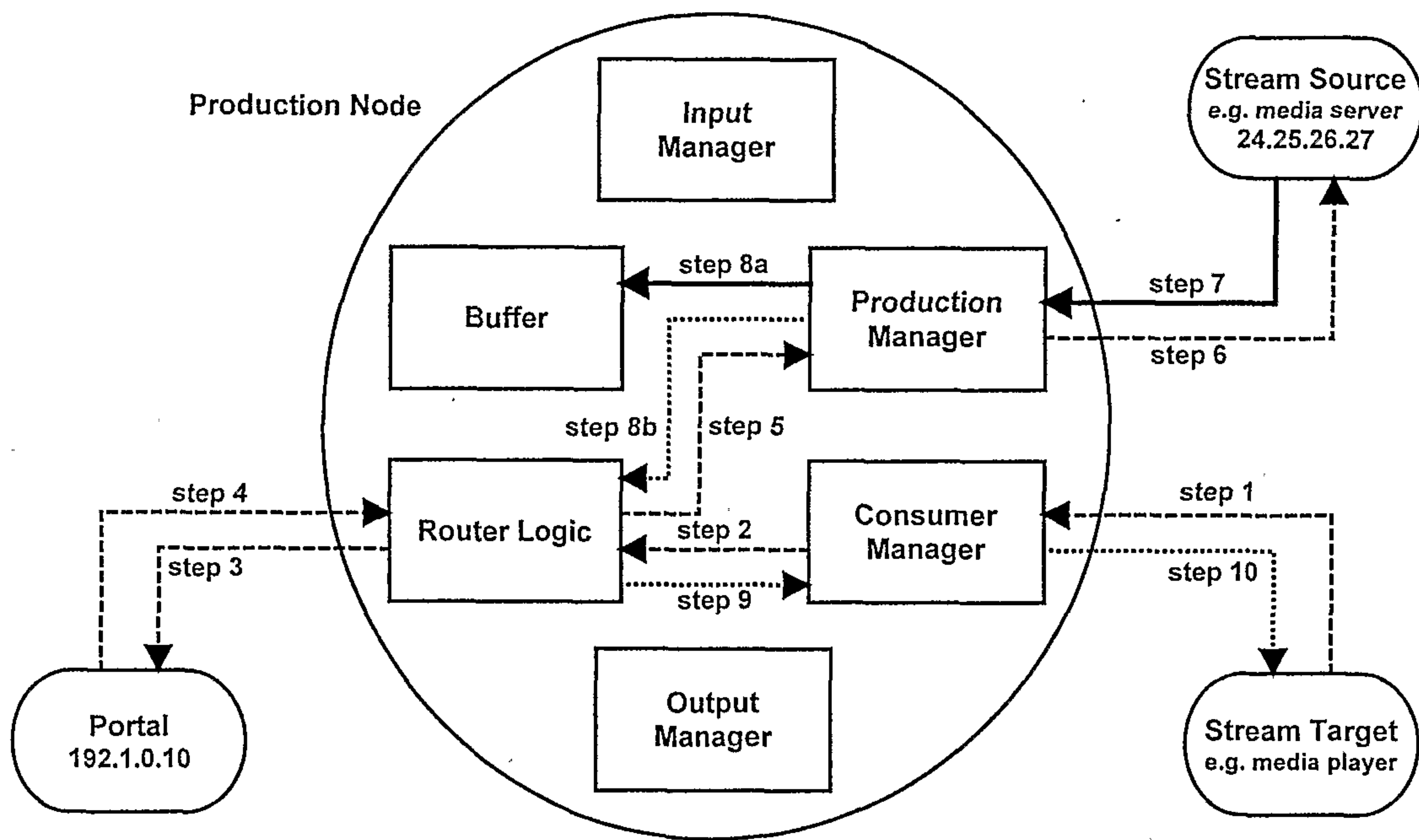


Fig. 7

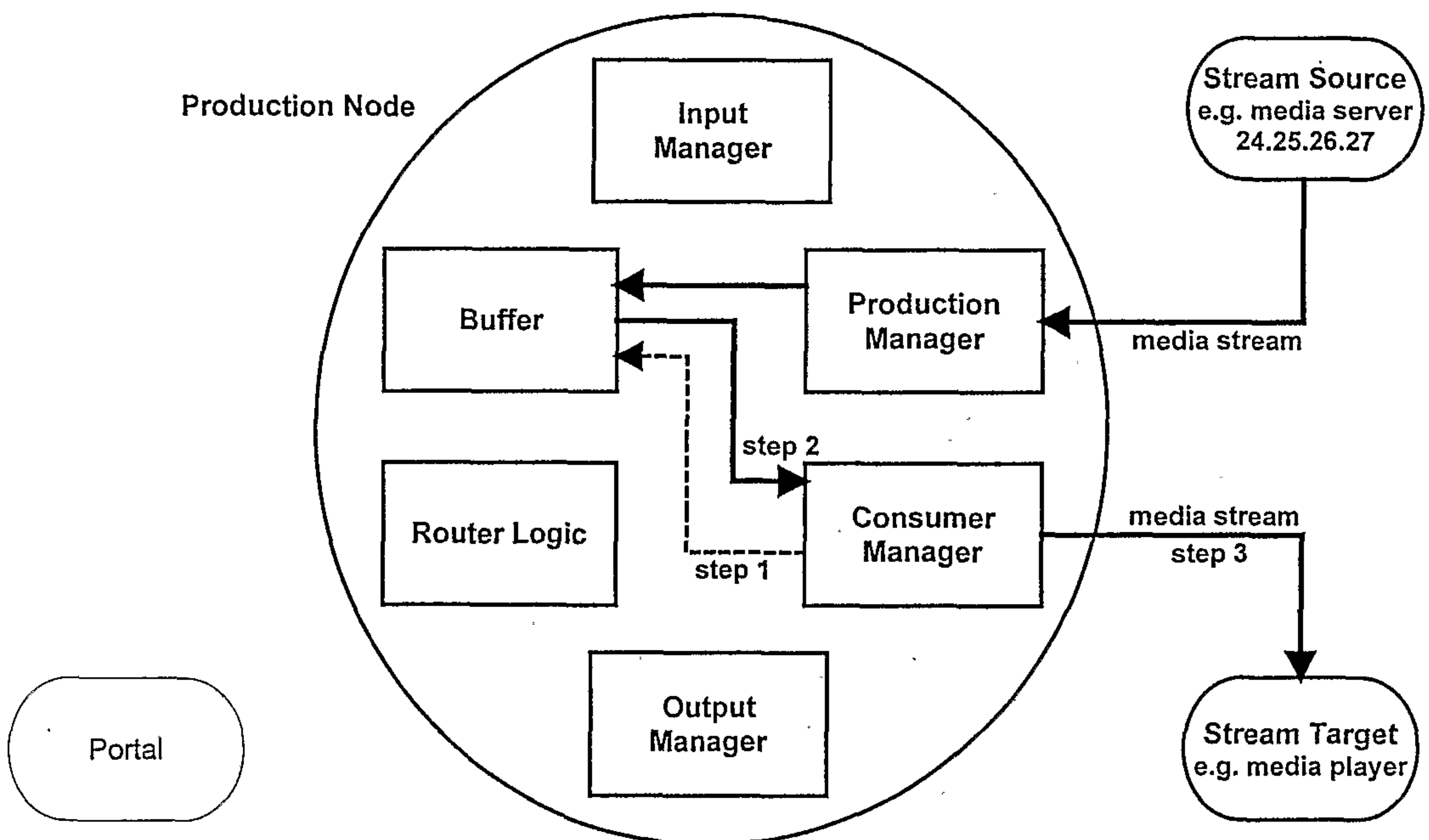


Fig. 8

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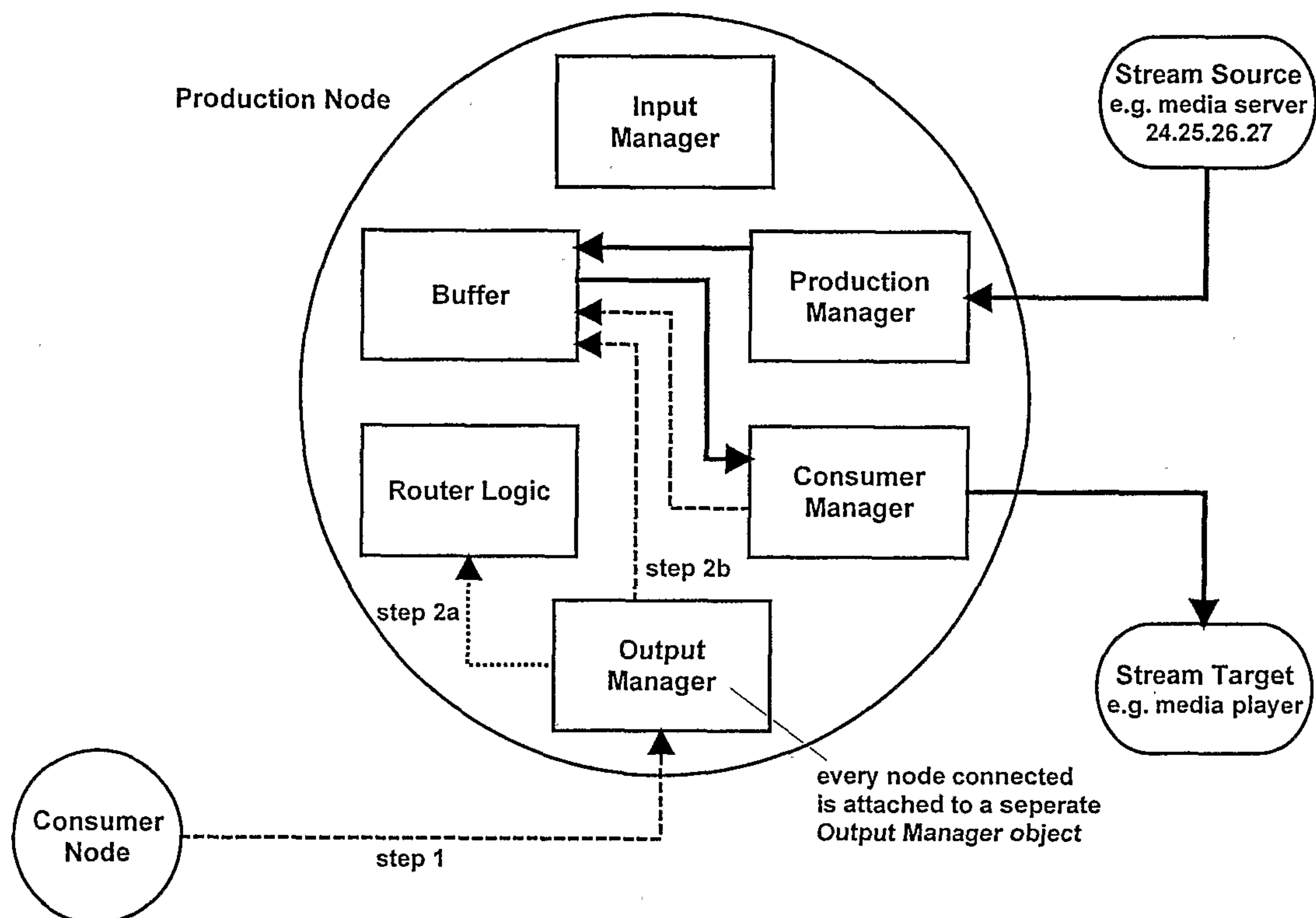


Fig. 9

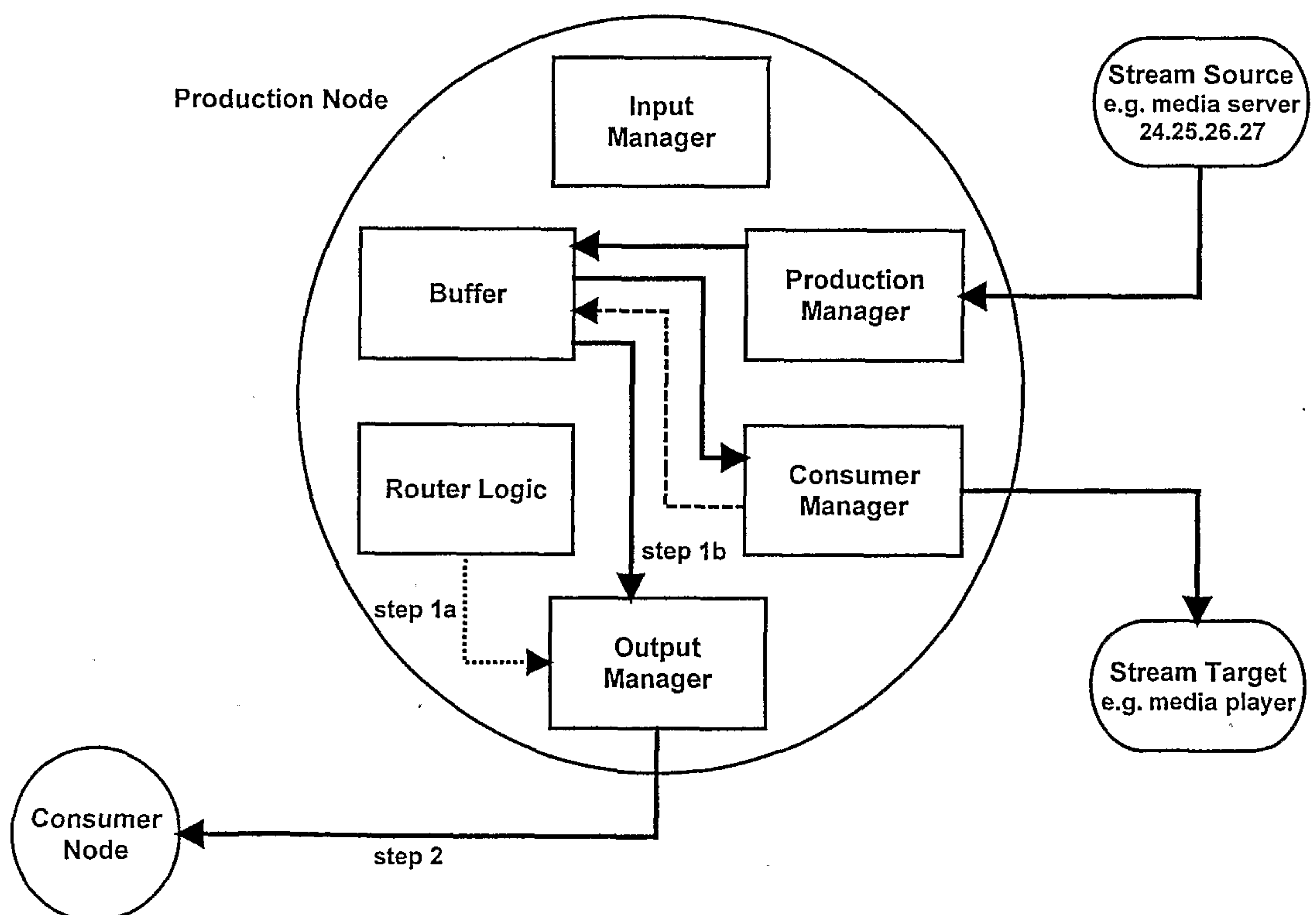


Fig. 10

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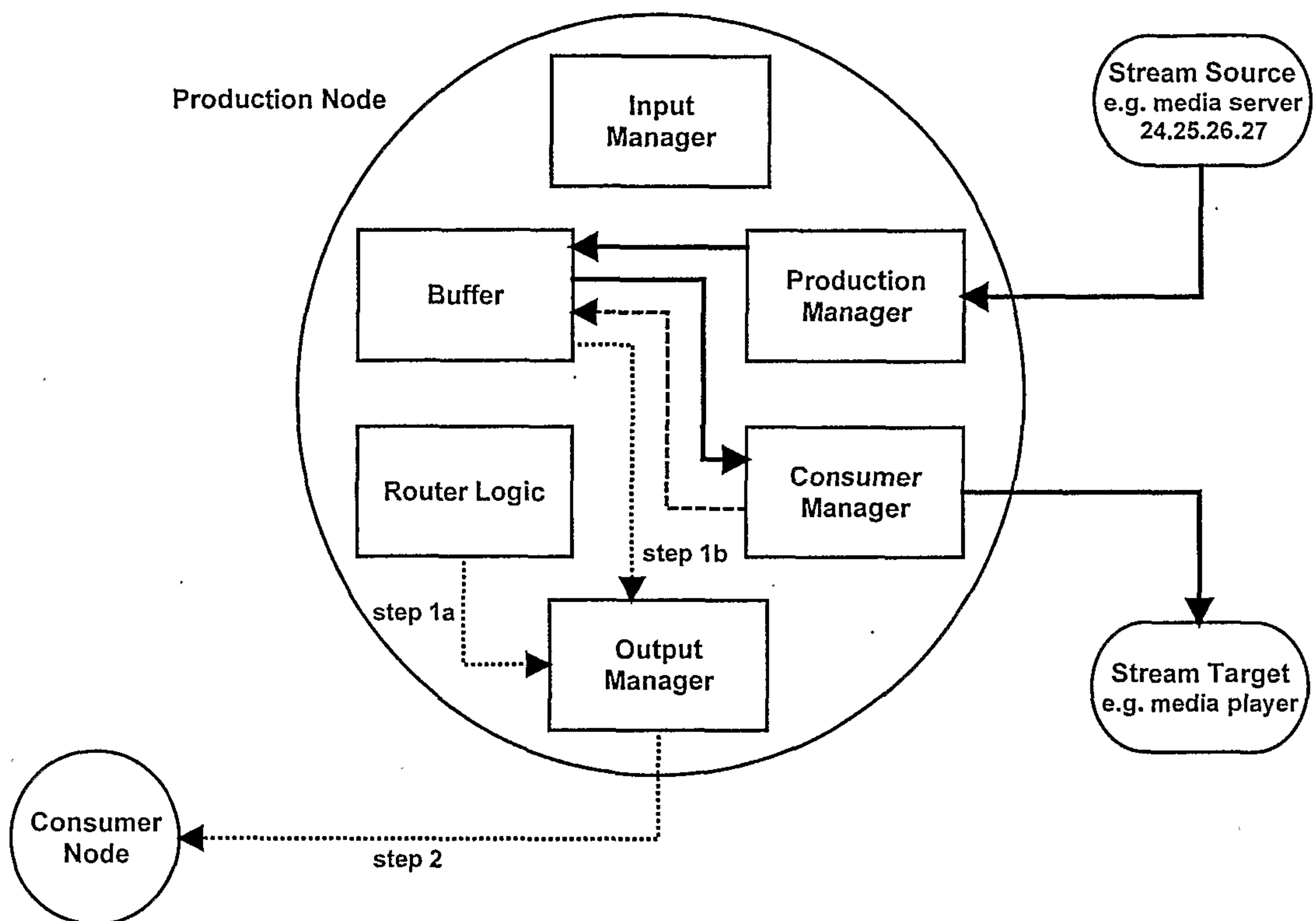


Fig. 11

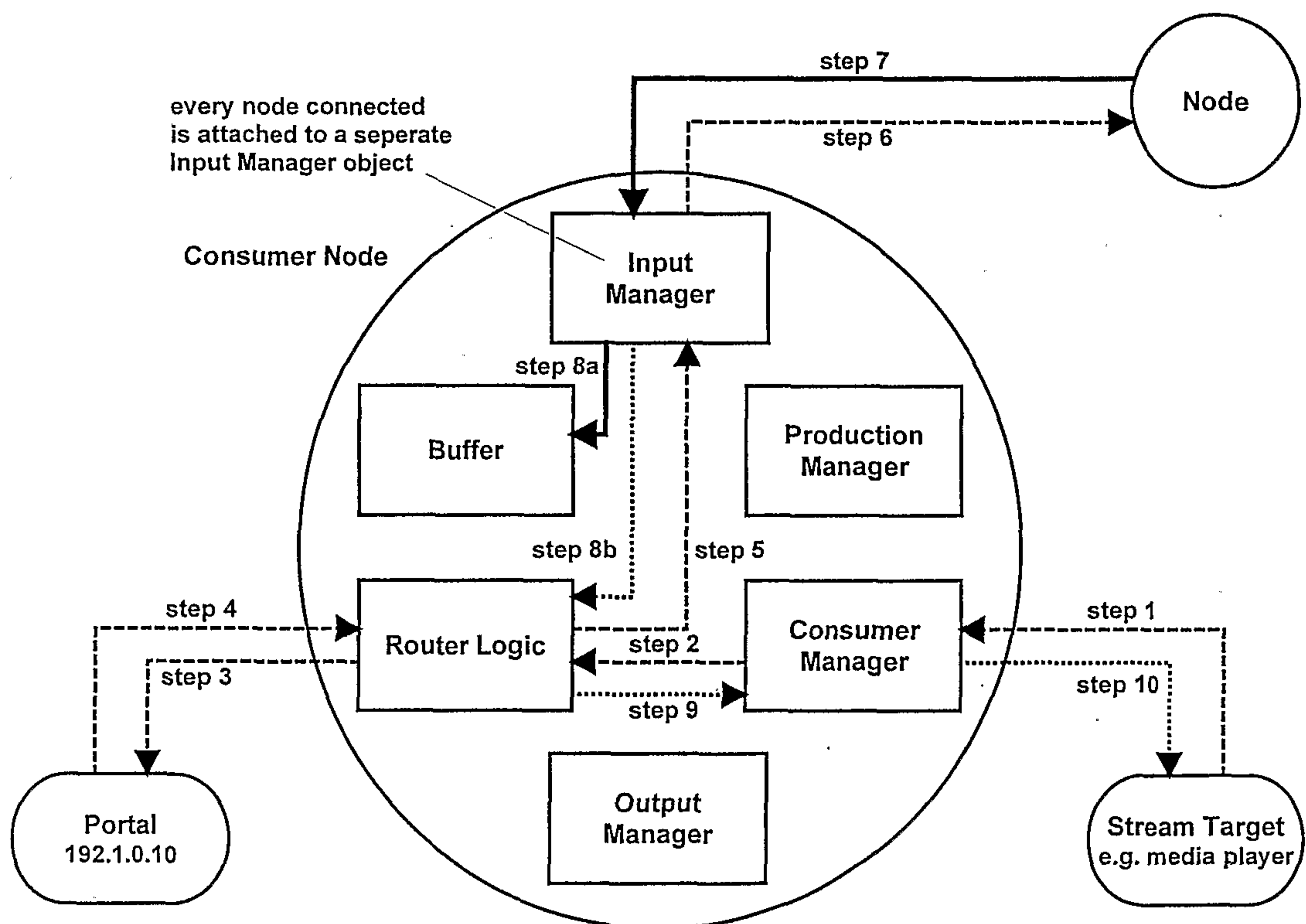


Fig. 12

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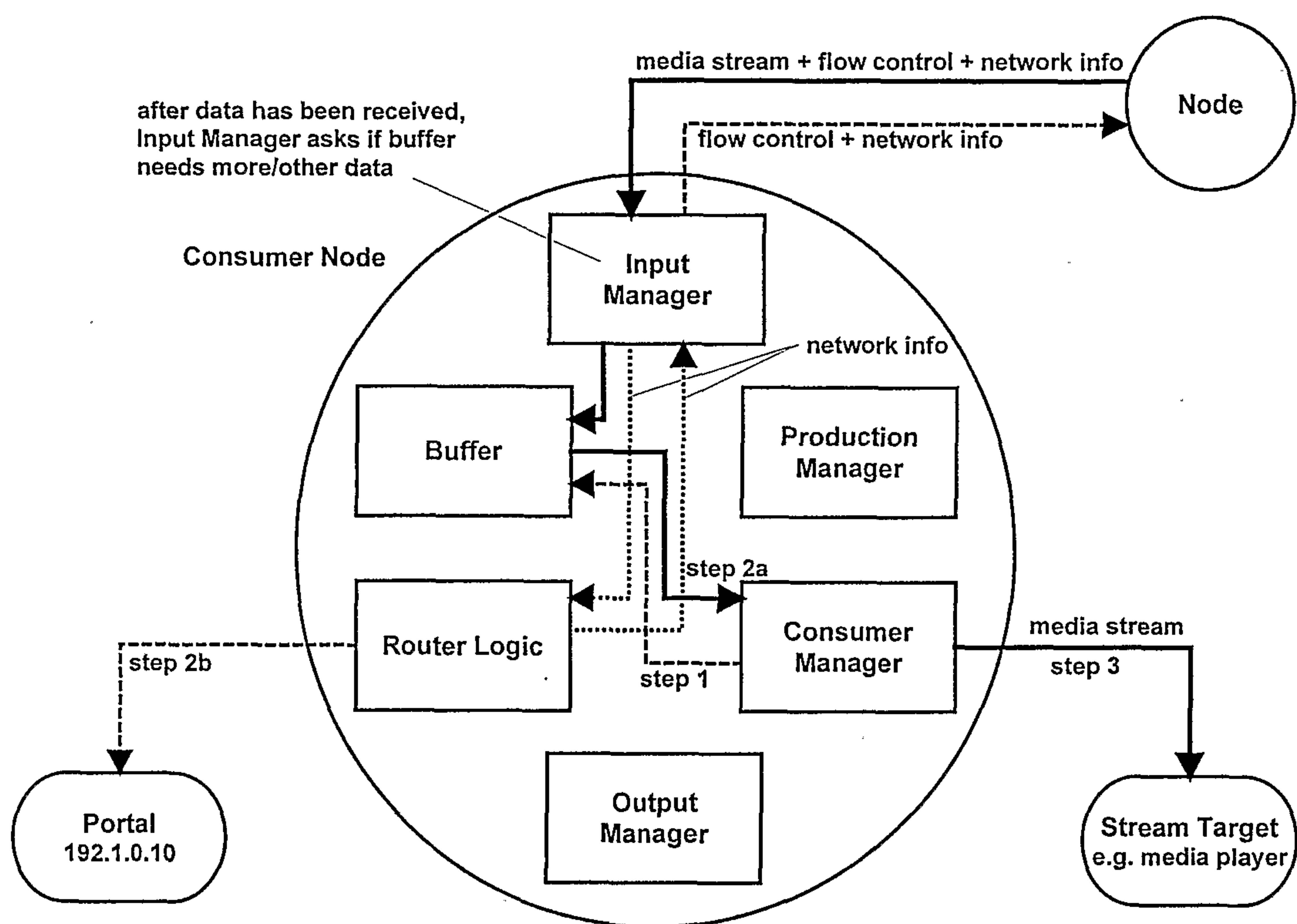


Fig. 13

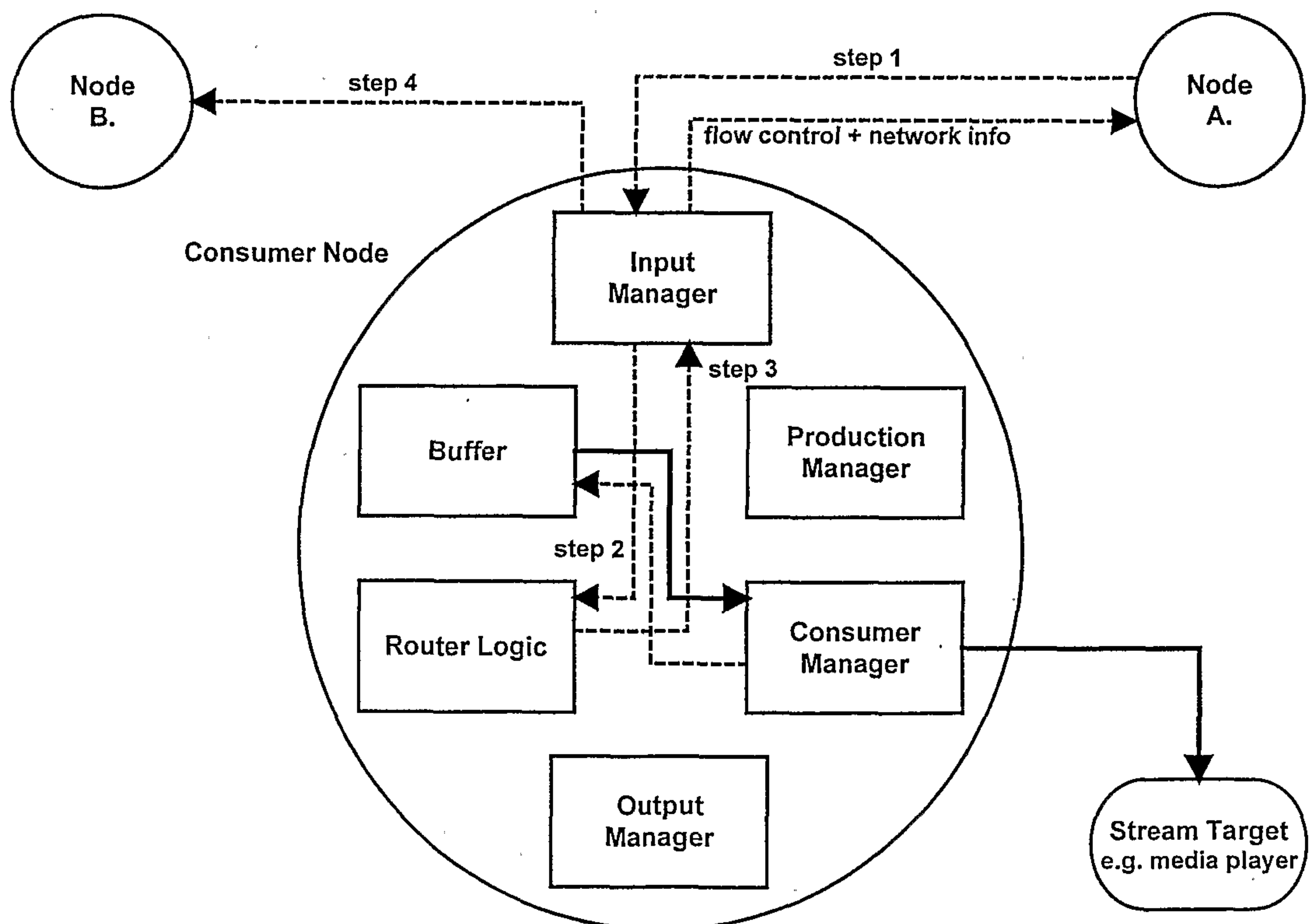


Fig. 14

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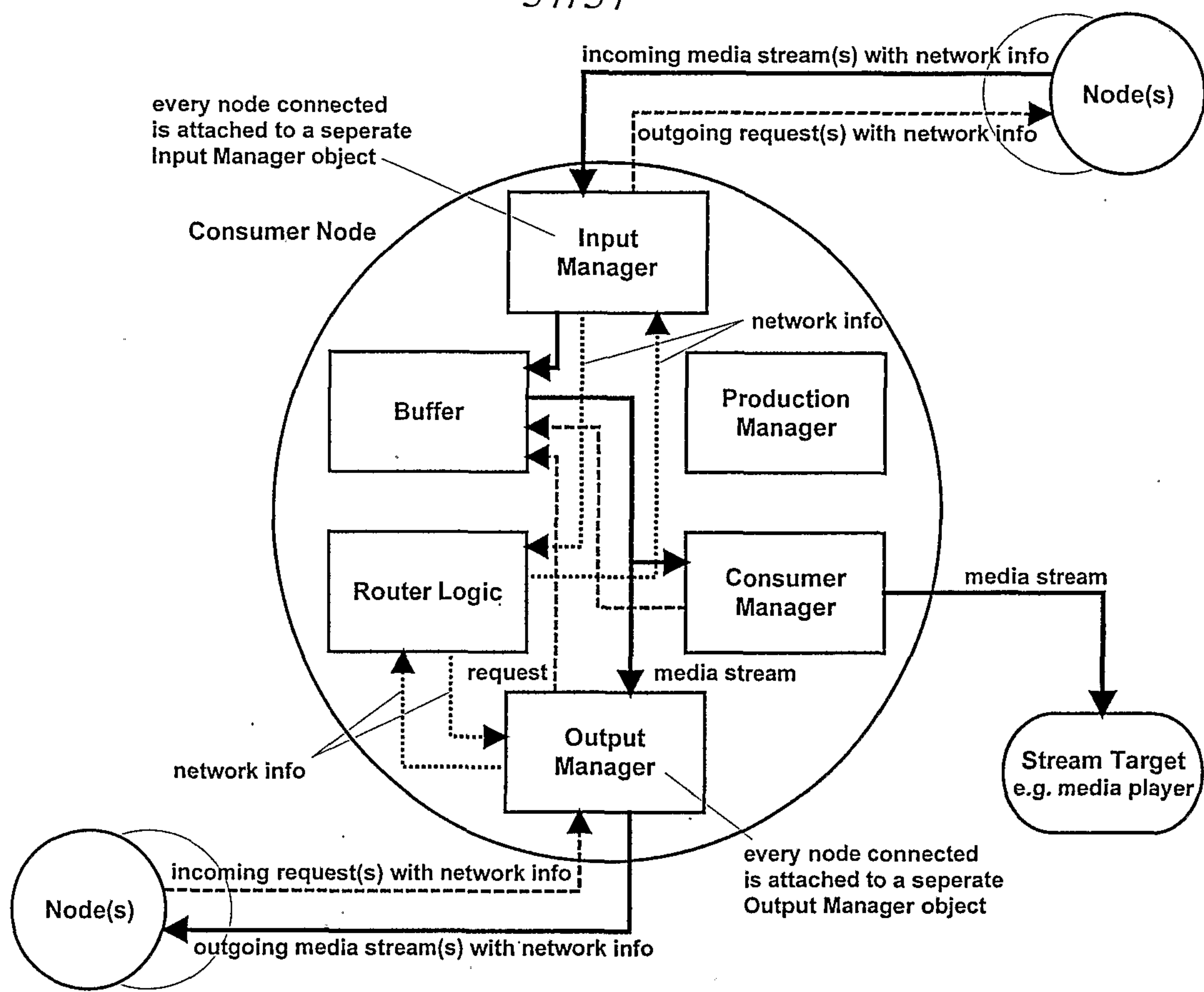


Fig. 15

