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CYCLADES NETWORK

IDENTIFICATION: Address Format in Mitranet
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AIMS: A package given to Mitranet has an address. One can consider several means of coding this address depending on the number and quality of the recipients. This code discusses various alternatives and proposes an address format.

1. Senders and Recipients

Who sends a message and to where? Normally a message originates from outside of Mitranet, addressed to the outside. The most essential information is the name of the recipient without which the message would not go anywhere. The name of the sender is equally important in order to be able to distinguish messages originating at several sources, but one could say that this is to be charged to the recipient, i.e., the name of the sender could be put in the text of the message without the knowledge of Mitranet.

However, it would be desireable if Mitranet could identify the sender of a message in order to be able to make traffic analyses, to obtain accounting information, to be able to perform research in case the proper functioning of the system is contested, and, if so desired, to filter the traffic as a function of its origin. All this leads to the desire to have the name of the sender outside of the message text.

But how can one be sure of the true identity of the sender? If only one possible sender corresponds to a Mitranet entry point, there can be no ambiguity, and it would even be possible to initialize Mitranet with the names of all senders. However, this would not be a general case.

Several senders can be linked to a Mitranet entry point. For example, two CP using the same frontal multiplexer, or even another network, e.g., postal and telephone service, if one has the foresight to connect oneself to Mitranet by commutated lines ("Caducee" [intertwined?]).

The only assured information available to Mitranet is the location of the entry point: node + line. All other data about the sender is conjectural. It is possible under certain circumstances to perform verisimilitude tests, e.g., to check that the name of the sender belongs to a limited list. But this requires that the node has data that is initialized as a function of its position in the network. The node thus has more difficulty in initializing itself starting from a neighbor, unless it has protected data.

If one is faced with a situation where there are multiple senders with uncertain identification, it would be safer if Mitranet adds the location of the entry point to the message. This information would be withdrawn at the exit since it has very little interest to the recipient if it does not allow him to identify the sender.

All these problems are not particular to Mitranet. They always exist when one must identify a terminal or user at the other end of the line. Either the identification is accepted as implicit or the correspondent provides an identification which is accepted at face value, with an option to check the veracity of the identification.

We will make this latter hypothesis with Mitranet except if serious difficulties arise. One must keep in mind that veracity controls have an ad hoc character. Plans to assign code numbers to the source may facilitate the implementation of controls.

Since an addressee can be reached by several Mitranet exit points it is not possible to use an exit position as an identification of the recipient. Again, this implies that nodes contain data dependent of their position in cyclades.

2. Transport Stations (ST)

One way of designating a source is to consider that a computer is a unique source. This is not a useful method when several computers are coupled, because it allows only one computer at a time to be tied to a network. Furthermore, several virtual machines may be activiated on a single computer and may be connected to the network without one wanting to create between these virtual machines means of communication other than the network itself.

It is, therefore, preferable that each communications software be identified individually even if it is necessary to go through a common line or common computer to reach it. This is, after all, a technique presently in use for polling or for concentrating messages to address terminals.

3. Internal Stations (STI)

A good many Mitranet services are available by designating them as STs and by exchanging messages with them. Directions will be given in this latter form rather than by giving specific codes to describe them, which would be less evolutionary and more restricted.

Therefore, these STI must appear as either sources or addressees, at will.

For convenience sake, it is desireable that messages have the same format whatever their source or destination, but it is not necessary that the interpretation be the same because the localization of an STI does not use the same mechanisms as is used with an ST.

There can be several varieties of STI:

Situated in one node.

Its topological localization is very precisely known.

Situated in all nodes.

The first node encountered will suffice.

Situated in certain nodes.

The nearest STI (in a routing sense) can be used.

When used as a source, an STI is of course precisely localized. When used as an addressee, it can be in several nodes, and Mitranet chooses a copy which is easy to reach.

An ST can receive messages from an STI. Since the conventions governing exchanges between the STs must be independent of Mitranet peculiarities, and, vice versa, these conventions do not usually apply to STIs. An ST must, therefore, be able to determine without ambiguity if a message comes from an STI or from another ST. The same criteria can be used by Mitranet to verify that messages from an external source do not pretend to come from an STI.

4. Addresses Format

One possible format is the following:

<NETWORK#>	<REGION#>	<ST#>	TOTAL
3	5	8	16 BITS

<NETWORK#> is mainly a prefix which will allow to introduce later the address of a different format, following a hierarchical technique which is classic in telephone application. In cyclades <NETWORK#> = 000.

<REGION#> is used to reduce the routing tables in partitioning the network. Only the region is taken into account to route the inter-regional messages

<ST#> is the name of a transport station inside or outside Mitranet. In the case where it is an STI, its format is as follows:

<00>	<NODE#>	<STI#>
2	3	3

which is equivalent to saying that STs which have numbers from 0 to 63 in one region are in fact STIs. There remain 192 external STs in each region.

if <NODE#> = 000	STI is within all the nodes
if <NODE#> = 111	STI is within some nodes.

In case 8 STI per node appears to be too small in number, one could envision:

-- Use format: <0><NODE#><STI#>

<0>	<NODE#>	<STI#>
1	3	4

which only leaves 128 ST per region, or 4096 ST for cyclades.

--Use <NETWORK#> = 100 for the STIs, which allows 32 per node.

5. Routing Tables

They are vectors, each element of which is a doublet:

<DEST><LINE OR WEIGHT#>

<DEST> may be a region number or an ST number within the same region, or a node number within the same region. This can be done using four indexed tables per region, ST, NODE, or STI.

In the worst case, the volume is:

--REGION 31 Entries

--ST 256 Entries (In fact no more than the number of STs tied together)

--NODE 6 Entries

--STI 16 Entries

It is apparent that if the number of effective STs remains limited to a few tens per region for a long time, there will be no difficulty to prepare routing tables.

6. Conclusions

The format proposed for cyclades is:

<000><REGION#><0><1000><ST#> for ST
 3 4 1 4 4

<000><REGION#><0 <0><NODE#><STI#> for STI
 3 4 1 1 3 4

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