# DISTRIBUTION INTERPROCESS COMMUNICATION AND SIGNALLING.

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#### DISTRIBUTED INTERPROCESS

COMMUNICATION AND SIGNALLING

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### 1. - THE GENERAL CONTEXT

Let us consider a system including several processors being linked together through an interconnection structure. We will distinguish between processors being accessed by external users who wish to initiate activities and processors which run these activities and may return results to some external users. Initiation of activities, execution control and transmission of data are accomplished through transmission of messages. In the following, we will refer to these processors respectively as senders and receiversof messages (see figure 1). We will not make any assumption regarding the size of these messages.



Figure 1. - A schematic representation of the system

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- senders and receivers may be micro, mini or maxiprocessors,
- these processors may fail,
- the interconnection structure is any resilient hardware structure (using alternate routes in telecommunication networks, multiple busses/cables in multiprocessors/multicomputers, radio frequencies, etc),
- errors, duplicates and losses are possible during the transmission of messages,
- message transit delays are variable,
- there is no privileged processor in charge of handling either communication or interprocessor cooperation.

We would like first to describe some of the problems we see to exist in such systems and, second, to present a solution.

#### 2. - THE PROBLEMS



## 2.1. - Multiple sender/single receiver systems

Let us consider a system as depicted in figure 1 but including only one receiver. We can identify two different problems :

- i) for any sender, it may be necessary to maintain a strict sequencing of messages being sent to the receiver
- ii) the various message flows converging at the receiver may have to be serviced by the receiver according to a particular discipline, which may be dynamically changed and not to be known statically or guessed by the receiver.

Problem (i) is a problem of end-to-end signalling or singlepath signalling (sps). Solutions to the sps problem are well known. The "window" technique is an example of such a solution.