SLAVKO ŠARIĆ, D.Sc.
MIROSLAV MIKULA, D.Sc.
Fakultet prometnih znanosti, Zagreb
MLADEN BEGOVIĆ, D.Sc.
INA Naftaplin, Zagreb

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INTELLIGENT NETWORK IN THE REPUBLIC OF CROATIA

SUMMARY

The introduction of intelligence into the telecommunication network of Croatia is becoming one of the key elements of the future development of the network. The paper describes the re-organisation of the telecommunication network in Croatia, the process of creating and managing the intelligent services, the initial situation and the feasible plan of introducing the IN concepts. The paper is concluded with a list of IN services that are being introduced in the initial phase of the Croatian telecommunication network.

1. INTRODUCTION

Modern telecommunication networks tend to provide their users with the possibly widest scope of services, ranging from public commuted telephone network services, intelligent network services, to services for special business groups of users. The basic aim is to fulfil the users' requirements for new services, and their fast and efficient introduction in the telecommunication network.

The capacity of the intelligent network offers a new approach to the organisation of the telecommunication network as a whole, based on the dynamic location of functions supporting various services in the network, according to current needs.

The capacity of the intelligent network is based on the decomposition of services to Service Independent Building Blocks (SIB). This principle of service independence helps to achieve high level of flexibility such that new services can be created and modified according to the users' requirements.

2. THE TELECOMMUNICATION NETWORK STRUCTURE

The Croatian telecommunication network is at the moment re-organising four-level hierarchical structure into a network structure of two parallel planes with two hierarchical levels (Figure 1). The first one is the access level to which the subscribers will be connected, and the other is the transit level. In the new network hierarchy pairs of transit nodes have been defined, with the possibility of connecting every access exchange to a pair of transit nodes. This will result in a significant reduction of the number of commutation nodes in the national network from about 1000 current to about 120 digital nodes, with a great number of remote subscriber grades. The new structure is expected to be fully realised by the end of the year 2000.

The existing network model is a static one, in which each commutation node is denoted by a set of constant functions and a set of certain services. The increased requirements to introduce new services demand such a telecommunication network which will provide service suppliers with the maximum independence regarding their nodes.

3. THE STRUCTURE AND ELEMENTS OF THE INTELLIGENT NETWORK

The concept which defines the model and architecture of a more flexible network is known as the Intelligent Network (IN).

The basic aims of this concept are the following:

- the independence of services, achieved by defining the Service Independent Blocks (SIB),
- independence from the network, achieved by defining the functional elements of the network, and
- independence of the manufacturer, by defining unique interfaces and protocols between IN elements.

The IN concept includes the network and services architecture, signalling protocols, creating of services, commutation functions and services control, managing the network and the statistical data processing. Factors that allow for the intelligence in the network are primarily the advances in the digital transmission and commutation, signalling along a joint channel and distributed data processing and database management supported by expert systems.

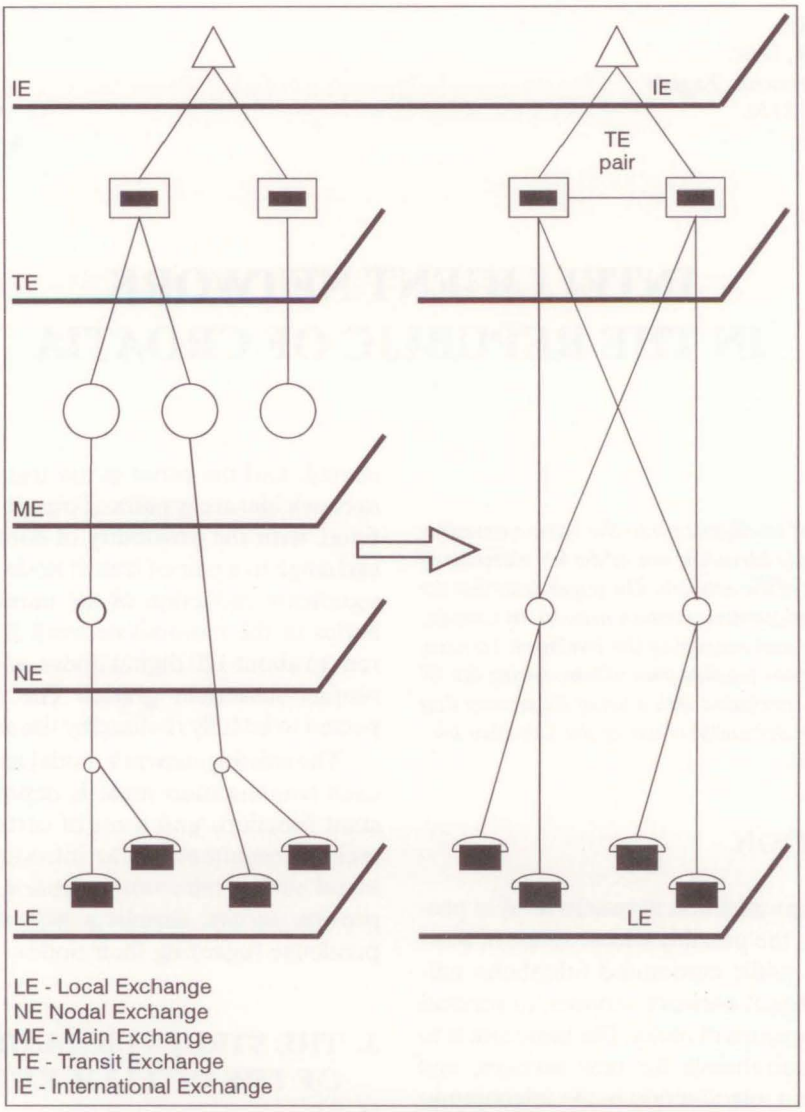

Figure 1 - Telecommunication network structure is changing

In a conventional local commutation node, each offered service is defined by the service logic (program), and each change in logic required individual changes at the level of each commutation local node. The introduction of a new service required the development of the full service, and introduction into single nodes was done individually. In order to reduce the costs, time needed for development, testing, and introduction of new services, single functions need to be defined, that are included in one service, i.e. the service needs to be decomposed down to the level of elementary functions. Thus, a set of elementary functions is formed, which occur at least once in one of the services, and which are worked out in detail and solved by a program only once.

All the services are realised by means of one or more Service Independent Building Blocks - SIB, which do not depend either on the service or the technology. Each SIB has a logical beginning and more than one logical endings. SIB can be used for several services without the need for any modifications. By combining the Service Independent Blocks using the data that are assigned to every independent block (depending on the service creation procedure), a single service is realised - Figure 2.

The introduction of an intelligent network requires special functions assisting the services be set into the existing network nodes, new nodes be formed, and the existing nodes to be replaced by new ones with IN functionality. Therefore, planning and defining of the realisation phase is needed as well as monitoring of the state in the network prior to and following the introduction.

Considering the current functionality of the commutation systems, during the initial phase of IN introduction the SSCP node (Service Switching and Control Point - point of commutation and services control) will be introduced, in order to allow all the users

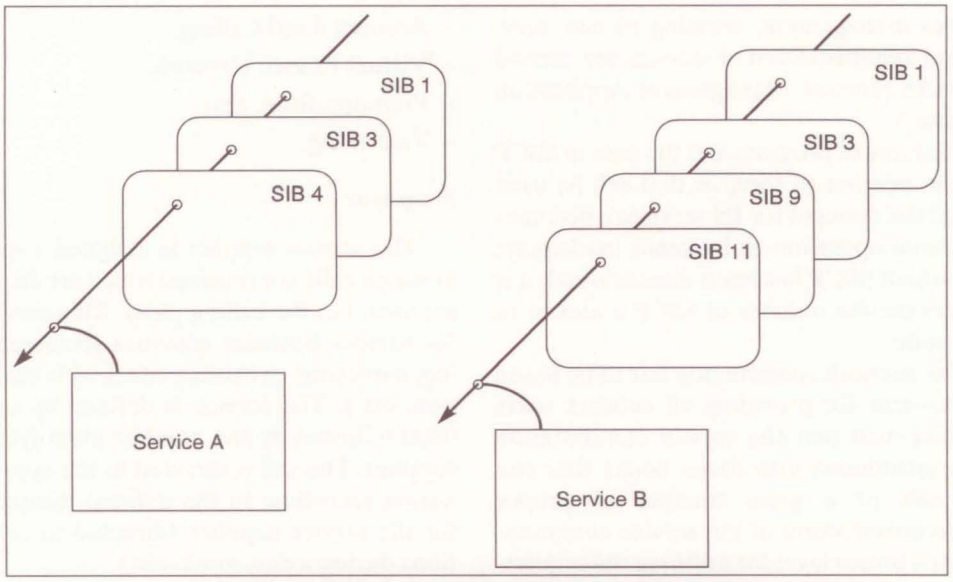

Figure 2 - Service Idependent Building Block SIB

to access IN services. The SSCP node combines all the functions of SCP (Service Control Point) and SSP (Service Switching Point). This node is introduced at the highest level of the national network, at the transit level, and all the calls demanding IN service are directed towards it. The SSCP node contains the services logic for all the services that will be introduced in the initial phase, and the centralised database for the whole network and all the services. The node is connected to pairs of transit exchanges which send the demands for IN service. Commutations of these calls and the services control is carried out in the SSCP node.

Once SSF (Service Switching Function) is introduced into the transit exchanges, the existing SSCP node will become an SCP node with the services control functions only .

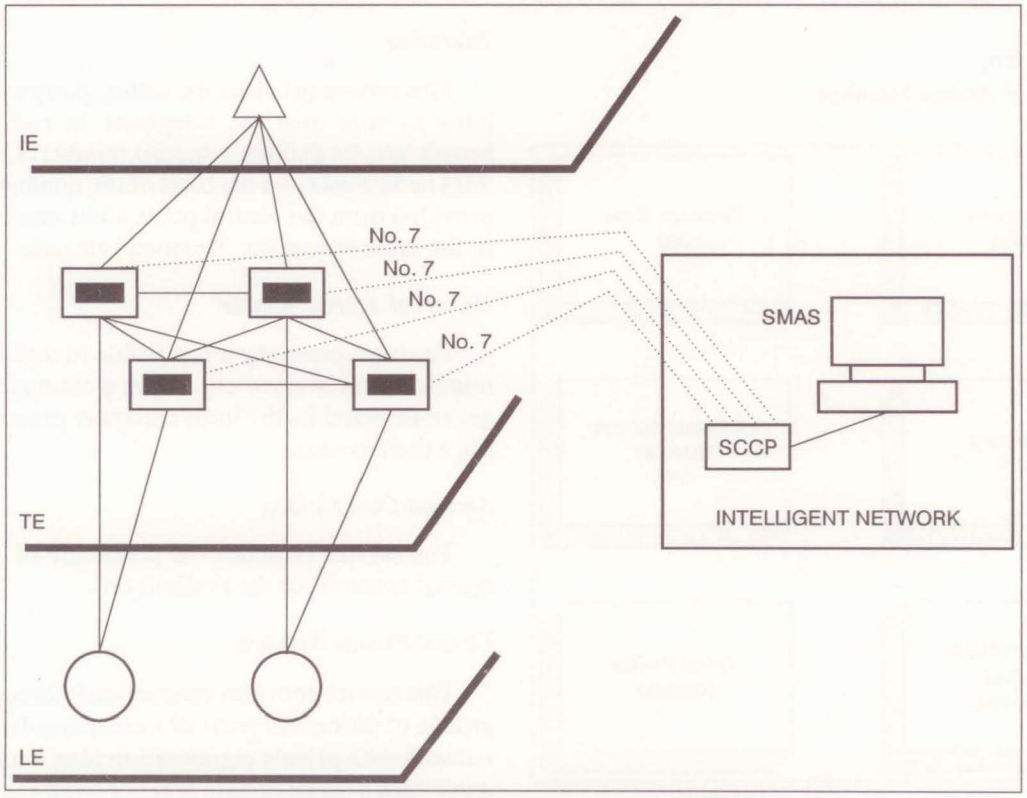

Figure 3 - Implementation of the intelligent network

The services management, creating of new services, testing and administration of services are carried out by the SMAS (Service Management Application System) - Figure 3.

When the volume of program and the data in SSCP (increase of the number of services that will be used and increase of the demand for IN services), becomes critical for normal operation or becomes inadequate for traffic for which SSCP has been dimensioned, it is possible to increase the number of SSCP nodes or to form an SCP node.

The plan for network construction has to be based on the requirements for providing all network users with IN services such that the service commutation functions are introduced into those nodes that can process IN calls of a great number of proper subscribers, on introduction of the service commutation function at a transit level for fulfilling the requirements for IN calls from the minor and geographically remote local nodes, as well as the introduction of new SSCP nodes i.e. SCP in pairs (for reliability and load distribution). All the non-SCP nodes need to be covered by SSCP or SSP at the transit level.

4. THE SET OF INITIAL *IN* SERVICES

In the initial phase of introducing IN services into the telecommunication network of the Republic of Croatia, six services will be introduced from the so-called set of possibilities CS - 1 (Figure 4), and these are:

- Freephone,
- Universal Access Number,
- Account Card Calling,
- Virtual Private Network,
- Premium Rate, and
- Televoting.

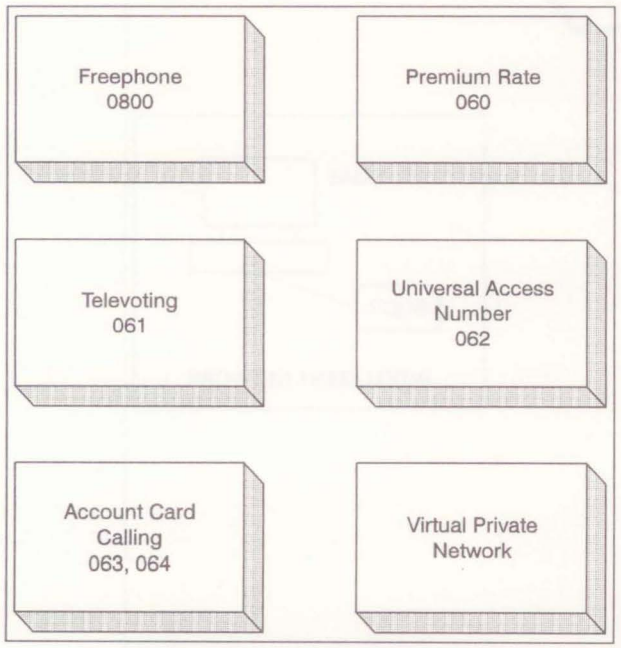

Figure 4 - IN - based services

Freephone

The service supplier is assigned a special number at which calls are received which are free for the service user, i.e. the calling party. This service is suitable for various business activities (commercial advertising, surveying, providing users with various information, etc.). The service is defined by an access code 0800 followed by the number identifying the service supplier. The call is directed to the appropriate destination according to the defined transaction number for the service supplier (directed to various destinations during a day, week, etc.).

Premium Rate

Premium rate services are accessed by dialling the access number, and charging is carried out in accordance with additional information on charging. Calls to this number are directed to adequate destinations by using special parameters (parameters given by automatic messages to which the calls are redirected), and the appropriate tariffs which are higher than those for normal calls. The telecommunication network operator shares the profit with the service supplier.

Televoting

This service provides the calling party with a possibility to vote over the telephone in radio and TV broadcasts, by dialling a special number. Counting of YES or NO votes on the basis of the number of calls is provided from the central point. Calls may be charged in the same way as the Premium rate calls.

Universal Access Number

To ring a company it is possible to dial a universal number from everywhere within a country. Calls will get re-directed to the local company premises covering a certain area.

Account Card Calling

The service provides the possibility of charging a special account for the realised call.

Virtual Private Network

This service provides connection between business groups of dislocated parts of a company. In this way a network with private enumeration plan is formed, and it includes a list of private numbers with the appropriate number of the destination.

5. CONCLUSION

Planning the phases of developing a network with intelligent nodes needs to consider the users' requirements for new services, costs of introducing and locating the service into the network elements, locations of intelligent nodes, and estimate of the profit realised by using various kinds of services.

The introduction of intelligent functions into the Croatian telecommunication network will be realised in two phases.

SAŽETAK

INTELIGENTNA MREŽA U REPUBLICI HRVATSKOJ

Uvođenje inteligencije u telekomunikacijsku mrežu Hrvatske postaje jedan od ključnih elemenata daljnjeg razvoja mreže. U radu je opisan tijek reorganizacije TK mreže u RH, proces kreiranja i upravljanja inteligentnim uslugama, početno stanje i sagledivi plan uvođenja IN koncepta. Na kraju rada dan je pregled IN usluga koje se uvode u inicijalnoj fazi u hrvatsku telekomunikacijsku mrežu.

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