

Tele-working services from the Greek PTT

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Abstract

During the last years tele-working methods that utilise network resources and services are gaining wide acceptance. Interestingly enough not all the enterprises that want to and can use tele-working are doing so. The main obstacles in adopting and implementing tele-working techniques are lack of technical knowledge, poor infrastructure, and lack of support. In Greece the main PTT organisation, as part of its strategy to offer integrated Telematic services in various areas, designed and is currently testing under several tele-working scenarios various services that will be offered in suitable packages. The services offered include telephony services, basic and advanced network services etc. The packages to be offered cover a wide area of tele-workers, including tele-workers from home, mobile tele-workers, tele-commuters etc. The packages also cover the need to establish suitable infrastructure for the tele-workers in the enterprise's premises, and the establishment of telecentres/telecottages or satellite centres. In order to effectively test all the proposed services a pilot network has been established. The network is based on ISDN links and it consists of a few central nodes (i.e. representing enterprises' premises) and several remote nodes (some of them mobile) representing for the tele-workers. The central nodes are equipped with an ISDN PBX, an enterprise server, and a router. These nodes are connected to the public ISDN network via a few Primary Rate Interface (PRI) ISDN links. The tele-workers' nodes are equipped with communication devices, such as telephones and facsimiles, and with personal computers. The nodes are connected to the public ISDN network via one or a few Basic Rate Interface (BRI) ISDN links. The initial tests show very promising results. The offered integrated services are easy to use and very reliable. As a consequence the tele-workers exhibit improved performance.

1 Introduction

The term tele-working refers to all kind of work that is done outside the traditional working area (e.g. work done at home, work done while travelling, etc.). Tele-working includes two kinds of actions (which are usually interlaced and mixed together to form an inseparable activity):

- working actions (i.e. all kinds of actions that directly target at completing the work at hand)
- communication actions (i.e. all actions necessary to communicate either with other people in order to exchange information, or with systems to get input or provide processed output)

Tele-working methods and systems give more emphasis to the latter group of actions. The reasons for that are:

- The actions of the first group do not change very much when the work is done over a distance. They mainly remain the same as when they were performed at the

traditional working space (e.g. the office).

- The recent evolvement of network infrastructure and network services affect greatly the communication means one has at one's disposal.

During the last years tele-working methods that utilise network resources and services are gaining very wide acceptance. An increasingly number of enterprises uses these methods to increase the employees' performance and decrease the costs.

Interesting examples of such enterprises are Digital, AT&T, IBM, BMW etc. (Digital has achieved a 40%-50% decrease on the costs for maintaining the installations for the employees via application of tele-working.) A study by British Telecom indicated that enterprises that applied tele-working manage to increase their productivity by as much as 45%.

These results indicate that all modern enterprises should at least consider and apply (where possible) tele-working. Interestingly enough not all the enterprises that want to and can use tele-working are doing so. This is especially true in Greece where the enterprises are not big (i.e. they are mostly SMEs). This reluctance by the Greek enterprises in adopting and implementing tele-working techniques is attributed mainly to the following reasons:

- lack of technical knowledge,
- poor infrastructure, and
- lack of support.

The role of PTTs is important here. As mentioned above, tele-working is closely related to telecommunications. Therefore PTTs can provide not only the connections necessary for the implementation of tele-working services but the services themselves. This will facilitate the process of adopting tele-working easier for the enterprises.

Many PTTs world-wide have noticed that and are developing and offer integrated solutions for the provision of tele-working services. Examples include AT&T, Bell Pacific, British Telecom etc.

In Greece, the main PTT organisation (i.e. Hellenic Telecommunications Organisation) has decided to extend its business, and enter the market of advanced network services. In this direction an operational plan has been elaborated. The Greek PTT, as part of its strategy to offer integrated Telematic services in various areas, designed and is currently testing under several tele-working scenarios various services that will be offered to the public.

2 Services to facilitate tele-working

The aim of the design phase was:

- to define the services (i.e. communication services, basic and advanced network services etc.) that can be used to facilitate the implementation of tele-working,
- to define the set of services applicable to various tele-working scenarios, and
- to design the architecture of the supporting communication network

An initial goal was that the services to be offered should cover a wide area of tele-workers, including tele-workers from home, mobile tele-workers, tele-commuters etc.

The services also should cover the need to establish suitable infrastructure for the teleworkers in the enterprise's premises, and the establishment of telecentres/telecottages or satellite centres.

The services that are useful in the implementation of tele-working were divided into the following general categories:

- Telephony services

These are the traditional services offered by PTTs. They mainly cover the need for interpersonal communication, and they also include fax services and supplementary services such as tree way conference, call redirection etc.

- Basic network services

These are the simple services offered by in any computer network. They are mainly targeting at satisfying simple communications needs (e.g. e-mail) and they include file transfer, remote access to computers, resource sharing etc.

- Advanced network services

These services are more advanced than the ones in the previous category and they have more requirements from the underlying networks. They mainly cover the need for advanced synchronous interpersonal communication (e.g. video conference), and for transmission of streaming data (e.g. video). These services also include application sharing, data sharing etc.

- Collaboration and workflow services

These services are targeting at coordinating the work performed by more than one persons (which is usually the case). They are mostly asynchronous services

Many services exist in all of the above categories, and some of them exist in various forms with variations in the quality. It is obvious that not all tele-workers need or can have access to all of these services. On the other hand not all of the services are to every enterprise's advantage (i.e. the expected results by the use of some services may not justify the corresponding investment).

Therefore, various cases of tele-working needs were considered and then sets of services needed for each case were defined. The main sets defined were:

- Simple services for home tele-workers

These services are targeting tele-workers with very simple needs and they include telephony services and some basic network services (e.g. e-mail, remote access, file transfer etc.)

- Advanced services for home tele-workers

These services are targeted to tele-workers with advanced need or to tele-workers that the nature of their work is not covered by the previous set of services. The set includes advanced network services (e.g. audio/video conference, application and data sharing) and collaboration and workflow services.

- Services for mobile tele-workers

These services are targeted to mobile tele-workers, and are essentially the same as the simple services for home tele-workers, but they are provided with lower quality due to technical limitations imposed by what the mobile tele-worker can

carry with him.

All of above take into consideration the tele-worker's side. On the enterprise's side exists the need to support the enterprise's tele-workers. In order to satisfy this need consideration was given to:

- Central node services for tele-workers support

These covers all the supporting services needed to support the services for tele-workers included in the above mentioned sets (e.g. multipoint conferencing servers, groupware servers, workflow servers etc.)

These sets of services will be the basis for the commercial packages that will be made available to the public. A challenging objective while designing the commercial packages was to conclude to some few and easily manageable core packages that under little customisation can cover a broader spectrum of tele-working needs.

As an example, the design process concluded to one only basic "central node" package, which under appropriate customisation can be used as infrastructure for several other needs, such as the infrastructure of a telecentre / telecottage, or the infrastructure of a satellite centre etc. In a similar way, the home-teleworker's packages can be easily customised to cover the need of a teleworker or telecommuter working from a remote telecenter/telecottage.

In addition, the design of the package is scalable and allows for the definition of various derivatives of the main commercial packages that can vary from simple phone and facsimile services to typical and advanced network and collaboration services.

3 Network architecture

The services have to be supported by a suitable network infrastructure. This network infrastructure has to satisfy some requirements i.e.

- It should cover a wide geographical area
- It should be already available to the Greek PTT
- It should support easily both synchronous and asynchronous communications
- It should support both telephony and computer networking
- It should not be too expensive to use

The general network architecture is based on the public ISDN network. Notice that this is in accordance with the practice applied by many enterprises that used the ISDN network to implement tele-working.

The telephony services and some other synchronous communication services (e.g. videoconference) are implemented natively by the network itself. For the other (mainly asynchronous) services widely acceptable protocols (PPP and the TCP/IP suite) were used to implement a computer network over the ISDN infrastructure.

Various nodes are interconnected using the network. These are either tele-workers' nodes or supporting nodes.

The tele-workers' nodes can be either static or mobile, and contain the necessary equipment and applications that allows them to gain access to the services (typically a phone, a fax, a computer with an ISDN card and networking software etc.). Mobile

workers can gain access to the ISDN network (but not to the ISDN services) using a mobile phone and a corresponding modem for the computer.

The supporting nodes contain the necessary equipment and server software in order to provide the services to the tele-workers (typically a Multipoint Control Unit – MCU, a router with a Primary Rate Interface ISDN card, an enterprise server, server software etc.)

3.1 Pilot implementation

In order to effectively test all the proposed services a pilot network has been established. The various services have been implemented over this pilot network using free or commercially available software. The pilot network and its services have been made available to a few selected enterprises that showed interest, in order to be evaluated. The results of the evaluation will drive the full-scale implementation of the services that will facilitate tele-working.

The pilot network is based on the public ISDN network infrastructure of the Greek PTT. It consists of a few central nodes (i.e. representing enterprises' premises) and several remote nodes (some of them mobile) representing the tele-workers. The pilot network architecture is shown in figure 1.

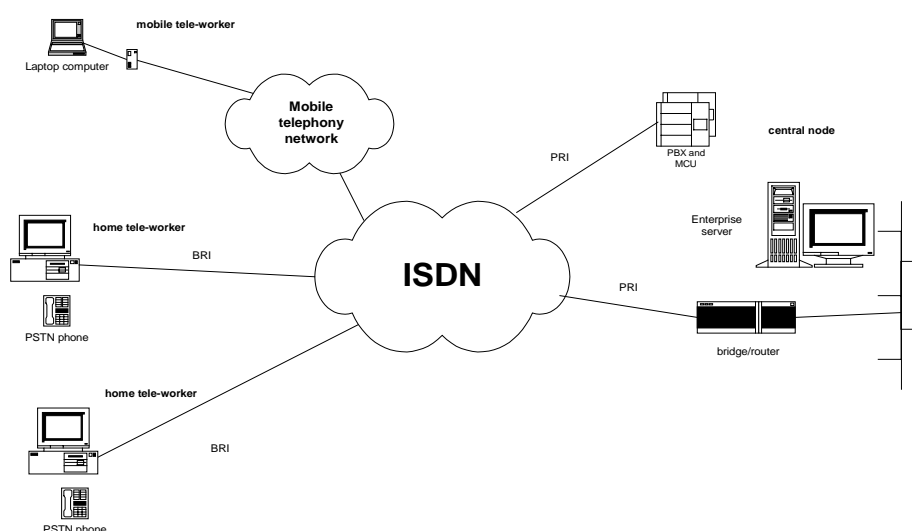


Figure 1: The pilot network architecture

The central nodes are equipped with an ISDN PBX, an enterprise server (including all the necessary software packages, such as e-mail, ftp, WWW and groupware servers etc.), and a router. These nodes are connected to the public ISDN network via a few (one or two) Primary Rate Interface (PRI) ISDN links. One of the central nodes is also equipped with an MCU.

The tele-workers' nodes are equipped with communication devices, such as ISDN phones and facsimiles, and with a personal computer (equipped with all the necessary network communication software and the possibly needed advanced video teleconference and collaboration hardware and software tools). The static tele-workers' nodes are connected to the public ISDN network via one or a few Basic Rate Interface (BRI) ISDN links. In the case of mobile tele-workers the corresponding devices are either portable (for tele-workers that set up a static non-permanent node at

various places e.g. at the hotel rooms) or mobile (for tele-workers that work while travelling).

The selection of the software and hardware to be used for the implementation of the pilot network was based not only on general performance and quality criteria for each product/tool, but also took into account:

- the suitability of each product/tool with respect to the special tele-working needs,
- the ease of use, simplicity, full set of basic features etc. with regard to the applications for remote tele-workers, and
- the reliability, high performance, large number of users support etc. with regard to server applications.

4 Evaluation

The evaluation of the pilot implementation has two phases (internal evaluation and external evaluation). The Greek PTT and Computer Technology Institute did the internal evaluation. The pilot network was used by people that have never before worked from a distance to do their job from home and in some cases from other places (while travelling).

The external evaluation is currently in progress. A few a few selected enterprises that showed interest use the pilot system for their tele-workers. After the end of the evaluation period their comments will be used to improve the system and implement the full-scale version of it.

5 Conclusion

The initial tests show very promising results. The offered integrated services are easy to use and very reliable. As a consequence the tele-workers exhibit improved performance.

In the near future these services will be made available to the public and the Greek enterprises will find an easy way to benefit from the advantages that tele-working has.

6 References

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