NEW GLOBAL COMPUTER NETWORK

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Abstract

We suggest the new global/regional PC•net computer network, which offers PC users some new benefits the Internet lacks, and we shall, similar to the Internet, refer to them as services:

- the trading service;
- the exchange service;
- the banking service;
- the analytical service;
- the educational service, etc.

The advantage of the PC•net is the complete information security it offers and the shorter time of information retrieval, compared to the Internet.

Keywords: information network Internet, computer network PC•net, information security, business-oriented services, data retrieval speed, intelligence.

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1. Introduction

In 1831, one of the British MPs asked Michael Faraday, the founder of the theory of electricity, how people can benefit from his works. Faraday replied that he didn't know. Shortly, the industrial revolution started, brought forth by the use of electricity (Chebotarev, 2004).

The new information technologies suggested in the paper are so efficient that will enable the countries connected to the new PC•net computer network to quickly make significant progress in their economic, as well as scientific and technical development.

Compared to the suggested PC•net network, the current information technologies based largely on the broad use of the global Internet computer network (Cronin, 1997; Castels, 2003; Elliott, 2004; Brousseau & Currien, 2007; Zittrain, 2008) have numerous significant drawbacks (Janczewski & Coralik, 2007; Higgins, 2009; Kramer *et al*., 2009; Brenner, 2010; Clough, 2010):

- fundamental inability to provide complete and guaranteed information security;
- extremely long time of retrieving the necessary information due to, on the one hand, the existence of poor and abandoned web sites, and, on the other hand, lack of the necessary information;
- impossibility to prevent its use for criminal, anti-social and even terrorist purposes;
- and, finally, lack of many services necessary for serious work.

Some of these drawbacks of the Internet are still present in all of its numerous improvements (Barnes & Jackson, 2002; Shakhnovich, 2006; Roggy, 2006; Wood, 2006; Baklanov, 2008).

Therefore, the necessity is imminent to create the new information structure which eliminates the abovementioned drawbacks of the Internet. The global/regional PC•net computer network can do this, however, it is not an alternative to the Internet. The PC•net and the Internet supplement each other, as they have different ways of solving various tasks.

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2. Global/Regional PC•net Computer Network

The new PC•net computer network (Antonov, 2009, 2012) eliminates the main drawback of the Internet – its fundamental inability to provide complete information security – due to removing the reason for it. This reason is the use of packet switched communication which always requires two communication channels – the direct and the feedback, or one bidirectional, which is basically the same. Here belong, for instance, telephone communication lines widely used in the Internet. And it is this additional feedback communication channel necessary for packet switched communication that is used by trespassers, e.g. hackers, in the Internet.

Therefore, the absence of packet switched communication in the PC•net, i.e., the absence of the feedback communication channel, disables the trespassers to retrieve any information from the user's PC. The noise immunity of computer information transmitted in the PC•net, instead of packet switched communication, is improved due to the use of noise combating codes which have proven their high efficiency, for instance, in deep space communication.

The use of one-way television communication lines in the PC•net, apart from providing for complete information security, enables to increase the speed of communicating computer information due to larger channel band width.

It is also important that the widely developed network of television broadcasting almost everywhere has an unbalanced load, i.e., during night hours it is very under-loaded. This allows significantly reducing the costs of the PC•net deployment, as payment for the use of television broadcasting channels is the largest expense item. The PC•net can use television communication lines at any time of the day.

Elimination of another important drawback of the Internet in the PC•net, i.e., significant reduction of information retrieval time (or rather bringing it down to zero), is achieved through the use of a different user servicing mode. Whereas the Internet users search for the information they need, the PC•net users do not search for it, they just receive it by subscription. Moreover, the users get the new information immediately as it appears, and access archive information by receiving and viewing the special periodically broadcast issues of archive information.

All these considerations are implemented in the global PC•net computer network which at the initial stages of its deployment may be developed as a regional one. Its regional implementation may consist of only one satellite transponder, or even none. For global

implementation, at least three satellite transponders are necessary. But, naturally, the larger the corresponding region is – e.g., the Asian-Pacific region – the USA, Europe, etc. – the more efficient the PC•net will be. The best efficiency will certainly be achieved with the global implementation of the PC•net computer network.

The simplest example of regional implementation of the PC•net is given in Figure 1. As can be seen, the information stored in the data base comes to it in any known way, and is received by the users' PCs via cable, aerial and/or satellite television communication lines and TV adapters, instead of the modems used to access the Internet.

The suggested PC•net computer network has one more advantage, in addition to those already discussed – it allows its users to quickly create their own data bases which will allow solving much more intellectually demanding tasks than is currently possible (Antonov, 2010, 2011a, 2011b). It is advisable to store these personal data bases using special personal memory in the form of an additional external storage of a large enough capacity.

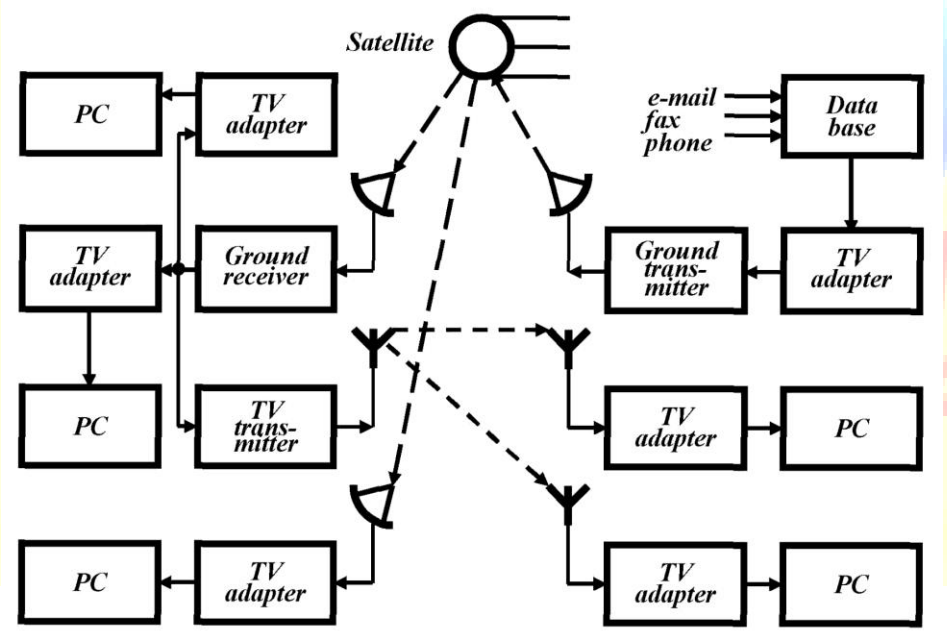

Figure 1: Simplest implementation of the PC•net computer network without feedback

Finally, an obvious advantage of the new PC•net computer network is the fact that is new business-oriented services (Antonov, 2011c).

3. Services of the PC•net Computer Network

3.1. The trading service

The trading service is the simplest in terms of its implementation, as it can be created in any large city which has television broadcasting. In the simplest case, it is not even necessary to have a satellite transponder, as people usually do their shopping close to their place of residence.

The service works as follows. The city trading data base receives in a regular way, including via the Internet, the uniformly arranged offers of vendors. These offers contain detailed information about the goods or services – the name, code, price, manufacturer, vendor details, special terms and conditions, etc. In the data base (Figure 2) the offers submitted are arranged into a single price-list and broadcast periodically via television communication channels to the potential buyers – the users connected to the PC•net computer network. This information can be broadcast in the background mode around the clock, including the night time. In a PC it is sorted in accordance with the descriptors set by the PC•net user and stored in the personal memory. The users can view this information at any time convenient for them, pick the goods and services that interest them, and then make their purchases as usual.

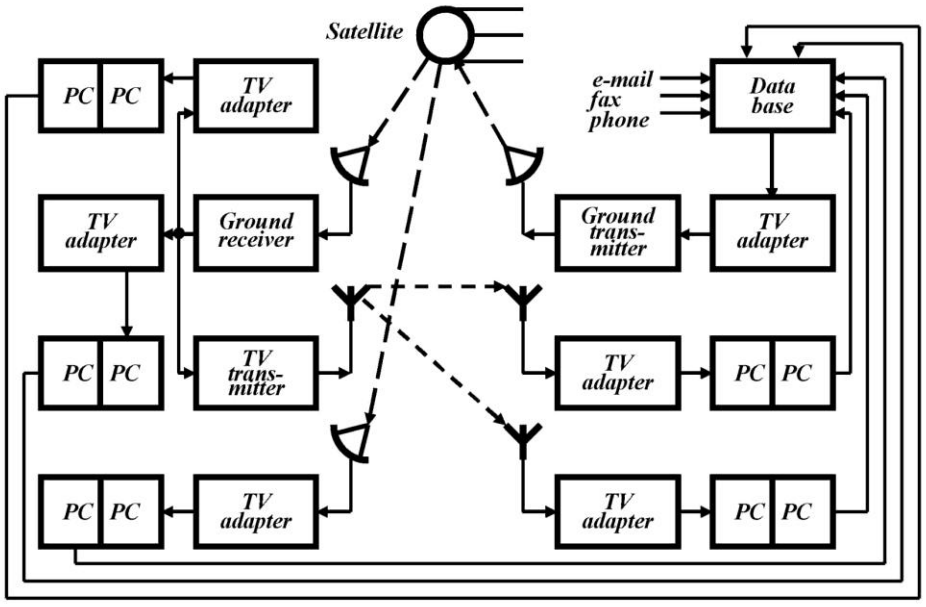

Figure 2: The simplest implementation of the PC•net computer network with feedback

We do not rule out that the trading service may generate profit for the owners of television broadcasting networks which would exceed their advertisement revenues. Moreover, contrary to advertisement, there is no need to interrupt the television broadcast for the trading service to operate. The service would also benefit the vendors as it would allow increasing the turnover. And, finally, the service would also benefit the buyers as it ensures quick and efficient shopping.

3.2. The exchange service

Goods and services can be traded not only at fixed prices, but also at contract prices. In the exchange service, similar to the trading service, the vendors submit their uniformly arranged offers to the data base. They contain detailed information on the offers. In the exchange data base, a single list of offers is created and broadcast to the PC•net users via television communication channels. The users choose the offers that interest them from the list.

But then, they act in a different way from users of the trading service. The PC•net users submit their counter offers to the exchange data base via the narrow band feedback communication lines (e.g., the e-mail service of the Internet), and these offers are then transmitted to the vendors via the Internet. The vendors make their choices and inform the corresponding buyers.

Depending on the type and the amount of offers, the electronic exchange services implemented by the PC•net can obviously be both regional and global, both commodity and stock, and other. Their use will enable businesspeople to quickly and conveniently find suitable business partners in any region.

3.3. The banking service

The banking service is, most likely, the most demanded one, since banks are the victims of the most intensive and sometimes successful hacker attacks made through the Internet. Banks are also vulnerable to other network threats.

Thus, guaranteed and complete information security, which is offered by the PC•net computer network, seems to be of the utmost interest to banks. Similar to other PC•net services

described below, this task is solved by connecting the users' PCs to the banking data base via one-way television communication lines (Figure 3). The peculiarity of the banking service, compared to the services discussed above, is the fact that in any bank a large number of users have to be connected to the PC•net. Therefore, it is advisable to connect them using the corresponding local area network (LAN).

In order to send messages outside the bank, the Internet may be used, and a local area network (LAN), although a different one, can also be used for this purpose.

In a similar way, it is possible to provide for information security of any other objects – public offices, corporations, funds, scientific and research institutes, i.e., of any institutions possessing sensitive information where the access of intruders is highly undesirable.

3.4. The analitical service

PCs with personal memory, which are connected to the PC•net for infotainment (Figure 1) and use its analytical service, will already be able to help users in solving at least some of the intellectually demanding tasks (Antonov, 2010, 2011a, 2011b) which are solved by scientists, developers of products supplied to the global market, businesspeople and other highly qualified specialists.

In order to understand in what way a PC connected to the PC•net can render its users real assistance in their creative thinking, we have to understand exactly what kind of assistance people need. In other words, we have to understand which stages of creative thinking are difficult for people, and which are not.

Thus, let us formally divide the process of creative thinking in terms of solving, for instance, multi-factor scientific tasks, into two stages which are substantially different:

- determining the factors which have a significant influence on the process under investigation, and elimination of the factors having little or no importance;
- determining the mathematical dependencies between the significant factors revealed earlier.

It turns out that in the process of creative thinking the first stage, i.e. revealing the significant factors influencing the results of the process under investigation and eliminating the insignificant factors, is the most difficult for people. People are able to successfully analyze only

simple processes where the number of factors correlated by the cause-and-effect relations does not exceed three or four. Here belong, for instance, almost all laws of physics.

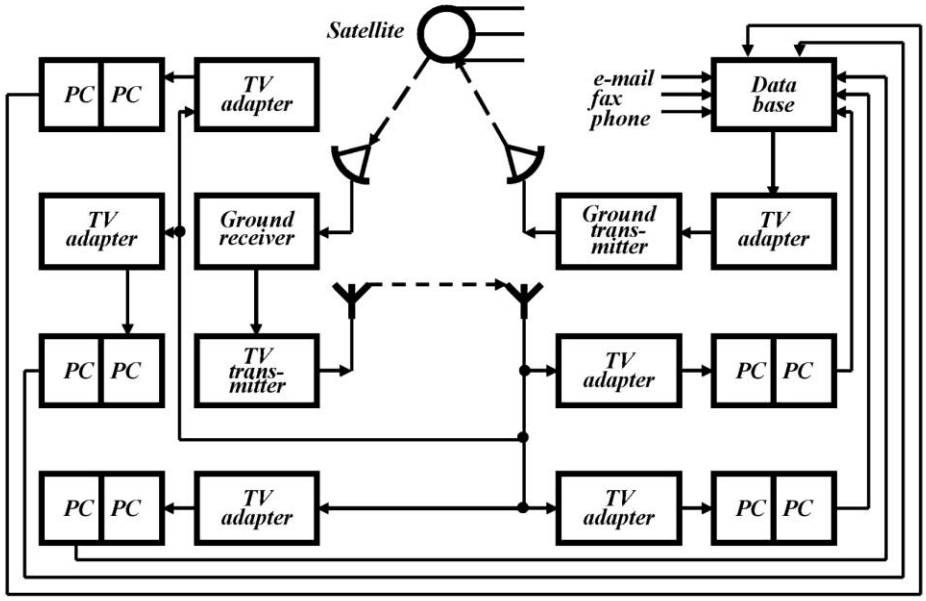

Figure 3: An example of the PC•net computer network with feedback and LAN

This is obviously accounted for by the fact that, since people live in a three-dimensional world, they can think with visual images and quite easily imagine two- or three-dimensional dependencies. In a more multidimensional space a human is not able to solve even the simplest tasks, for instance, to imagine a four-dimensional cube (also referred to as hypercube, tesseract, octachoron).

However, most events happening in real life – market processes, changes of weather, illnesses, biological processes (e.g., ageing), operation of complex scientific and technical systems, etc. – are the result of interaction of a much larger number (for example, thousands, and even more) of factors.

But for a computer the number of factors makes a qualitative, but not a quantitative difference. Therefore, it is able (or will be able) to successfully analyze even significantly multi-factor phenomena, especially taking into account that the corresponding mathematical tools and software already exist.

For this, the personal memory of a PC connected to the PC•net should have information which is complete enough, true and relevant to the problem under consideration. In order to

develop and render information support to such personal data bases, as well as for intellectual processing of this data, it is necessary to have the analytical service.

3.5. The educational service

Norbert Wiener, professor at Massachusetts Institute of Technology, discussing the possibility of computer thinking (Wiener, 1073), in particular, argued, that any informational machine, both a human and a computer, can become intellectual only gradually in the process of continuous education. Moreover, cognition and learning, being the elements of the integrated process of thinking, are inseparably linked and alternating, and in the case of people involved in creative labor, they go on simultaneously during their entire creative life.

Thus, not only thinking, but education, too, can be both usual and creative (Antonov, 2011d). Creative education currently exists, but it will be the more popular and efficient, the more computerized it is. In other words, there is pressing need to transform the educational process in the pair teacher/student into the educational process in the triad teacher/computer/ student.

For this type of education, it is necessary for students to choose and upload into their PCs via the PC•net (Fig. 1) or machine-readable medium:

- the necessary textbooks and tutorials;
- the materials of contests, competitions, student conferences, etc.;
- belles-lettres, encyclopedias, dictionaries;
- translation software, tutorial and other educational software;
- popular science literature, including periodicals;
- monographs, magazine publications, etc.

All electronic versions of textbooks and other tutorials must have a large number of hyperlinks, large sections of frequently asked questions. Moreover, the textbooks should have different levels of complexity adjusted for average students, gifted students, and even for retarded students. There should be electronic textbooks for schools offering advanced study of physics and mathematics, biology, cybernetics, philology, history, law and any other subject, as well as for classical schools, colleges, institutes, universities, academies, as well as for refresher and advanced training courses.

In other words, all individual peculiarities of students must be taken into consideration to create the best possible conditions for learning. The point is that all people have a different body of knowledge. Thus, people can learn well only the material which is based on the knowledge mastered earlier. The art of teaching lies in realizing this principle. Naturally, this principle is never fully implemented in the process of collective education. It is poorly realized during self-education (e.g., during distant learning). And, other conditions being equal, it is best of all realized in the process of individual education.

However, the best possible way of implementing this principle is self-education (distant as well) with the use of the above mentioned various tutorials having a large number of hyperlinks, large FAQ sections, a lot of illustrative matter (since people think with visual images), etc. With this comprehensive data base at hand, any student can, with the help of a teacher (or even on their own), get very good education.

4. Conclusions

Thus, the description of the new PC•net computer network suggested above allows concluding that:

- the numerous new services it offers will be demanded by the users doing serious work to an even greater degree than the services of the Internet, which are currently mostly used for entertainment;
- the turnover of the PC•net business is expected to be comparable to that of the Internet.
- It is evident that the PC•net services listed above can co-exist in it, in the same way as the services of e-mail, the world wide web and others co-exist in the Internet.

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