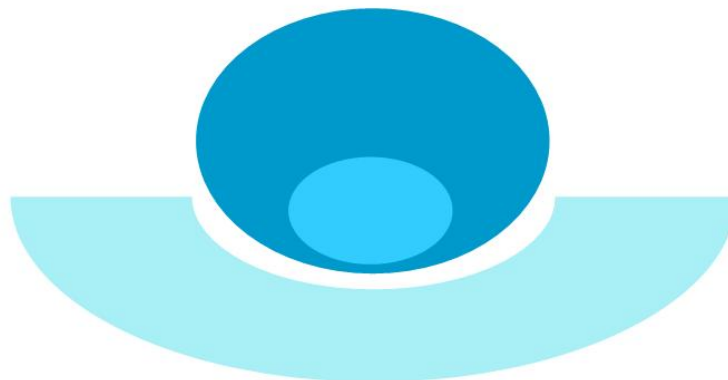




Heikki Mäkinen

Globalnet and Knowledge of Society



**Version 1.0
1.11.2005**

Knowledge of Society White Paper : 2

This Document is OBSOLETE since 1.8.2008



Heikki Mäkinen

Globalnet and Knowledge of Society

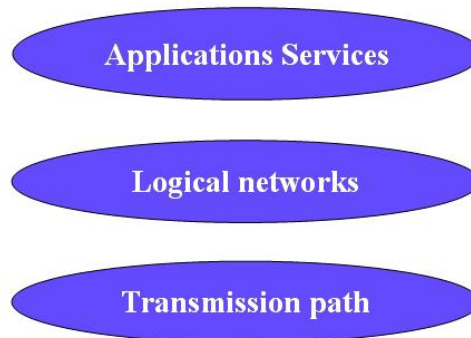
Internet – network inter networks – is an over thirty years old concept. Its success is not based on ‘Internet-technologies’, but on a coherent global communication infrastructure. In this infrastructure exists no principal difference between local area or wide area network and also no problematic of anything ‘inter’ networks. Neither technology used in network, its physical arrangements (cable or mobile) or material transmitted – is it data, voice, picture, motion picture or all these together - does not matter on principles of network’s functioning as a technical or social phenomenon. A social phenomenon network should be, if we want to talk about ‘network society’ (Castells, 2000) or ‘information society’.

The network we are involved with should rather been called **Globalnet**. It is quite different than Internet.

Service levels of global network

Network can be examined according to characteristics of services it offers to users. From this point of view network can be divided into three levels¹.

The Structure of Network



Network’s foundation is transmission path. It consists of physical structure of network and its management arrangements. This structure is global. It is managed by commercial operators. Totality as a whole is regulated by commercial principles. Its sociality is purely economical in same way as sociality of world economy.

¹ This model has a connection with the 7 layered OSI-model of communications network. Levels in this model are however not equivalent to any OSI-layer or a set of them. Here networks is examined from the point of view of network’s use, not its technical structure.



Transmission path's globality is anyhow quite different than globality of 'world market'. Latter is based on transferability of production factors - primarily of financial capital - and commodities. Transmission path is a concurrent and coherent global system which can be delivered and used concurrently irrespectively of spatial extent. Nodes and services situated in transmission path can be reached everywhere. Information and knowledge are not necessarily 'transferred' for to be available in different places and different times. Technically information exists as cells in parallel virtual paths or virtual channels or as packets in label switched paths. It is 'tranferred' any how but this transmission is not spatiotemporal in a socially meaningful way.

Transmission path's globality is also quite different from globality of 'network inter networks'. The latter is more like globality of 'world market'; constitutes of separate parts between which information should be transferred. If there is a spatiotemporal connection where information is transferred, it is quite different from above specified common global information, knowledge or communications network. - Internet as a communications concept of course uses the same transmission path as its infrastructure.

The second level of network is its logical network structures. They constitute of set of nodes and communication connections situated in transmission path and defined as working totalities by a common information security and quality policy. Policies are defined in different levels of trust required by the processes network should serve. As a part, or view, of transmission path, logical networks are not spatiotemporal entities but defined by common security politics; they are devoted to the special aims of an organisation, several organisations or public service. Logical network is a social construction which can be global in connecting several places but not as a concurrent and coherent global system – like transmission path.

Technically it does not matter how logical network is accomplished. It can be implementation of local area network technologies as well as a set of virtual circuits realised by ATM or MPLS- technologies between spatially distant nodes or even an ad hoc network built by nodes identified by PKI².

The third level of network is service level. It is constituted by general network services or applications utilizing them. In principle it is global totality. At this level every information asset in network can be accessed by any node or user in network. But services are regulated according to information security policies of network partners constituting logical networks.

Network services can be divided into general services, as for example directory and certification, network management used by all the other services and application services as message handling, file transfer, transaction processing and general database services, interactive services or www-services. These are all global. General elements of these services are same regardless of logical network, node or user utilizing them.

² ATM – Asynchronous Transfer Mode, basic network technology based on virtual circuits, MPLS – Multiprotocol Label Switching, technology for establishing virtual circuits on dynamically routing networks, for example in IP-network (www.mfaforum.org). PKI – Public Key Infrastructure, encryption technology based on combination of private and public key, basic technology in identification, authentication and non-repudiation.



By services it is possible to globally connect network partners acting according to their own information security policies in their own logical networks and arrange access on their knowledge resources according to these information security policies. Information and knowledge can be accessed, delivered and utilized in a concurrent and coherent environment.

Applications created for specified purposes and utilizing general communications services are constructed by same principles regardless of network they serve. Application can be intended for restricted set of nodes or users but the principles utilized in encountering risks and creating trust are same irrespectively of networks extent or its user groups.

Communications network has a close connection with the concept of globalisation. But, as seen, it makes necessary to talk about globalisation in two meanings. It is obvious that formation of global transmission path means a quantum leap in development of communications network: first time in history we have network which has same coherent, concurrent and global structure as information and knowledge. That is why we should talk about a new phase of globalisation which I shall call **genuine globalisation** in contradistinction to **pre-globalisation** of transferable factors of production and information.

Quality of Service, Service level

Quality of Service (QoS) is a central concept defining characteristics of communication network.

It is technically defined as characteristics where

1. bandwidth is guaranteed for an application under various circumstances, including congestion and failures,
2. an application flow traversing the network, must receive the appropriate class-based treatment, including scheduling and packet discarding (MPLS and Frame Relay Alliance, 2003; IETF RFC 2475, IETF RFC 3270)

These requirements are possible to meet at the transmission path. But when it is discussed about the upper levels of communications services there are no exact measures of QoS. Requirements must be based on risk analysis (security) or service level analysis (availability) which are quite indeterminate factors.

In general case essential quality factors for network's service level are at least:

- throughput and speed of communications traffic,
- scalability of communication,
- quality of availability of service,
- network management,
- security as confidentiality and integrity.



Network's every customer service has its specific requirements for service level. This is rather a continuum. According to service level it is possible to define different network concepts which are reasonable and relevant in Globalnet.

In every case there must be a minimum level of service which is at least required for communications. From the security point of view it must include at least certain cryptographic techniques to protect flowing information, treatment of malicious software (f. ex. viruses), firewalls and information security service for identification of network entities (IETF, RFC 3631). This is a Zero-Level security service. Network which fulfils this level is called Internet.

General technical solutions for network's information security exist only at this Zero-Level. But they exist any how. The service must function. This is the content of Zero-Level security. But in Globalnet there must exist quite more requirements.

It is however always a question of circumstances what is necessary or meaningful to implement. Security is relative to balance between acceptable risk and trust required by people involved with the activity in question. That is why general security solutions exist only on circumstances of 'no-trust' required.

The attempts for general security solutions in global network are usually based on cryptography and Public Key Infrastructure. The other aim is to form a 'trusted path' of communications where information can be transmitted virtually 'isolated' from other transmissions and, so supposed, 'safely'. The standard of information security evaluation – new version CommonCriteria 3.0 instead of the former version ISO15408 - considers neither cryptography nor 'trusted path' as security functional requirements. The former is understood as a means by which security solutions are constructed and the latter as a functionality which must be realised by essential security requirements. The central aim of network security is to form a binding between peer entities of network, human beings, services or nodes. In this binding peer entities must have identification, authentication and non-repudiation. These solutions are specified by distinctive features of nodes, services or users.

The question of quality of service or information security afforded by network is a commercial question too. The price of service must be specified according to quality and security afforded. It should also be specified from volume of use.

Internet

As said, Internet as a communications concept uses the transmission path earlier defined as its infrastructure. But it is not 'network' in the sense here discussed. It is rather a service concept using network.

In its early years Internet was really a network which connected separate IP-networks; it was 'Network Inter Networks'. This kind of characteristics has no meaning in modern communications.



Network's general service level is analogous to Internet's central idea: every information asset should be possible to reach everywhere. This general principle is relevant and important in all communications services.

In concept like Internet this access is arranged with zero service level or zero security level. This is quite reasonable, if it is payed a part of network only for presence in network and not yet any special 'network-commodity', service using network. If activity however presupposes a product which satisfies some needs of customers, has a 'use-value' as classical economics said, this kind of service or security level is not enough. They must be specified.

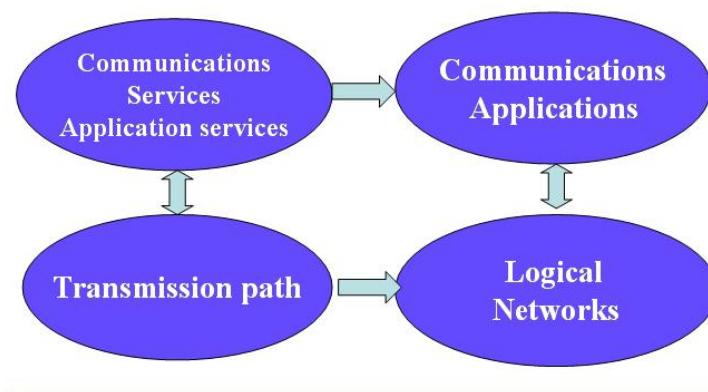
If the aim of networking is to form sociality, a societal or economic process, it cannot be based on a concept like this. That is why Internet cannot be basis of 'information society' but only basis of risk society where risks are not - and cannot be - defined by their probability and consequences (Mäkinen, 2005a, Mäkinen, 2005b).

Process network environments

In a sense transmission path and service levels are socially chaotic. It does not mean that there is no management in these network levels, but they have no specific societal structure. General elements of transmission path and communications services are possible to offer and utilize regardless of specific requirements of user. If these entities are not specified as commodities, there is not even an economic regulation of network, or 'economic sociality' which is typical to capitalistic market (Mäkinen, 1993).

Logical networks or applications created according to special purposes of network users are however not chaotic. We can divide the services level into two parts in the same way as physical network. This can be presented as follows.

The Structure of Network



Logical networks can be presented as a view of transmission path and communications applications as a view of general communications services. They have a specified social structure.



Information as general social resource has its developing environment in global network. In this way it is also chaotic. This is represented in practice by huge amount of information, information overload, misinformation and disinformation (Lash, 2002, Mäkinen, 2005b). But information realised in social processes in organisations and between them, has a special social meaning. It is knowledge. Knowledge cannot be disinformation or misinformation or include them.

General framework of process environments is rather simple and obvious. There are environments of organisation, between two or several organisations which have an agreement about co-operation and finally a public environment (ECMA-271). These environments however differ remarkably from each other in accordance with security and quality policies practised in them. They are different as risk management environments, by security objectives and even from the point of view of technical security solutions required (Mäkinen, 2005a).

The word 'public' needs a little contemplation. It does not mean 'governmental' or anything else with is connected with nation state. In global network government or nation states have no special social status. 'Public' is a system where it is not possible beforehand to decide who are the participants of the process. In public environment anyone – users, node or service – can be participant of the process.

The central question of environment's functioning in a socially meaningful way is how binding in environment is constituted, how participants are identified, authenticated and non-repudiation of their activities is guaranteed. These are factors which make possible the settling of social action in extensive space and time – connecting or 'disembedding' (Giddens, 1990) factors.

In general case disembedding factors are symbolic tokens, as money, and systems based on expertise (Giddens, 1990, Mäkinen, 2005a, 2005b). Money is surely this kind of factor in networks too, but it can function only if there is a real product which can be marketed. Product cannot be 'part in a chaotic network' but it must have a specific service level, quality and security of service, which it meets.

Logical network is a binding in the sense defined. As such it is only a technical binding without specific social content. The latter presupposes also services for processes' knowledge content. This content is information security which the process requires as balance between risk and trust connected with the process and network environments. Logical network is means to form environment where processes reside but process environments must include all levels of networking.

Information society service

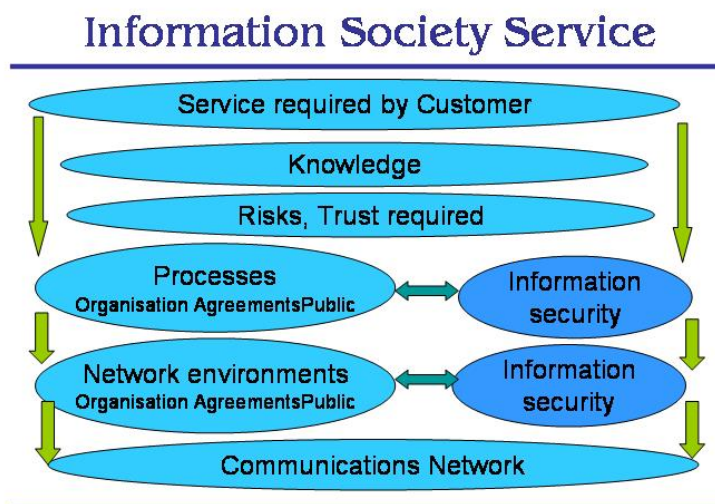
In global environment sociality is not bounded with nation state – although it of course can be national (Beck, 2000, especially 23 -26). Sociality is build upon information society services which are both administrative and economic. It depends on security which is a balance between acceptable risk and trust.



Information society services are global in the sense that they are independent of space and relatively independent also of time. It is not important what the distance between participants of the service is. Information society services are not dependent on extent of network. The latter is important only in pre-globalisation.

But information society service of course has its spatiotemporal dimensions. These are processes and network environments which maintain this service.

Information society service can be described as follows.



Foundation of service is global network. Above it are established network environments and processes required with the specific information security arrangements. This presupposes information security management systems of processes and organisations. Same principles must be applied in relationships between organisations, are these relationships based on agreement or public.

Network connection is an integral part of organisation's processes. Service which customer requires, is based on meaningful knowledge of society about the service, its processes and environments. The quality or type of service does not matter in this context. But its social functioning presupposes balance between acceptable risk and trust. Information society services are based on social structures where information is knowledge, socially meaningful.

Literature:

Beck, Ulrich: What Is Globalization? Polity Press, 2000

Castells, Manuel: The Rise of the Network Society. Blackwell Publishers, (Second edition) 2000

Common Criteria for Information Security Evaluation, Version 3.0, Revision 2, (June 2005)

(www.commoncriteriaportal.org)

ECMA, European Computer Manufacturers Association: Extended Commercially Oriented Functionality Class for Security Evaluation, ECMA-271, 1997 (www.ecma-international.org)

Giddens, Anthony: The Consequences of Modernity. Polity Press, 1990



- IETF, Internet Engineering Task Force, RFC, 2475: An Architecture for Differentiated Services, (www.ietf.cnri.reston.va.us)
- IETF, Internet Engineering Task Force, RFC 3031: Multiprotocol Label Switching Architecture
- IETF, Internet Engineering Task Force, RFC 3270: Multi-Protocol Label Switching (MPLS) Support of Differentiated Services
- IETF, Internet Engineering Task Force, RFC 3631: Security Mechanisms for the Internet
- ISO/IEC, International Standardisation organisation, Standard 15408: Evaluation Criteria of Information Security, (www.commoncriteriaportal.org)
- Lash, Scott: Critique of Information. SAGE Publications, 2002
- MPLS and Frame Relay Alliance: QoS Support in MPLS Networks, White Paper, May 2003, By: Victoria Fineberg, <http://www.mfaforum.org/tech/MPLSQOSWPMay2003.pdf> (7.10.2005)
- Mäkinen, Heikki: Yhteiskunnan tieto (Knowledge of Society). Acta Universitatis Tamperensis ser A vol 381, Tampereen yliopisto, Tampere 1993
- Mäkinen, Heikki: Yhteiskunnan tiedon turvallisuus (Knowledge of Society: Security), 2005, (2005a), www.yhteiskunnantieto.fi,
- Mäkinen, Heikki: Risk, Trust and Security, 2005, (2005b), www.yhteiskunnantieto.fi