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## **Finnet Matrix Challenges Internet Trunk Network**

It its' present form, the Internet is structurally incapable of handling the profilation of high bandwidth applications and services. IPTV and many other advanced services require consistent high bandwidths, as the total capacity requirements increase a hundredfold. The national goal of a hundred megabit connection in every home will demand major restructuring of the net.

According to a recent study by VTT Technical Research Center of Finland, the challenges of IPTV cannot be met by simply increasing bandwidths in the trunk network – major reforms of network structures and functionalities are required. The network operators in the Finnet-led Supermatrix-project are endeavouring to meet these challenges by creatively applying the latest technologies together with recycled ideas from the Internet's originators.

For reasons of US national security, Internet was designed to a model of distributed control: loosing any node or even several nodes would not paralyze the network. Since those days, the network has evolved into a direction of greater vulnerability. The originators of the Internet didn't foresee the subdivision of the traffic into networks of many different operators. Gateways created for bridging these operator networks have turned into vulnerable bottlenecks of the net.

The Finnet-operators are well on their way to building a new kind of Internet. "Many types of new applications are feasible only in a network where high bandwidth, low lag connections can be guaranteed", says Mr **Risto Linturi**, the chairman of the board of directors of Finnet Association and Chairman of the Delegation of the Supermatrix Project. "We are creating a platform for these applications by turning network hierarchies into more efficient and fault tolerant matrix structures."

"The practicalities of the Internet trunk network have made it impossible to provide applications with connections of guaranteed bandwidth and quality of service. Internet's hierarchical structure squeezes traffic. A set of new standards and technologies is now enabling a matrix-structured network without bottlenecks", says Mr **Timo Simula** from Supermatrix Project. "The most important of these is Multiprotocol Label Switching (MPLS). It can be used to create point-to-point shortcut tunnels of guaranteed bandwidth."

"The nature of using the Internet is changing", Timo Simula says. "IPTV is the fastest growing Internet application. The audience is moving away from watching broadcasts into watching programs in their own time and pace. According to the VTT study, a thousand simultaneous HDTV watchers can be enough to clog the national trunk network. The demand is however many thousandfold."

"These reforms are also important to the Finnish national security", says Mr **Tero Kauppinen**, the CEO of Finnet Association. "Internet was originally designed to be a nuclear war proof network of US defence and research institutions. In its' present form, it is even vulnerable to technical malfunctions in some key nodes. Complete replacement of the trunk network with matrix structures solves this problem, because there is no dependence on critical centralized system components."

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