

Virtual Silk Highway

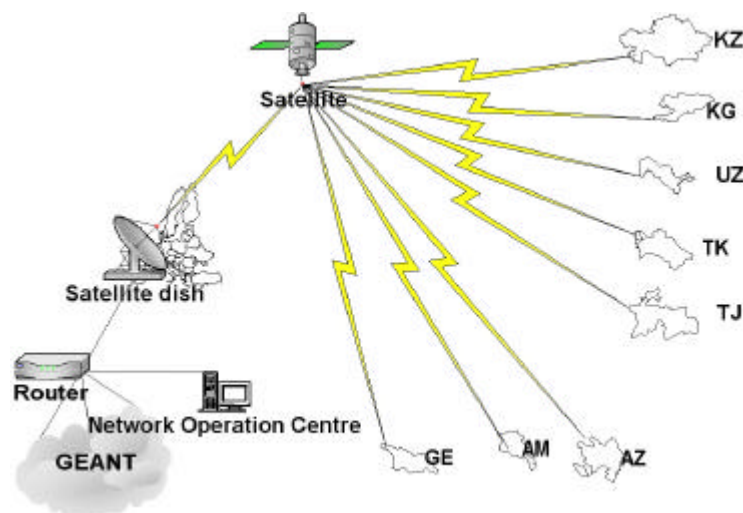
to: Silk community
from: Robert Janz
subject: Virtual Silk Highway Project, status August 2002
date: August 19, 2002
cc: Walter Kaffenberger, NATO

Project description

The SILK Project is a computer networking project; it is designed specifically to facilitate the exchange of information between academic and educational institutions in the Caucasus and Central Asia with peers in the rest of the world by providing basic and reliable Internet connectivity. The project was approved on 29 October 2001 at the Autumn NATO Science Committee meeting in Georgia and subsequently launched by the Science Committee's Advisory Panel on Computer Networking. Each of the eight participating countries will receive state-of-the-art satellite technology, linking them to the Internet and creating a modern information network – the SILK Network - which is forecasted to be fully operational by the end of 2002.

The whole Silk initiative covers the installation of the necessary technical infrastructure (the actual Silk project) as well as support for setting up NRENs (National Research and Education Networking organizations) in a related project ('SPONGE'; see below).

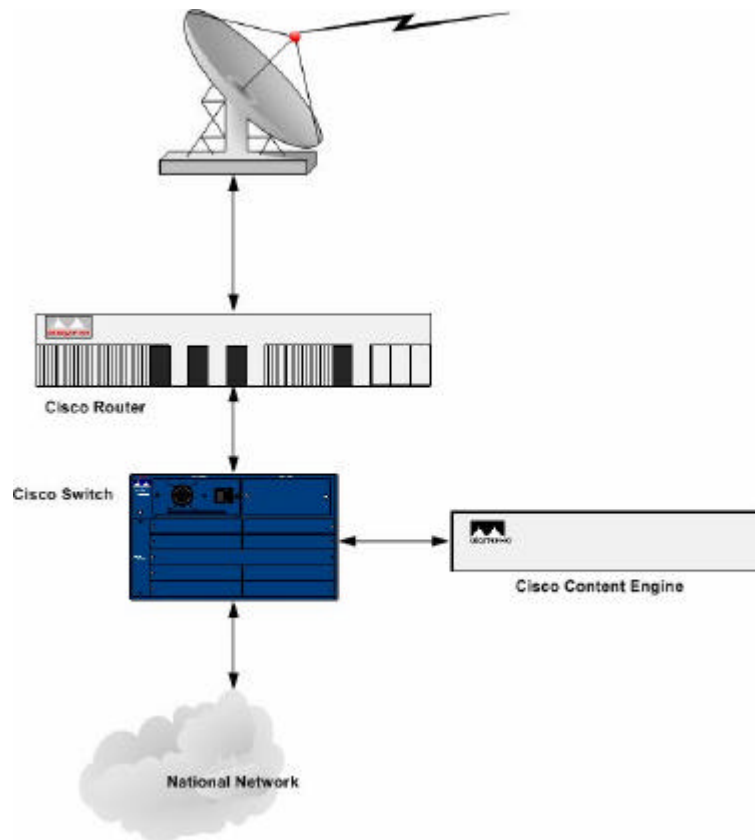
The SILK Network configuration consists of satellite dishes and network equipment in each of the eight participating countries, a central distribution point (hub) with a dish and network equipment in Western Europe, a contract with a satellite vendor and Internet access. A common satellite beam will connect the academic and educational communities of the eight participating countries to the Internet.



The European node is situated at the DESY ('Deutsches Elektronen-Synchrotron') institute in Hamburg where the central dish is installed and the connection to the Internet is established (through the German NREN DFN). The technical support of the infrastructure is also coordinated from DESY.

The satellite connection is provided by EurasiaSat (a Turkish/French company) on EurasiaSat-1/TurkSat-2A and the technology used is Digital Video Broadcasting (DVB).

In each of the eight countries connectivity equipment is being installed enabling the national research network to connect to the Internet through the infrastructure described above. A simplified overview of the configuration is as follows:



The network equipment consists of a satellite dish, a router and a switch for the national connections. At first the configuration has a maximum capacity of 50 Mbps that, if necessary, can be upgraded to 100 Mbps.

In addition to the networking equipment that is necessary for the Internet connection a Content Engine is part of the configuration. With this caching device the Internet connection can be used more efficiently in circumstances where several people try to download the same information, e.g. in education environments.

The Silk Project, as approved by NATO, requires a budget of \$ 3,400,000 and will provide basic Internet connectivity until the beginning of 2005. The budget for satellite connectivity is \$ 1,500,000 (44%) and \$ 800,000 (23%) for operational costs. The remaining budget is necessary for investments in the central European node, \$ 450,000 (14%) and the eight local nodes, \$ 650,000 (19%). The budget for connectivity allows the countries to be first connected at a bandwidth of approximately 1 Mbps per country and to grow to 3 Mbps at the end of the project period.

In parallel to the Silk Project, the University College London (England), The University of Groningen (The Netherlands) and the NRENs of Georgia (GRENA) and Armenia (ARENA) have successfully applied for an EU grant to manage the Silk Project and support the establishment of NRENs in the eight countries. This so called SPONGE (Silk Project Operations Networking and GEANT Extension) project is still in its initial phase and will be mainly devoted to strengthening the non-technical organizational structure that will be necessary to reach the desired level of sustainability. The objectives of SPONGE are the management of the Silk project, liaisons with other donor agencies,

knowledge dissemination, monitoring and the introduction of IT based communication techniques (VoIP, video, etc.).

The Silk Project as defined above will provide the technical infrastructure for Internet connectivity for research and education in the eight participating countries. Together with the SPONGE project sustainable network organizations will be established. The Silk Project does not provide manpower for the local management of the technical infrastructure and it does not concern itself with content that makes use of the infrastructure.

Description of Current Situation

The main target areas of the new initiative are the Caucasus with the countries Armenia, Azerbaijan and Georgia and Central Asia with the countries Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan. As said the central node is situated in Hamburg (Germany) at the DESY institute.

At this moment (August 19, 2002) the central node has been installed and is operational (including the Internet connectivity through DFN). The satellite link has been tested (DESY/satellite/DESY connectivity). The local node configuration has been tested in combination with the setup at DESY. These tests have been successfully concluded and the participating countries have been notified that they may receive the equipment after meeting several conditions that have been stipulated. The conditions to be met are:

- there is an existing NREN that represents a substantial portion of the academic and educational community,
- the NREN has formulated an Acceptable Use Policy (AUP) that has the approval of the Silk Board (the organization structure governing the project)
- the NREN has the necessary licenses for the operation of the Silk dish,
- the NREN has the technical staff that is necessary for the management of the local installation.

The situation regarding the NRENs differs per country and depends on historical issues (how the first academic networking initiative evolved), local regulations regarding the legal entity that is being set up and the involvement of NGOs. For years Uzbekistan has had an active technical group managing the Internet connectivity (UzSciNet) and is now in the process of setting up a legal entity for the government of the infrastructure. Kazakhstan is quite new in the field of academic networking and has started with the establishment of an NREN (KAZRENA), to be followed by the installation of network connectivity within the city of Almaty. Tajikistan has established its NREN (TARENA) nearly two years ago, but has only recently been able to receive the necessary licenses for Internet connectivity. Kyrgyz Republic has a network organization for Research and Education (AKNET) that provides services free of charge for the academic community and asks fees for governmental users (the Silk infrastructure will only be used by the non-paying academic community). Turkmenistan is in the process of establishing its NREN, already has the necessary license but has a very poor metropolitan infrastructure. In the Caucasus, Georgia set up GRENA already in 1999, Armenia followed with ARENA in 2000, while in Azerbaijan two organizations are still competing: AzRENA and AzNet. In each of the countries NGOs (and NATO through its Advanced Networking Workshops) are assisting the academic community with advise and training involved in organizational and technical issues related to the NRENs.

Starting August 14, the shipment of equipment to the eight countries has commenced. A time slot two weeks is allocated for the installation or the local node and acceptance, so that the whole installation procedure will take up the next two months. Uzbekistan is

being installed as first country, to be followed by Georgia. The next batch consists of Turkmenistan, Kyrgyz Republic, Kazakhstan and Armenia that should be connected by the end of October. Azerbaijan and Tajikistan will follow as last countries. As all the technical tests were successful and there are positive signals from the various countries regarding the conditions that have to be met, we do not foresee any delays of this implementation schedule.

	NREN exists?	AUP accepted?	License obtained?	NREN staff Acceptable?
Kazakhstan	Yes	Not yet submitted	No - no problems expected	Not yet
Uzbekistan	Nearly	Not yet submitted	Yes, temporarily	Yes
Kyrgyz Republic	Yes	Yes	Yes	Yes
Tajikistan	Yes	Not yet submitted	Yes	No
Turkmenistan	No	Not yet submitted	Yes	??
Armenia	Yes	Yes	Yes	Yes
Georgia	Yes	Yes	Yes	Yes
Azerbaijan	Yes, two!	Not yet submitted	No	??