**2.3 NOAA/NWS Telecommunication Gateway – Dick Zitzmann**

**2.3.1 Computer Systems**

There are a half dozen operating units within the NWSTG. At the center, functionally, and connected to all others is the "Gateway." Among its various switching functions, the Gateway fulfills the principal switching role of the Regional Telecommunication Hub (Region 4).

In recent years the Gateway has been migrating to an architecture described as a network centric, distributed client/server concept. In the present implementation phase, the switching software that has been used in the existing HDS 9060 computers is being moved to new IBM 9672 computers. Additionally, application codes are being reprogrammed in "C" language and moved to processors distributed on the backbone Local Area Network (FDDI LAN. Internal NWSTG systems will be protected by firewalls. Servers providing public access and other special purpose processors will reside on an Ethernet backbone LAN with Internet and other special external access points.

The new architecture will offer a number of advantages, including much greater processing capacity and more flexibility for future growth. To illustrate the first point: there are three existing HDS 9060 computers today, two for operations and one for backup. Each provides a nominal 11 million instructions per second (MIPS); today, they switch about 3.5 Gbps of data per day. There will be three replacement IBM 9672 computers as well. Each has a nominal processing power of about 53 MIPS. At this writing, the switching operating software that had been running in two of the HDS 9060s is now running operationally in two partitions of a single IBM 9672. The second and third new computers will be delivered later this summer, and the main switching function will be in its final operational configuration by next year. Also in 1998, data basing capabilities will be enhanced substantially, the new distributed processors will be implemented on the backbone LANs, and the full architecture made operational for an expected large increase in data in 1999 associated with the NWS modernization.

Of note is the fact that the link between the Gateway and the NCEP Operations Center in Suitland, Maryland was changed significantly in recent months. Previously, i.e., since the NWSTG moved to Silver Spring in 1992, data between the NCEP and OSO centers were exchanged using dual parallel point-to-point T-1 links that terminated in front-end processors at NCEP. This spring, when NCEP completed its process of converting software from its front-end computers to run directly on the Cray, a new 10 Mbps fiber network service (FNS) was implemented among the centers of OSO, NCEP, and NESDIS (SOCC). Products from the Cray are now pulled via TCP/IP File Transfer Protocol. By 1999, it is very likely that the new FNS will be replaced with an even higher capacity facility. Various alternatives are under consideration at this time, including 100 Mbps FDDI, and various alternative capacities of ATM (Asynchronous Transfer Mode).

**2.3.2 Link to Bracknell**

The links between the NWSTG and Bracknell are essentially the same as they have been for several years. The 64 Kbps capacity is multiplexed to provide four different circuits: a 9.6 Kbps SDLC-operated circuit and a 19.2 Kbps "experimental data" TCP/IP circuit for NESDIS, a 19.2 Kbps X.25-operated GTS circuit and a 4.8 Kbps T-4 FAX circuit into the Gateway computers. The two circuits going to NESDIS actually bypass the Gateway computers, and come to Silver Spring only to share the total available 64 Kbps capacity of the link via the terminating multiplexing equipment.

The 19.2 Kbps GTS circuit is of greatest concern because of the heavy volume of gridded products that it has carried the last couple of years. (Three bar charts in the appendix show the typical daily traffic volume.) Two years ago, the U.K. and the U.S.A. representatives developed a plan that would have migrated the GTS traffic to a full 64 Kbps TCP/IP circuit. Although some aspects of the plan were accomplished, the configuration has not been implemented as of this date. At this point, increasing the capacity of the GTS circuit above 19.2 Kbps will not be helpful because of current processing limitations of the Bracknell switch. However, the capacity of the switch is expected to be increased significantly by the end of this year.

As a consequence, the U.K. and U.S.A. centers are in the process of developing a revised plan for upgrading the link. Certain technical issues have been resolved by both centers in the last couple of years. For instance, both have operating links in which X.25 and TCP/IP are combined. In the case of the NWSTG, the Gateway link to Dorval, Canada, involves X.25 protocol above IP; and, in the case of the Gateway link to Tokyo, SOC has arranged for TCP/IP data intended for Melbourne, Australia, to travel over the X.25 link with Tokyo. The U.S.A. and U.K. centers also have implemented ISDN as a dial backup for the full bandwidth of the link when problems develop with the primary link. Previously, only 9.6 Kbps was available on a dial-up basis. Finally, when the NWS recompeted the communications facilities that include the link with Bracknell, an option was negotiated in the contract which would permit the bandwidth of the link to be doubled if needed at a predetermined cost.

**2.3.3 Other Links**

Increasingly, Internet is becoming a major factor in Gateway operations. The NWS Homepage and WWW server are maintained at the Gateway; in addition, there is an anonymous FTP server that is open to public access via Internet. Together, the two servers handle about 13 Gbytes of data on a typical day. When the high volume of traffic through the restricted-access Gateway server is considered as well, it is apparent that the distributed-network, FTP/IP, traffic of the evolving Gateway is already several times greater than the conventionally switched data through the main Gateway switch. This trend is not likely to change. Indeed, NCEP and OSO recently agreed that all operational traffic on the NCEP file server will be moved to OSO servers in the near future. From all appearances, Internet is becoming increasingly popular with users for the receipt of meteorological data. Nevertheless, Gateway users are always cautioned to plan to access Gateway servers or the main switch via dedicated transmission links and not over the shared, public Internet if timely and secure delivery of data are operational requirements. And special precautions are taken in the Gateway directory to ensure that data described as "additional" under provisions of WMO Resolution 40 are not stored on the Internet server.