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by

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Abstract

This paper describes the System Development Network (SDN), the R&D computer networks in the Republic of Korea. The SDN started with two nodes in 1982 and the number of nodes has been increased to eight. So is variety of services such as the name server and netnews. Management structure is defined, and the future development plan is stated.

1. Introduction

SDN is the research & development computer networks for universities, research institutes and industry in the Republic of Korea. Started with two nodes in 1982, System Development Network (SDN) is in its third year now. Numbers of organizations and computers are gradually increasing. At first, the services provided was the file transfer, the mail transfer and the virtual terminal services, and the various services have been added such as the SDN Name Server [15] and netnews [13]. New services such as dialup link for domestic and international connections have been installed. Preliminary meetings were held since early 1983 until Oct. 1983 when the organization structure of SDN was defined. Section 2 describes the architecture of SDN, and Section 3 addresses the organization of SDN management. Section 4 describes the services provided. Future plans of SDN are explained in Section 5.

2. Networks

Among multiple networks in SDN, the leased line network based on TCP/IP is the backbone network for SDN [6,16,17]. It provides the file transfer, the mail transfer, and the virtual terminal services, and the most nodes are connected in this way where 1200 bps is supported for both intra- and intercity-traffics. The speed may be increased to 2400 bps or more later. The domestic dialup network similar to Usenet [3,11,12] and Phone Net [22] is being formed now. Many isolated organizations may have only dialup facility. They may use it rather than the leased line due to its high cost. The international dialup link to Usenet started in 1983.

2.1 Leased line Network [10,16,17,23]

The leased line network was the beginning point of SDN which started with two nodes in late 1982. The software systems are based on TCP/IP. Currently, eight organizations have been connected, and the number of organizations is expected to increase to more than 10 in 1984-1985. The number of computers may increase much more than the number of organizations due to multiple computers within the organizations. See Fig.1 for the current configuration. Currently, only the UNIX-based computers are connected. Other computers such as VAX/VMS, IBM/VM and HP may be added later.

2.2 Dialup Network [2,11,12,13,18,22]

The dialup network is now available in SDN. Currently, three organizations have the dialup facility, and we expect more nodes to join later. See Fig. 2 for the configuration.

The 1200 bps lines are supported now and the 2400 bps lines may be supported later. The software is based on uucp and netnews [5,13]. The international connection to USENET/EUNET, started in 1983 initially as offline service, was converted to online in Nov. 1983.

The dialup network offers the mail transfer, the file transfer, and the netnews. We subscribe to several news online with others offline by magnetic tape. We plan to connect to other countries in Asia starting with Japan in 1984 [4].

2.3 Local Area Networks [6]

The mail transfer of the dialup network will be integrated to that of the leased line network later. Some of the participating organizations are converting from a single computer to multiple computers connected by local area networks. The minimal gateway service is being developed to connect the local area networks to SDN.

3. Organizations

The SDN management structure is as follows :

- (1) SDN Overseeing Committee (SOC)
  - SDN Overseeing Committee (SOC) meets twice a year for the decision making. SOC functions as the board of directors where all participating organizations send a delegate. SOC is headed by Professor C.S. Kim of Seoul National University (SNU).

- (2) SDN Management Committee (SMC)
  - SDN Management Committee (SMC) meets monthly. There are five members headed by Professor K. Chon of Korea Advanced Institute of Science and Technology [KAIST]. SMC handles day-to-day operation and reports to SDN Overseeing Committee for approval.

- (3) SDN Network Management Center (NMC)
  - SDN Network Management Center (NMC) handles overall network management and documentation. NMC reports to SMC. NMC publishes SDN Report and SDN Newsletter.

- (4) Technical Committee (TC)
  - There are several technical committees. More committees may be added as needed. They report to SMC. The technical committees are as follows :

- (a) VAX/UNIX
- (b) PDP/UNIX
- (c) Z8000
- (d) Data Communications
- (e) General

4. SDN Services

SDN offers various services in addition to the file transfer, the mail transfer, the virtual terminal, and the netnews. The two most prominent services are

- (1) Network Management Center, and
- (2) SDN Name Server.

SDN Network Management Center handles monitoring of day-to-day operation and coordination among organizations. It also publishes the necessary documents such as reports and newsletters to keep SDN members up to date[19]. The center is located at KAIST.

SDN Network Management Center  
Dept. of Computer Science  
KAIST, PO Box 150 Chongryang, Seoul, Republic of Korea

CHON, Kilnam	knchon at kaist
XIM, Yoon Hwan	yoonkim at kaist
Voice Phone	+81-2-967-6811 X3744, 4714
Dialup (uucp)	+81-2-213-5793
Dialup (terminal)	+81-2-965-8861

SDN Name Server keeps the directory for SDN members. It may route a message later. See [15] for more information. It provides the interactive services via virtual terminal and the batch services via the file transfer or the mail transfer.

#### 5. Future Plans

- The following subjects are some of our ongoing or future plans:
  - (a) Hangul (Korean Language) Mail [5,21]  
The Hangul Mail is being developed and the R&D prototype is ready now. There are several problems to overcome. Some of them are as follows:
    - (1) Standard hangul code for data communication networks
    - (2) Standard hangul CRT terminal requirement
    - (3) Interface to hangul editors and word processing systems
  - (b) Integrated Mail  
There are two kinds of mail services now. One is based on uucp, and the other is based on TCP/IP. Another mail system based on MUDF is expected in 1984, too[22]. Since some sites have only dialup or leased line facility, it is necessary to have proper interface to deliver mails across mail systems.
  - (c) Bilingual Mail  
Bilingual mail may be needed to serve users more effectively[7]. This requires the bilingual mail software with limited language translation capability.
  - (d) Integrated Network  
Various networks may be integrated like Integrated Services Data Network. We have the leased line, dialup-data, dialup-image, and other networks in SDN[6] now.
  - (e) Local Area Network  
Many organizations are developing local area networks now. They require gateways to connect to SDN or other computer networks[14]. This may lead to a gateway network. The local area network having hierarchical architecture may be installed in 1984.
  - (f) X.25 Interface  
X.25 sites cannot access to SDN now. Similar effort to that of

Purdue University may be needed to have the interface at the network transport layers[9].

#### (g) International Links

Currently, we have the dialup link to USENET and EUNET. We would like to extend the international links in two areas ;

- (1) CSNET  
This link may be done along UK, Norway, Australia and Israel in 1984[9].

#### (2) Asian Network

Japan may join USENET through SDN in 1984[4]. Other Asian countries may link to these networks later[5]. This may lead to establishment of the Asian computer network.

#### (h) Satellite Networks

Satellites offer unique opportunity to link various computers and networks. They can offer high speed, broadcasting links. Both a domestic network and an international network based on the satellite should be considered.

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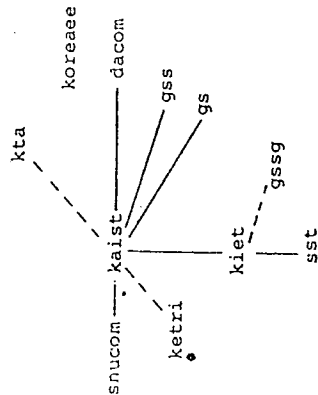


Fig. 1 Leased Line Network of SDN

— : Connected (1984. 1)  
 - - - - - : expected (1984)

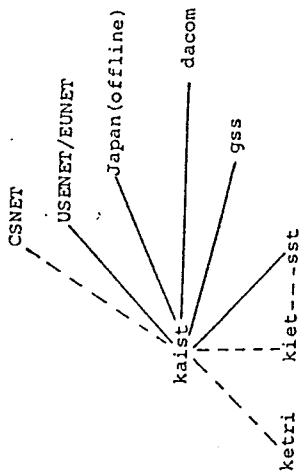


Fig. 2 Dialup-Data Network of SDN

— : Connected (1984. 1)  
 - - - - - : Expected (1984)

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