

YES, *in TIFR* we can

# YES, *in TIFR* we can :

## The Saga of Global E-Mail Connectivity in India

*Rajiv V. Gavai*

*T. I. F. R.*

*Mumbai*

Three decades ago, the era of global email connectivity began in India from TIFR. Funding was a lot more scarce then, and scepticism about utility of such a connectivity was in plenty. Some "Young Turks" from TIFR made a difference, and got it rolling. It could only happen *in TIFR*, and our system still can do it again, if required.

# A Spark

# A Spark



narendra modi rajiv gavai



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**LIVE news updates: Modi speaks with Trump over phone, discusses ...**

**National Herald** - 22 hours ago

**PM Modi** said that “extreme rhetoric and incitement to anti-India .... NSA Ajit Doval, Home Secretary **Rajiv** Gauba and senior ..... A bench comprising justices Arun Mishra, MR Shah and BR **Gavai** will deliver the judgment.



**Latest News: 5 Held for Thrashing Man to Death in Delhi**

**The Quint** - 8 hours ago

A bench comprising justices Arun Mishra, MR Shah and BR **Gavai** will .... The Ministry added, “Prime Minister **Narendra Modi** will be on State Visit to ..... the memorial of **Rajiv** Gandhi in the early morning on August 20, the birth ...



**Did Modi own, buy digital camera costing Rs 7 lakh in 1987-88, also ...**

**COUNTERVIEW** - 14-May-2019

**Rajiv Gavai**, professor of the Theoretical Physics Department, Tata ..... has sent an open letter to Prime Minister **Narendra Modi**, saying the ...

**PM Modi's Digital Camera & Emails In 1987-88 Vs The Real History Of ...**

**MensXP.com** - 14-May-2019

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!



# The Alternative Truth ?

## The story of how the Internet came to India: An insider's account

Srinivasan Ramani, who played a significant role in creating ERNET - the precursor to the Internet in India and an inductee into the Internet Hall of Fame, documents those early days.

IBNLive Specials | Updated: August 14, 2015, 1:08 PM IST



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Srinivasan Ramani, who played a significant role in creating ERNET - the precursor to the Internet in India and an inductee into the Internet Hall of Fame, documents those early days a chapter of the book *Netch@kra*. An excerpt:

What have ERNET team members all over India achieved? We set out to build India's academic network and succeeded in doing that. We did that as a nationwide academic coalition of eight institutions of higher learning and R&D. Working together to win gives you a high, as all sportspersons know. So, how we did it was as important as what we did. In the process we brought the Internet to India.

This is a subjective view of a small but important part of the IT Revolution in India - the arrival of computer networking and the impact it made on many aspects of our lives. It was part of something

# Situation in late 1986

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- Joined TIFR in November 1986.
- My collaborators then were in BNL, New York and Boston University, USA as well as in Germany.
- When I was in USA, I was already using BITNET to communicate with them by e-mail, and ARPANET to submit jobs to supercomputers in Livermore.
- Witnessed Tremendous slowdown in communications with collaborators after coming back: Weeks to exchange manuscripts by airmail, and days to get ideas across by telex.
- No fax machines; No DHL/FedEx!! Even for Speed-Post, one needed a signature from a Professor to send one.

# Sample Messages

TELEX

23.12.86

SERGIU SANIELEVICI  
PHYSICS DEPT.  
BROOKHAVEN NAT. LAB.  
UPTON NY 11973  
U.S.A.

TELEX NO. : 967 703

---

PLEASE FIND OUT PRECISE BETA OF POSSIBLE TWO STATE  
SIGNAL FOR 'THREE FLAVORS STOP RUN ON EIGHT CUBE TIMES  
FOUR AT THAT BETA OR VICINITY STOP TELEX THE  
RESULTS STOP REGARDS

- RAJIV GAVAI

---

NOT TO BE TELEXED

Rajiv Gavai  
Theory Group  
T.I.F.R.

# Sample Messages

TELEX

18.2.87

SERGIU SANIELEVICI  
PHYSICS DEPT.  
BROOKHAVEN NAT. LAB.  
UPTON NY 11973  
U.S.A.

TELEX NO : 967 703

---

MANUSCRIPT GENERALLY OK. CAN WE HAVE WORDS PHYSICAL OBSERVABLES  
BACK IN PLACE OF LATTICE MEASURABLES ? NEED A COMMENT ON  
PSIBARPSI FOR THREE FLAVOURS. REFERENCE LIST SENT WEEK AGO.  
NICE IF FINAL MANUSCRIPT HAS TIFR/TH/87-2 NUMBER ON TOP. DETAILED  
COMMENTS ON POTENTIAL FOLLOW IN LETTER. REGARDS

-- RAJIV

---

Not to be Telexed :

Dr. Rajiv Gavai  
Theoretical Physics Group  
Tata Institute of Fundamental Research  
Homi Bhabha Road, Bombay - 400 005.

# Sample Messages

\*  
11 3009 TIFR IN

MSG 102 MAR 24

ATT. DR.R.V. GAVAI

PLEASE SEND COMMENTS ON LARGE LANGEVIN PAPER URGENTLY. IF NO NEW  
COMMENTS OVER WHAT YOU'VE ALREADY WRITTEN, JUST TELEX WHETHER YOU  
AGREE TO PR.

REGARDS,

DR. S. SANIELEVICI

BROOKLAB UPTONNY TLX 6852516\*

11 3009 TIFR IN.....

ABOVE VIA ITT REPLY TO EVHHN UPTO VIA  
ITT USA ACCESS CODE 0025



# Setting the Ball Rolling

- A lot of frustration about delays, wastage of time..
- Venting it out in discussions in West Canteen, TIFR Sea Shore....
- Constructive suggestion came out of this churning : Why Can't We, to How Can We at TIFR have Global E-Mail Connectivity.



# Setting the Ball Rolling

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- Constructive suggestion came out of this churning : **Why Can't We**, to **How Can We** at TIFR have Global E-Mail Connectivity.
- Designed & Conducted an Institute-wide survey.
- Assess if only a small set of scientists felt so constrained.
- List the purposes for which BITNET may be necessary/useful tool.

# Questionnaire

## QUESTIONNAIRE

Name

Group

We are interested in finding out how necessary and urgent it is to have a computer link with BITNET/EARN which, as you probably know, provides a fast and reliable means of exchanging information in form of manuscripts, programs, data, mail messages, interactive messages etc with essentially all of the premier research institutions, supercomputer centres and universities abroad. We request you to spare a few minutes of your valuable time to fill up the questionnaire below and return it to Rajiv Gavai, Theory Group. Thank you very much for your help.

D. Mathur, K P Singh, G Hassan, R V Gavai, A Ray, N K Mondal

# Questionnaire

1.a Are you familiar with Bitnet?

☐ Yes

☐ No

.b Have you ever used it before?

☐ Yes

☐ No

2 Would your research benefit by a faster means of international communications?

☐ Yes

☐ No

If all three questions are answered no, you may stop here.

3. Do you have collaborators abroad with whom you are working/  
would like to work or continue work began earlier abroad.  
Please name them and their institutions.

4. If you have used Bitnet in past for research, please list your  
collaborators and list the publications from that research  
and give a brief description of how Bitnet helped in the research.



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4. If you have used Bitnet in past for research, please list your collaborators and list the publications from that research and give a brief description of how Bitnet helped in the research.

5. Do you need bigger and better computers or data bases for your work which may become accessible via Bitnet? If yes, please ~~list them or describe how you will use them.~~

6. Do you favour acquiring a BITNET connection

( ) as soon as possible ( $\leq$  1 year) ?

# Following up Survey

- Encouraged by results of our survey, a letter was submitted to Director, TIFR, requesting action for E-mail connectivity for TIFR.
- Prompt Action by the Director : One Day meeting organized on March 2, 1987.
- MTNL & VSNL executives, NCST Director (Prof. S. Ramani), other local institute's representatives were invited, and participated.

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- MTNL & VSNL executives, NCST Director (Prof. S. Ramani), other local institute's representatives were invited, and participated.
- RVG made presentation, to explain, “What BITNET is, Why it is needed, and How it is helping scientists abroad”.
- Key slides from that presentation :



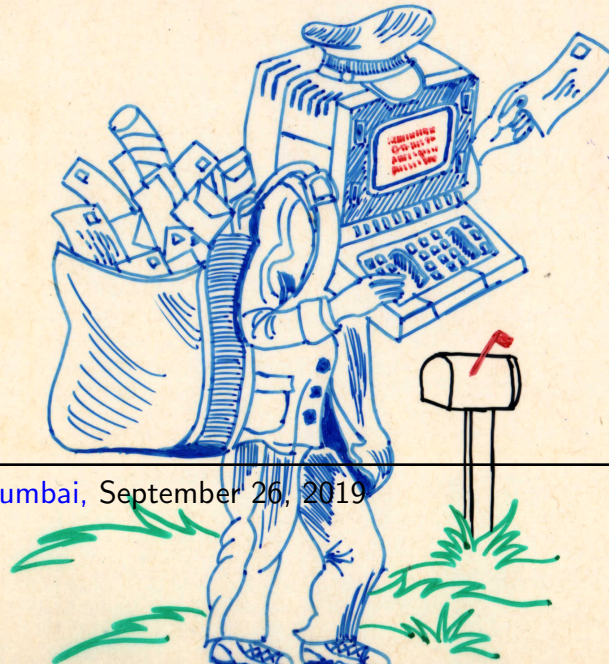
BITNET / EARN / NETNORTH

ERROR: syntax error  
OFFENDING COMMAND: true  
cvt fpgm x -glyf head

— TOPOLOGICALLY ONE SINGLE INTERCONNECTED  
NETWORK

- BASED ON STRONG INTEREST AND WILLINGNESS TO CONNECT
- BASIC GOAL : FACILITATE EXCHANGE OF NON-COMMERCIAL INFORMATION ORIGINATING FROM INSTITUTIONS OF HIGHER EDUCATION
- ANYONE CAN USE IT : STUDENTS, PROFESSORS, SCIENTISTS OR EVEN SECRETARIES AND ADMINISTRATORS

USERS SHARE INFORMATION BY ELECTRONIC MAIL



## BITNET : How it WORKS

BITNET is A STORE - AND - FORWARD NETWORK

It utilizes Remote Spooling Communications  
Subsystem component of IBM's  
VM/370 operating system  
or NJE (Network Job Entry)  
or NJI (Network Job Interface)  
line protocols

HOWEVER, NON-IBM IMPLEMENTATIONS OF  
NETWORKING SOFTWARE IS READILY AVAILABLE  
MORE THAN 50% NODES RUN THAT.

E.g. CALTECH HAS ~50 Nodes : 27  
VAX minis with VMS, 9 VAX minis with UNIX,  
DEC-20 (TOPS-20), 4 DATA GENERAL running ADS,  
PDP-11, RIDGES, HP-9000 all running UNIX  
and 1 IBM-AT running UNIX  
Computers connected by leased telephone  
lines running at 9600 bits per second  
(Compare : normal - 300 bps. Telex 50-60bps)



# WHAT BITNET CAN DO

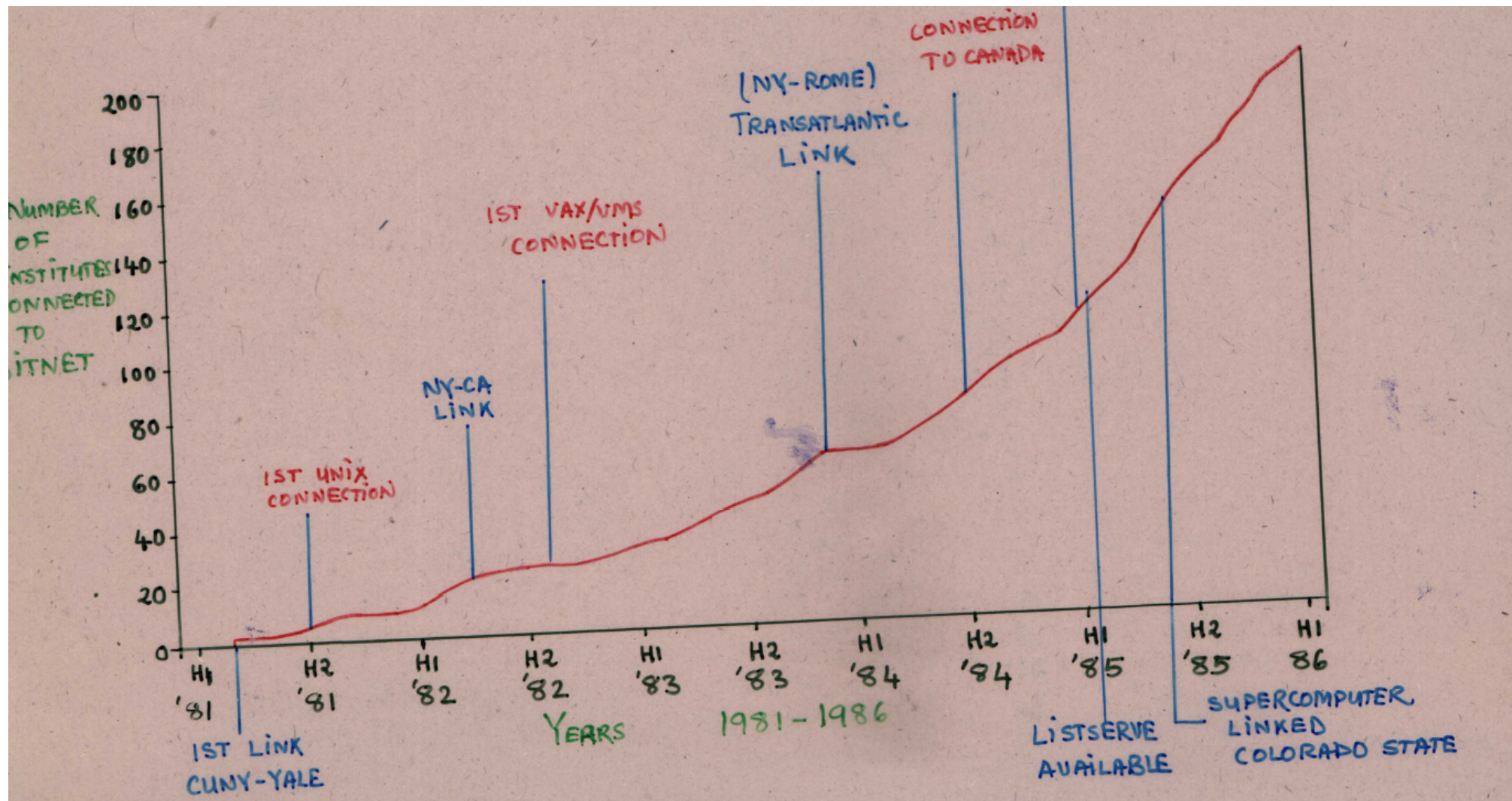
BITNET USERS CAN

- SEND INTERACTIVE MESSAGES
- SEND SHORT LETTERS, MEMOS ETC.
- SEND FILES CONTAINING TEXT, PROGRAMS, DATA, COMMANDS .. ETC.
- SUBMIT JOBS FOR EXECUTION ON A REMOTE HOST
- SEARCH THROUGH DATA BASES USING "FILE SERVERS"
- PARTICIPATE IN COMPUTER CONFERENCING

NOTE THAT 1) ALL MEMBER INSTITUTIONS OF BITNET/EARN/NETNORTH ARE THUS ACCESSIBLE

2) THERE ARE NO SEPARATE CHARGES FOR USING ONE OR THE OTHER

3) ONE MAY ACQUIRE REQUIRED





## COUNTRIES LINKED TO BITNET/EARN/NETNORTH

- |                         |               |
|-------------------------|---------------|
| • AUSTRIA               | • ISRAEL      |
| • BELGIUM               | • ITALY       |
| • CANADA (NETNORTH)     | • JAPAN       |
| • DENMARK               | • MEXICO      |
| • FINLAND               | • NETHERLANDS |
| • FRANCE                | • NORWAY      |
| • GERMANY (FR.)         | • PORTUGAL    |
| • GREAT BRITAIN (JANET) | • SPAIN       |
| • GREECE                | • SWEDEN      |
| • IRELAND               | • SWITZERLAND |

• U.S.A. (BITNET)

ACTIVELY CONSIDERING ; MAY BE LINKED NOW

- |            |             |            |
|------------|-------------|------------|
| • S. KOREA | • SINGAPORE | • THAILAND |
|------------|-------------|------------|

PLAN TO CONNECT

- |             |               |
|-------------|---------------|
| • AUSTRALIA | • NEW ZEALAND |
| • ARGENTINA | • CHILE       |
| • BRAZIL    | • PERU        |

1/14/87

**URGENT NOTICE RE:**

**Telemark IV: Neutrino Masses and Neutrino Astrophysics**

The location of the Telemark IV meeting, March 16-18, 1987, has been changed to the Hotel Chequamegon, Ashland, Wisconsin, on the shores of Lake Superior. This change was necessary due to the bankruptcy closing of Telemark Lodge. The new location is 40 miles northeast of Telemark and promises to be equally desirable. Skiing is also available nearby. **Participants should rebook their accommodations directly with Hotel Chequamegon.** Hotel and conference registration forms are enclosed as well as travel information.

For further information: BITNET address LDOLAN @ WISCPHEN.

# USER SUPPORT IN TIFR

- STATISTICAL NATURE
- ASPECTS OF USER REQUIREMENTS

TOTAL RESPONDENTS ~ 110

## DISCIPLINES COVERED :

- 1) ASTRONOMY + ASTROPHYSICS
- 2) MATHEMATICS
- 3) MOL. BIOLOGY
- 4) DENTAL RESEARCH
- 5) EXPT. PHYSICS (SOLID STATE, NUCLEAR, PARTICLE)
- 6) THEO. PHYSICS ( — " — )
- 7) CHEM. PHYSICS

2 OUT OF EVERY 3 : BITNET IN 1 YEAR

9 OUT OF EVERY 10 : BITNET IN 3-5 YEARS

MOST POPULAR REASON : 56 RESPONDENTS

COLLABORATIVE WORK WITH SCIENTISTS ELSEWHERE  
ON A DAY-TO-DAY BASIS

SOME HAVE ALREADY USED IT IN SUCH A WAY  
RESULTING IN 23 PUBLICATIONS

SECOND REASON : 29 RESPONDENTS



## SPECIFIC DATABASES IDENTIFIED :

### 1. STRASSBOURG DATA CENTRE, CDS FRANCE

ERROR: syntaxerror  
OFFENDING COMMAND:

ACCESSIBLE ON BITNET : UO1117 @FRCSZ1

- 400 AERONOMICAL CATALOGUES OF  
700,000 STELLER + EXTRA-GALACTIC OBJECTS  
( EXPECTED  $\sim 3 \times 10^7$  )
- VITAL FOR ANY AERONOMER?

### 2. ASTRONOMICAL DATABASES IPAC, CALTECH AND NSSDC IN USA

### 3. DATA FROM A) EXOSAT + B) EINSTEIN OBS. VIA SPACE PHYSICS ANALYSIS NETWORK (SPAN)

### 4. DNA SEQUENCE LIBRARY DATABASE (VIA BIONET CONNECTED TO BITNET)

### 5. SPIRES IN SLAC, USA : LITERATURE DATABASE FOR HIGH ENERGY PHYSICS

## THIRD REASON : 12 RESPONDENTS

ACCESS TO BIGGER/BETTER COMPUTERS

## SPECIAL REQUIREMENTS : EXP. HIGH ENERGY PHYSICS GROUP

- L3 COLLABORATION ON LEP IN CERN,  
GENEVA

- L3 HAS A DATABASE OF 100 MB  
WHICH INCREASES BY  $\sim 50$  MB/YEAR.

- ANTICIPATE LARGE DATA TRANSFERS

FROM THEIR EXPT. FOR ANALYSIS HERE  
APPROX. 20 MB/DAY.

- PROF. P.K. MALHOTRA



# COMPUTERS & OPERATING SYSTEMS COMPATIBLE WITH BITNET

|                 |                         |                      |                              |
|-----------------|-------------------------|----------------------|------------------------------|
| AMDAHL          | VM, MVS, UNIX           | HOONEYWELL           | CP6                          |
| AT&T 3B20       | UNIX                    | HP 3000/64           | MPE V                        |
| BASF            | VM, MVS                 | IBM                  | VM, MVS, MTS, OS, TSS, MUSIC |
| BULL            | MULTICS                 |                      |                              |
| BURROUGHS       | MCP                     | INTEGRATED SOLUTIONS | UNIX                         |
| CCI             | UNIX                    | NAS                  | VM, MVS                      |
| CDC CYBER       | VOS, VSOS               | OLIVETTI             | VM, MVS                      |
| CGX             | BS                      | PARALLEL             | UNIX                         |
| CRAY X/MP       | COS                     | PERKIN-ELMER         | UNIX                         |
| DATA GENERAL    | AOS                     | PRIME                | PRIMOS                       |
| DEC VAX         | <u>VM, UNIX, ULTRIX</u> | PYRAMID              | UNIX                         |
| DEC PDP 11      | UNIX                    | SIEMENS              | VM, MVS                      |
| DECSYSTEM 10/20 | TOPS-10/20              | SPERRY               | OS/1100                      |
| DIETZ           | XOS                     | SUN-2                | UNIX                         |
| FUJITSU         | BS3000                  | VLS                  | UNIX                         |
| GOULD           | MPX, UTX/32             | SCALDSTAR            |                              |

NETWORK PRODUCTS  
 i) TIELINE  
 ii) NJEF  
 iii) DTF

NETWORK PRODUCTS  
 i) ANJE  
 ii) DECNET  
 iii) jnet  
 iv) PMDF

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  - Was it Education & Research *by* NETwork, as we users envisaged ?

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  - Was it Education & Research *on* NETwork, as computer scientists would wish ?
  - Fair to say that it was then completely the latter.
  - Nevertheless, existence of network expertise in India was very encouraging.
- MTNL/VSNL assured that connectivity was technically feasible in India.
- The costs did appear high, but a possibility of bringing them down existed, if a nationwide negotiation were to take place.

# Swift Action

- An impromptu round table discussion was organized at the end of the meeting to decide on the next step.
- Consensus emerged for a grand national project — VIDYANET, name suggested by Prof. Ramani — to achieve E-mail connectivity throughout in India, and simultaneously connecting VIDYANET to BITNET.

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- Consensus emerged for a grand national project — VIDYANET, name suggested by Prof. Ramani — to achieve E-mail connectivity throughout in India, and simultaneously connecting VIDYANET to BITNET. .
- The structure for the proposal was also finalized the same day, and the final proposal was ready in 2 days, on March 4 !
- It was felt that one should approach Department of Science & Technology (DST) in view of the envisaged broad coverage.
- Director, TIFR ensured hand-delivery of the proposal to DST within a few days. Yes, we can! 😊 😊

OLD DRAFT PROPOSAL FOR COMPUTER NETWORK

for

ACADEMIC AND RESEARCH INSTITUTES

(Tentatively called VIDYANET)

March 4, 1987

prepared by

Tata Institute of Fundamental Research

Homi Bhabha Road, Bombay - 400 005

AND

National Centre for Software Technology

Gulmohur Cross Road 9

Juhu, Bombay - 400 049



## 2. Scope

It is proposed that a computer network be established with the following requirements in mind:

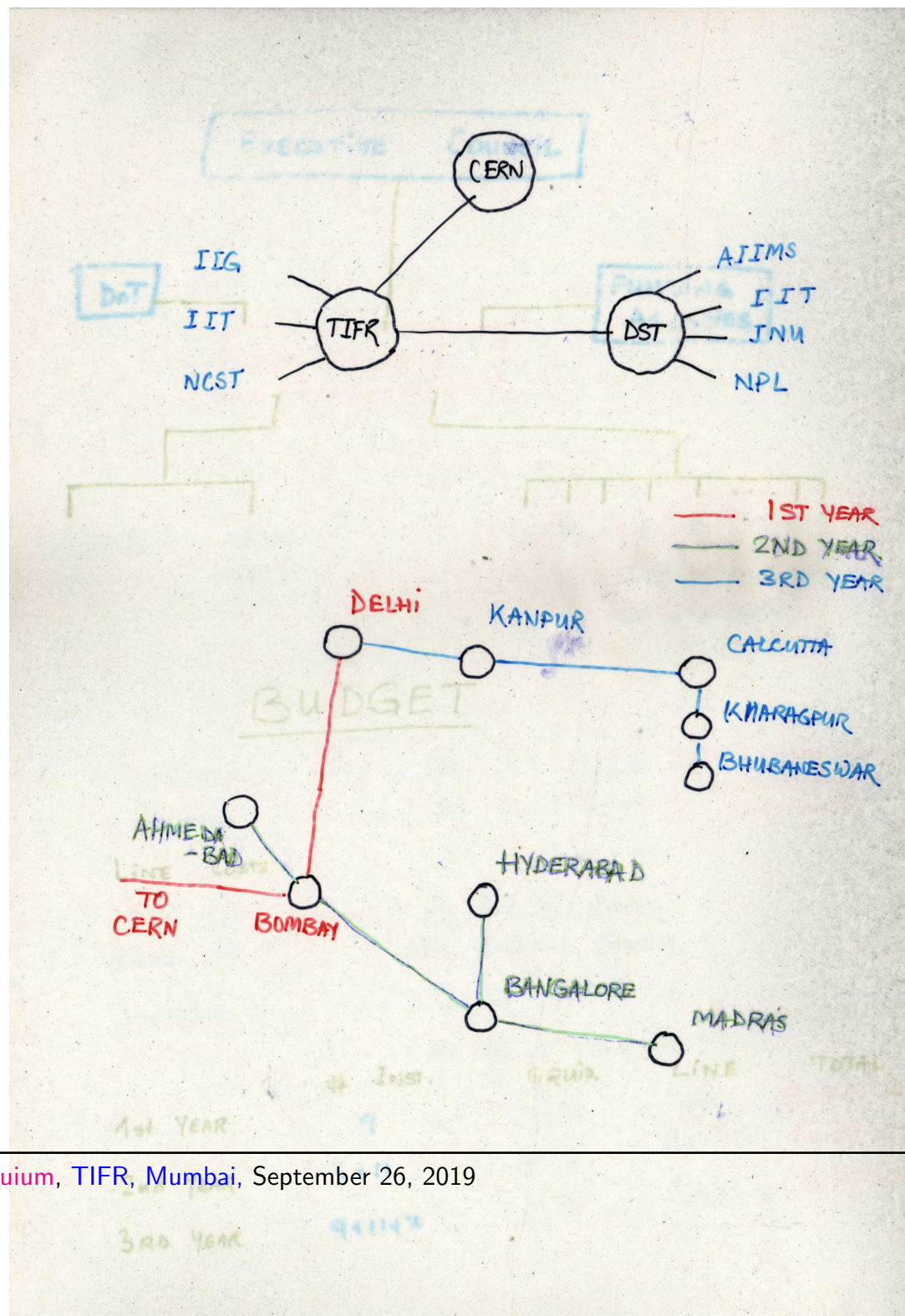
- a) The network should provide for rapid exchange of scientific data and information via computer to computer links
- b) It should support major makes of computers running different operating systems
- c) The network should be limited to non-commercial activities
- d) The network should be used to interconnect institutes of higher learning within India and should also have an overseas link to a network such as EARN (which connects over 20 European countries and is purely an academic and research users network).

## 3. Network Structure

In order to set up the network fast and to be able to manage it easily, the following structure is proposed:

- a) All links in the network should be dedicated links
- b) The network should be created merely by linking existing general purpose computers
- c) The network should operate on links running at 4800/2400 bps (Synchronous) within India. The overseas link(s) should operate at 9600/4800 bps
- d) It should be possible to communicate information from/to any institute on the network







5. Management

Of the many possible institutes that could be connected to this network, TIFR, Bombay has played a lead role. NCST, Bombay, has also expressed desire to be on this network. The computers at these two institutes are already linked up and another link from NCST to IIT, Bombay is in progress. An immediate task would be to acquire an overseas link from Bombay to enable Indian members on the network to be able to exchange information with other international networks.

Potential new members for VIDYANET, in the immediate future, are:

|             |   |           |                               |   |           |
|-------------|---|-----------|-------------------------------|---|-----------|
| AIIMS       | ) |           | VEC                           | ) |           |
| DST/DoE     | ) |           | SINP                          | ) |           |
| IIT         | ) | Delhi     | IIM                           | ) | Calcutta  |
| IARI        | ) |           | ISI                           | ) |           |
| NPL         | ) |           |                               |   |           |
| IIM         | ) |           | IIT, Kanpur                   |   |           |
| PRL         | ) | Ahmedabad | IIT, Kharagpur                |   |           |
| SAC         | ) |           | Inst. of Physics, Bhubaneswar |   |           |
|             |   |           | CCMB, Hyderabad               |   |           |
| SAMEER      | ) |           | ISRO                          | ) |           |
| IIT         | ) | Madras    | IISc                          | ) |           |
| MatScience) |   |           | RRI                           | ) | Bangalore |
|             |   |           | IIA                           | ) |           |
|             |   |           | IIM                           | ) |           |

It is proposed that a registered society and trust, be set up to look after the creation and development of this network, besides providing information services regarding the network. Institutes desiring to be on this network should be considered on a case-by-case basis. It is expected that VIDYANET will favourably consider all non-profit, R&D institutes recognised by the Government of India, as well as all degree granting institutes having post-graduate work.

An Executive Council will also be formed from amongst the participating institutes, to look after the network. Computers on the network shall not restrict the flow of messages/mail originating on other computers and destined for other computers on the network. The institutes can not charge for the routing of messages for other nodes. They will also not charge for the use of the mail facility. However, they will have the freedom to restrict the volume of,

or access to, mail facility in the case of their own computer users.

#### 4. Costs

The costs involved in setting up and running up of VIDYANET primarily comprise of hardware costs (modems etc.), software costs (electronic mail packages etc.), costs of communication links within India and overseas. The cost involved in setting up this network and for an institute to connect to this network can be worked out from the prices given below:

|  |                                   |
|--|-----------------------------------|
| Software Packages (each computer)                        | U.S.D. 10,000 to<br>U.S.D. 20,000 |
| Synchronous link hardware<br>Modems (one pair)           | U.S.D. 5,000 to<br>U.S.D. 8,000   |
| Link costs within India                                  |                                   |
| Inter-city   | Rs. 312/km/year                   |
| Intra-city   | Rs. 600/km/year                   |
| Overseas Link costs                                      |                                   |
| Half-circuit from India                                  | Rs. 900,000/year                  |
| Remaining half-circuit to be<br>paid in foreign exchange | Rs. 900,000/year                  |

The above mentioned costs are only indicative and do not include duties and any other overheads.



#### 6. Cost Sharing

We propose that the initial setting up of the VIDYANET and its continuing operation for a period of at least five years be supported by a Government of India grant. It is proposed that a gradual increase in membership fees will be adopted to switch over to a self-sustaining mode of operation, at the end of five years, in which the user institutions will share the operating costs. A slab system of payment is proposed, so that institutions will bear costs roughly in proportion to their size. For instance, when the network reaches the size of 30 member institutions, the costs are likely to be as follows:

Total Cost Rs. 40,00,000

Membership fees for institutions with:

|                           |             |
|---------------------------|-------------|
| over 300 scientists:      | Rs. 300,000 |
| over 200 scientists:      | Rs. 200,000 |
| less than 200 scientists: | Rs. 100,000 |

(Note1: Number of mail-ids in each institution will be limited to the number of scientists indicated against the slab concerned).

(Note2: Special provision is expected to be made for small institutions provided they do not require dedicated data links).

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- However, it got pushed around from one officer to another, acquiring different, bigger (unwieldy?) forms. *Lesson:* National projects have their own speed and inertia. Handle with care !

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- However, it got pushed around from one officer to another, acquiring different, bigger (unwieldy?) forms. *Lesson:* National projects have their own speed and inertia. Handle with care !
- A new Director took over on July 1, 1987. A fresh plea was made in July 1987, *"While VIDYANET is under consideration of DST, as an interim measure money be approved for connecting that year itself"*.



- Physics Faculty discussed our request in July 1987, & formed a committee.

After some discussion, Physics Faculty constituted a Committee consisting of the following:

Prof. P.V.S. Rao - Convener

Prof. B. Banerjee

Dr. R.V. Gavai

Dr. A. Gurtu/Dr. S.K. Gupta

Dr. S. Ramani, Director, NCST

Shri S.P. Srivastava

to look into the above proposal and make a suitable recommendation) before the provision of Rs.6.00 lakhs is agreed to.

# Move Forward

- In April 1988, the committee report was discussed in PF :

to look into the VIDYANET proposal and make a suitable recommendation.

11. A report of the committee is enclosed (Appendix II).

12. Prof. P.V.S. Rao, tracing the history of VIDYANET proposal to early 1987, informed the members that the Department of Science & Technology (DST) is favourably inclined towards our proposal. A decision from their end may, however, take an year or more. Keeping in mind the urgent need for an overseas link and the start-up and the implementation time for such a big project as VIDYANET, some staff members of the Institute wrote a letter to the Director on July 23, 1987 suggesting that the Institute should take a lead by bearing the cost of the overseas link as an interim measure till the DST funding under the VIDYANET becomes available.

# Committee Recommendations

- Having agreed that TIFR should take a lead, the committee recommended TIFR's Vax as the node to link to CERN at TIFR costs:

13. The committee, after considering (i) various options available to the choice of networks, (ii) the overseas centres to which TIFR be linked, has recommended that VAX Computer of the Institute should be a node of EARN/BITNET by linking with the EARN/BITNET node in CERN, Geneva. CERN, Geneva has been chosen as a nodal point for our link into EARN/BITNET as (i) the EHEP group is involved in the L3 collaboration and (ii) being an international institution, is most suitable for such a contact. Availability of an already operational efficient Mailer system on the VAX and the existence of a superior commercially available software package for it makes VAX the best choice. The details of cost of this system, delivery/time etc. are as follows:

- It further noted that other networks such as ERNET are a long way from realisation. DST visualised linking all 2500 colleges :

14. Prof. Rao added that two other proposals on Electronic Networks viz. (i) ERNET of Education Department and (ii) VIKRAMNET (an Indian PDE) programme of the Department of Telecommunications are also being talked about and planned but are a long way from realisation. As DST is favourably inclined to our proposal and as it is a challenging effort we should take up Phase I now. Later on, we could join with DST.

15. Very recently both Dr. R.V. Gavai and Dr. A. Gurtu visited Delhi for discussions concerning VIDYANET proposal with Shri Thiagarajan of DST. DST visualise a major project linking all the Science Colleges (approx. 2500) in the country. One national and several regional information centres are proposed to be created and linked to the network; these would make advanced information available to everyone.



- A lot of discussion took place, unfortunately without any of the strong proponents/PIs as the PF then had only Professors. A crash-landing ensued :

16. While some members felt the need for going in urgently for the VIDYANET proposal, others felt that we could wait till DST finalizes its decision of the Network.

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17. After a long discussion, Physics Faculty agreed that (i) the committee be enlarged to include Profs. P.K. Malhotra, V.S. Narasimham, M.V. Pitke and Dr. D.P. Roy and it should (ii) estimate real usage in terms of (a) hours on the link (b) volume of files/information transferred and (iii) impress upon DST vigorously the need to decide on the proposal at a very early date.

- We came to know later that remarks such as, "do we need e-mail(at such a cost)", "how about fax as a substitute", "let DST decide first" were the ones which turned the tide.
- In the meantime, I came to know from a wise Delhi source, that VIDYANET proposal was being handled by an officer known for always being a dead end for any project. A project meant to be killed was usually forwarded to him.
- Suddenly DST decided that computer networking should be handled by ERNET as it is the territory of DoE. We were advised to meet DoE officials.



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  - However, it will *only* have dial-up links within India.
  - International link was to be a direct one and he offered to link TIFR with Geneva, as proposed!!

- When we objected, saying our VIDYANET proposal seeks equal access to all, the response was, "one who pays the piper calls the tune". That is the only way ERNET can accommodate the aspirations of the VIDYANET proposal.
- Massive Let-Down !
- We updated Director, TIFR about these developments, and also recommended against accepting the DoE plan since it potentially had an undesirable impact on TIFR's reputation: We in TIFR could be accused of being selfish.

# Victory at last !!

- In Dec. 1988, Physics Faculty went back to reconsider our July 1987 letter, seeking a TIFR-paid connection. Clever lobbying was done by the "Young Turks". PF gave a green light !

17. Prof. B. Banerjee explained that DST is prepared to support our proposal (VIDYANET) only if the proposed network could be dovetailed with the network ERNET that they are developing with the help of UNDP. ERNET is aimed at research on networking technology, whereas our need is for a network already in operation and which can be used for scientific communication. Dovetailing with ERNET does not serve our purpose at all and DST has expressed its inability to support VIDYANET without the support of DOE.

18. The need for BITNET connection is quite urgent and the requirements are Rs 20.00 lakhs for 1989-90, and Rs 1.2 crores for the five year period 1990-95. As IUCA has willingly agreed to share 25% of its cost, he felt, the

Institute should agree to go in for BITNET.

19. Physics Faculty, after some discussion, agreed to go ahead with BITNET and use Plan money allocation for 1989-90, if possible. Its working and other modalities should be looked into carefully by separate committee, if necessary.

20. While on the subject, Prof. S.S. Jha emphasized that we should also improve our Telephone system and obtain a FAX Facsimile machine even before the BITNET system arrives.

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- And then TIFR shortly made the globe smaller by connecting to BITNET, via CERN, thus becoming the first in India to do so.
- Existence of our connection compelled ERNET to do something to serve the interest of Indian Academic Users, not just their PIs. Were it not for VIDYANET, it is hard to imagine ERNET's expansion beyond its PIs' interests on networking.



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- Further, it of course went with its dial-up plan, and for a long time ERNET provided access to "outsiders" only grudgingly as a favour.

# Final Remarks

- Global E-Mail connectivity of India came by a tortuous & time-consuming path. It materialised finally as the TIFR community kept pushing for it.
- Decision makers may have a valid point of view nevertheless one can also make them appreciate the other side as well, at least sometimes. One just has to try & try again !

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- Decision makers may have a valid point of view nevertheless one can also make them appreciate the other side as well, at least sometimes. One just has to try & try again !
- TIFR has, perhaps still, a system which can respond to the demands of scientists.
- If we in TIFR decide to undertake a project, we have the brand name and reputation to make it happen. Let's keep trying !