Iran's Telecom and Internet Sector:
A Comprehensive Survey

Open Research ◖ Network

June 15, 1999

Camera-ready copy prepared by The Open Research Network using LaTeX.
Printed in the United States of America.

Contents

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Acknowledgements

Chapter 1

Internet Usage Profile

This chapter reviews the framework for analyzing the development and status of the Internet within Iran following general guidelines established by the *Global Information Technology Assessment Group* (formerly the MOSAIC group).

The principal components of the framework are six "dimensions" and an open-ended list of "determinants". The six dimensions are:

1. Pervasiveness (number of users per capita)
2. Geographic Dispersion (physical dispersion of infrastructure and access)
3. Sectoral Absorption (connectivity in various social sectors)
4. Sophistication of Use (integration and innovation)
5. Connectivity Infrastructure (capacity and robustness of the infrastructure)
6. Organizational Infrastructure (degree of competition)

Dimensions represent a number of interrelated factors that comprise the "Internet capability" of a nation. Each of the six dimensions is given a numeric score supported by a narrative discussion.

Compilation and analysis of the determinants and relevant government policies not only establishes how the current situation came to be, but can inform decision-makers of the likely consequences of future regulatory or investment decisions on the further development of Internet capabilities. This is the subject of our next report.

Of the six dimensions, the first four relate to usage and are considered in this chapter. The last two, connectivity and organizational infrastructure, require more detailed analysis and are presented in separate chapters.

Connectivity Infrastructure represents the degree to which users can effectively communicate via the Internet and the number and speed of a country's international connections. *Organizational Infrastructure* describes the richness and robustness of the Internet service provision market, and hence the potential for further proliferation. It is also the dimension that best reflects one of the most important variables in Internet diffusion, government policy.

All six dimensions and relevant determinants will be brought together at the end of our two-report series, to form a comprehensive view graphically via a Kiveat diagram, a dimensional analysis tool representing a time-slice view that facilitates both assessment of the Internet within a country and comparisons between countries and regions.

1.1 Pervasiveness

"Pervasiveness" is a function of the number of users and hosts per capita. The elements of pervasiveness are listed below. The term "users" must be qualified here, since it allows for a great degree of ambiguity. The intent is to represent as accurately as possible the number of people who are regular users of the Internet. Such numbers are not readily available. However, it is often possible to obtain or reasonably estimate the number of subscribers, that is, Internet account holders. The actual number of users is usually larger by factors that vary greatly from Internet service provider (ISP) to ISP, and within a country. There is no way to measure this number and such published estimates as exist are of questionable validity.

Different levels of pervasiveness are

- *Level 0: Non-existent* – The Internet does not exist in a viable form in this country. No computers with international IP connections are located within the country. There may be some Internet users in the country; however, they obtain a connection via an international telephone call to a foreign ISP.

- *Level 1: Embryonic* – The ratio of users per capita is on the order of magnitude of less than one in a thousand. The ratio of hosts per capita is less than 12 hosts per 10 million people.

- *Level 2: Established* – The ratio of Internet users per capita is on the order of magnitude of at least one in a thousand. There are fewer than 1,700 hosts per 10 million people.

- *Level 3: Common* – The ratio of Internet users per capita is on the order of magnitude of at least one in a hundred. The ratio of hosts per capita is between 1,700 and 70,000 hosts per 10 million people.

- *Level 4: Pervasive* – The Internet is pervasive. The ratio of Internet users per capita is on the order of magnitude of at least one in ten. There are more than 70,000 hosts per 10 million people (7 hosts per 1,000 people).

Data on the number of Internet hosts in Iran can be obtained from the RIPE Network Coordination Center. These are shown in Table 1.1 for first and second quarter of 1999 surveys. In this table

- "SOA" is the number of delegated domains (zones) found below the .ir top level domain. In short this will be the number of subdomains below this top level domain that run a separate nameserver.

- "Counted" is the number of hosts (machines) found under this top level domain. Hosts like "loopback", "localhost", etc are excluded from this number (in DNS terms, only A records are examined).

- "Duplicate" is the number of duplicate hosts (machines) found under this top level domain. These are hosts that appear with more than one name, but with the same address (cname records are skipped automatically, and do not fall into this category)

- "Real" is the "Counted" number of machines minus the "Duplicate" number of machines.

- "Change" is change of the "Real" count for this top level domain compared to the previous count (counts are usually performed once a month, at the end of each month. Therefore this figure represents the increase over the last month).

Date	SOA	Counted	Duplicates	Real	Change
01/05/99	65	740	68	672	–54
02/05/99	72	915	77	838	+166
03/05/99	77	891	90	801	–37
04/05/99	74	942	84	858	+57
05/05/99	75	846	83	763	–95
06/09/99	82	990	90	900	+137

Table 1.1: Monthly progression of the number of Iranian Internet hosts – first and second quarter of 1999. See text for explanation of terms.

As it can be seen, the rate of growth of Internet hosts in Iran since the beginning of 1999 has been quite high, with a net increase in six months of 34%. This is a typical average figure for Internet's growth in Iran since its advent in 1992, although much higher growth rates have been seen, placing Iran among the top countries in terms of rate of growth of Internet access at times. [1] By way of example, the number of Internet hosts in Iran in January 1998 was only 203, with only 19 web servers, a growth from only 4 Internet hosts in July 1994.

Growth of the Iranian Internet over the first six months of 1999 is illustrated in Tables 1.3–1.5. The following definitions apply:

- *Zones:* The total number of zones (example: zone x.y.z) which were analyzed, either at a particular level of the Domain Name tree, of a particular size, for the .ir *Top Level Domain (TLD)*.

- *TLD:* TLD stands for Top Level Domain. The DNS tree is made up of several generic TLDs like .com and many so-called country code Top Level Domains (ccTLD), such as .ir, which in general correspond to existing states (Iran) or geographic areas in the real world. ccTLDs are all designated by two letters and correspond, with a very few exceptions, to the two-letter country codes of the ISO 3166 standard.

  In the context of this hostcount, TLD refers to Iran's ccTLDs in the RIPE NCC service area.

  Note that zones which were encountered in an NS record but which could not be retrieved via the DNS, for whatever reason, are not included.

- *Counted:* The number of hosts which were counted while traversing the DNS.

- *Duplicate:* The number of hosts which were seen while traversing the DNS which had already been seen elsewhere.

- *Empty/Small/Medium/Large/Huge:* These labels refer to a classification decided by the size of a zone, where "size" is determined by the number of hosts found in the zone. The following table shows the cut-off points for the 5 classifications:

  Some examples: a figure such as empty/zones/50, indicates that there were 50 zones found which contained no hosts. A combination such as large/hosts/2900 indicates that 2900 hosts on average were found in zones with 101–1000 hosts.

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[1]For instance, the 1995 Internet growth rate in Iran stood at 92%, placing it in second place in the world.

Classification	Hosts in Zone
Empty	0
Small	1–10
Medium	11–100
Large	101–1000
Huge	1001+

Table 1.2: Zone classifications.

	06/09/99	01/05/99	Change	% Change
Hosts Counted	990	740	+250	+33.8%
Duplicates Counted	90	68	+22	+32.3%
Real Hosts	900	672	+228	+33.9%
Zones Counted	82	65	+17	+26.1%
Average Hosts/Zone	12.1	11.4	+0.7	+6.1%
Average Real Hosts/Zone	11.0	10.3	+0.7	+6.8%
Average People/Real Host	73,064	97,854	$-24,790$	-25.3%
WWW Sites	93	70	+23	+32.9%

Table 1.3: Growth rates of the Iranian Internet in terms of the number of hosts from January–June 1999. See text for explanation of terms.

- *Level X:* The level in the Domain Name tree which is being analyzed. For instance, data from Level 1 refers to the IR TLD.

  The hostcount software analyzes all levels which exits in the data. However, to make results more presentable the numbers for all zones greater than level five are merged with the totals for level 5, hence the label Level 5+.

- *People/Host:* The number of people per real host for a given TLD.

- *Population:* The estimated number of people living in Iran.

  We are using data provided by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (1998). It comes from the *World Population Prospects: the 1998 Revision.* The data was transcribed on 2/15/1999. These are estimates which are revised yearly. At the current time we are still using the 1998 figures.

- *Real or Real Hosts:* The number of non-duplicate hosts. This is always obtained by subtracting the duplicate hosts from the hosts that were counted.

- *WWW Sites:* This refers to address records counted that are running a web server, whether or not the first label in their domain name is www, e.g., www.nic.ir, or pearl.sums.ac.ir. Duplicate domain names are removed. Two different names with the same address are counted as two web sites.

As of June 1999 therefore, there are only 900 Iranian hosts on the Internet (under the .ir top level domain). Caution should be exercised in quoting or using this number however, for the following important reasons:

		06/09/99	01/05/99	Change	% Change
Empty	Hosts	0	0	0	0.0%
	Zones	9	9	0	0.0%
	Hosts/Zone	0.0	0.0	0	0.0%
Small	Hosts	181	151	+31	+20.5%
	Zones	43	35	+8	+22.9%
	Hosts/Zone	4.2	4.3	−0.1	−2.3%
Medium	Hosts	809	764	+45	+5.9%
	Zones	30	28	−2	−7.1%
	Hosts/Zone	27.0	27.3	−0.3	−1.1%

Table 1.4: Growth rates of the Iranian Internet in terms of the number of zones and their classes from January–June 1999. There are no "large" or "huge" zones for Iran. See text for explanation of terms.

		06/09/99	01/05/99	Change	% Change
Level 1	Hosts	1	1	0	0.0%
	Zones	1	1	0	0.0%
	Hosts/Zone	1.0	1.0	0	0.0%
Level 2	Hosts	16	5	+11	+220%
	Zones	3	2	+1	+50%
	Hosts/Zone	5.3	2.5	+2.8	+112%
Level 3	Hosts	808	783	+25	+3.2%
	Zones	71	60	+11	+18.3%
	Hosts/Zone	11.4	13.1	−1.7	−13%
Level 4	Hosts	165	126	+39	+31%
	Zones	7	9	−2	−2.2%
	Hosts/Zone	23.6	14	+9.6	+68.6%

Table 1.5: Growth rates of the Iranian Internet in terms of the number of domain levels and their classes from January–June 1999. There are no "Level 5+" zones for Iran. See text for explanation of terms.

1. Hundreds of hosts, such as those at the Ministry of foreign affairs, other governmental offices, or the Iranian radio and television, are hidden from view behind firewalls.

2. Increasing use of .com, .net, and .org domains by Iranian entities means that such hosts are not queried in the RIPE survey, which searches for domains under the .ir top level domain.

3. Many companies and entities in Iran have only a few hosts connected to the Internet, which in turn feed entire local area networks with no direct Internet access and with local IP addresses.

Taking these into account, one can speculate that the real number of machines capable of accessing the Internet in Iran, is more than 10 times the 900 figure, and standing at around 9,000–11,000.

As for the number of current subscribers or users in Iran, extrapolating from previous estimates using host growth rates suggests that 65,000–80,000 people currently have Internet accounts in Iran. The breakdown is estimated as roughly 45–50,000 academic users, 5–8,000 government users, 5–8,000 industry users, and 10–12,000 individual users.

Both of these figures, for the number of hosts, and number of users, thus translates into a Level 2 classification (established) for the pervasiveness dimension. The level of Internet usage is at least one person in a thousand, but remains insufficiently available to the general public for widespread use.

This Level is consistent with the fact that the Internet has been in use in Iran for more than seven years and continues to grow, albeit slowly.

1.2   Geographic Dispersion

Geographic Dispersion describes the physical dispersion of the Internet within a country, there being benefits to having multiple points-of-presence, redundant transmission paths, and multiple international access points. Internet development in a country (e.g. Iran) typically starts with a single provider (e.g. IPM) and site in the capital (Tehran) or largest population center, from which the infrastructure spreads out as the user population grows and becomes more diversified. A mature Internet network will feature an infrastructure distribution that is proportional to the population. We summarize the characteristics used to evaluate geographic dispersion below:

- *Level 0: Non-existent* – The Internet does not exist in a viable form in this country. No computers with international IP connections are located within the country.

- *Level 1: Single Location* – Internet points-of-presence are confined to one major population center.

- *Level 2: Moderately Dispersed* – Internet points-of-presence are located in at least half of the first-tier political sub-divisions of the country.

- *Level 3: Highly Dispersed* – Internet points-of-presence are located in at least three-quarters of the first-tier political sub-divisions of the country.

- *Level 4: Nationwide* – Internet points-of-presence are located in all first-tier political sub-divisions of the country. Rural access is publicly and commonly available.

In Iran, while Internet connectivity and related activity continue to be concentrated in Tehran, full-time network access in one form or another is available in most, but not all, other major cities (provincial capitals). This gives Iran a Geographic Dispersion dimension of 2 – moderately dispersed. Rural dispersion is practically non-existent and via long-distance dialups to major centers only.

Condition Sector	Rare (1 point)	Moderate (2 points)	Common (3 points)
Academic	< 10% have leased-line Internet connectivity	10–90% have leased-line Internet connectivity	> 90% have leased-line Internet connectivity
Commercial	<10% have Internet servers	10–90% have Internet servers	> 90% have Internet servers
Health	< 10% have leased-line Internet connectivity	10–90% have leased-line Internet connectivity	> 90% have leased-line Internet connectivity
Public	<10% have Internet servers	10–90% have Internet servers	> 90% have Internet servers

Table 1.6: Assessing Sectoral Absorption.

Sectoral point total	Absorption dimension rating
0	Level 0 – Non-existent
1–4	Level 1 – Rare
5–7	Level 2 – Moderate
8–9	Level 3 – Common
10–12	Level 4 – Widely used

Table 1.7: Sectoral Absorption Rating.

1.3   Sectoral Absorption

Sectoral Absorption recognizes the differing impacts of the degrees to which four major Internet-using sectors of society have taken up the technology: the academic, commercial, health, and public (government) sectors. While the sectors describe the major social and economic divisions in society, none are homogeneous. Personal use is not considered in this metric. The sectors are

- *Academic:* Includes university education and research, and excludes primary or secondary education centers.

- *Commercial:* Includes distribution, finance, manufacturing, retail and services.

- *Health:* Includes hospitals, clinics, research centers, and physicians and practitioners.

- *Public:* Includes the central government, provincial and local governments, public companies, and the military.

Internet use within each sector is rated as rare, moderate, or common, according to the guidelines listed in Table 1.6. To rate the country as a whole, each sector with a rare rating is assigned one point, each moderate sector two points, and each common rating three points. The overall rating for Sector Absorption is derived from the matrix shown in Table 1.7.

The academic sector in Iran continues to dominate the Iranian Internet in terms of the number of organizations connected and the number of hosts registered. This sector also dominates in terms of the number of users. At present over 90% of the country's universities are connected. According to recently announced

plans, 100 research centers and universities, representing the sum total in Iran, will be connected via high speed links by September 1999 (this translates to common absorption in the academic sector – 3 points).

While the presence of Iranian commercial and government organizations on the Internet has increased noticeably, we estimate that fewer than 10 percent of the country's companies or government agencies have Internet connections (translating to rare absorption – 1 point).

The health sector remains almost totally absent, the exception being health-related academic institutions and a few hospitals (translating to rare absorption – 1 point).

Overall therefore, sectoral absorption is estimated at barely moderate (5 points).

1.4   Sophistication of Use

To truly understand the Internet capability of a country, it is necessary to understand not only how many and where people use the services, but how the Internet is employed. Of particular interest is the elbow reached when the service is mature enough to attract interest and use outside the narrow community of technicians. A second major milestone is reached when the user community transitions from only using the Internet, to creating new applications, sometimes eventually having an impact on Internet use elsewhere. We describe below the development stages that reflect an increasing sophistication in the use of the Internet.

- *Level 1: Minimal* – The small user community struggles to employ the Internet in conventional, mainstream applications.

- *Level 2: Conventional* – The user community changes established practices somewhat in response to or in order to accommodate the technology, but few established processes are changed dramatically. The Internet is used as a substitute or straight-forward enhancement for an existing process (e.g., email vs. postal mail). This is the first level at which we can say that the Internet has taken hold in a country.

- *Level 3: Transforming* – The user community's use of the Internet results in new applications, or significant changes in existing processes and practices, although these innovations may not necessarily stretch the boundaries of the technology's capabilities.

- *Level 4 Innovating* – The user community is discriminating and highly demanding. The user community is regularly applying, or seeking to apply the Internet in innovative ways that push the capabilities of the technology. The user community plays a significant role in driving the state-of-the-art and has a mutually beneficial and synergistic relationship with developers.

In Iran, the level of sophistication of used is decidedly *Conventional* (Level 2). Despite the limited development of the Internet in Iran, significant expertise has been developed in routine Internet activities, including network operation and management, and web site development. The improving skills of Iranian technicians, system administrators, and web designers are very much evident.

Chapter 2

Internet Connectivity Infrastructure

2.1   History

Origins of the effort to bring the Internet to Iran date back to 1987. At the time, the Internet (also called ARPANET) was a project supported by the Defense Advanced Projects Agency (DARPA), connecting various academic and defense research centers in the US. This network supported only email and simple data transfer (ftp). A similar network supported by IBM was known as BITNET. In Europe, only universities and academic centers were connected to the European Academic Research Network (EARN) which was part of the BITNET network.

Iran's entrance into the Internet was then spearheaded by IPM and its deputy director, Dr. Siavash Shahshahani. The link was at first through the BITNET network and Iran's membership in EARN (which developed later to the Trans-European Research and Educational Networking Association – TERENA). It consisted of a single 9600 baud leased line to the University of Vienna in Austria in January 1993. The first email from Iran was a simple greeting from IPM's director, Dr. Larijani, to Vienna University administrators.

The link later developed into a full-fledged Internet link with the assignment of 500 IP addresses to the country and acceptance of Iran as a Class C node. Primary users of the connection at first were academics and research institutions, all being served through their own connections to IPM.

Over the past few years, domestic Internet connections have grown very rapidly, at times placing Iran among the top countries in terms of rate of growth of Internet access. The present Iranian Internet scene, more than seven years after the original connection, is still a very dynamic one, with tens of thousands of mostly academic users being served via a single 512 kbps link, and with networks and bulletin boards expanding everywhere. Recently however additional outside links have been put into operation by the Iranian PTT, serving mostly commercial entities and government agencies. Ambitious plans for expanding Internet access and availability nationwide have also been announced.

As an indication of the rapid growth of the Internet in Iran, for the first time, the two leading presidential candidates in the May 1997 elections used the world wide web to get their message across: President Khatami at http://www.khatami.com and the conservative candidate Ali Akbar Nategh Nouri at http://nategh.co.ir. Results of the elections were announced "live" on the web site of the Iranian government (http://www.netiran.com) as well.

The technical know-how for putting very fast links into operation in Iran is certainly there. A variety of protocols for satellite channels at T1 speeds of 1.544 Mb/s were tested by the Data Communication Company of Iran (DCI) in the late 1980's. A major reason for lack of progress on fast connections to Iranian universities and research centers for some time was friction between DCI and both IPM and the High Council

of Informatics (HCI) – the governmental body charged with strategic planning of information technology expansion in Iran. At the same time one cannot discount the effect of the U.S. embargo on Iran, which has made the acquisition and maintenance of powerful servers, workstations, and satellite communication equipment difficult, if not impossible in certain cases.

Political tension between Iran and the US unfortunately made an impact on the free flow of information between the two countries as well (despite this last item being specifically excluded from the text of the US embargo on Iran). For a year or so after Iran's Internet debut, U.S. academic sites (on NSFNET) were not even recognizing Iranian IP addresses for telnet/ftp access. This problem resurfaced recently in August of 1996 only to be put swiftly to rest through the efforts of many people and organizations in the US, Europe, and Iran (including IPM, and the Electronic Frontier Foundation), who brought pressure on NSF to correct the situation that had been brought about by unilateral and unauthorized actions of one of its administrators, Dr. Steve Goldstein.

2.2 Internal Internet Connectivity

The infrastructure of Iran's internal internet connectivity is based on two major networks. One is the Public Switched Telephone Network (PSTN) to support connections based on modems. PSTN provides a connection for end-users to ISP's over mostly digital voice lines (see Chapter 3).

The second major internal Internet connectivity is provided by the Public Data Network (PDN) operated by DCI as an independent subsidiary of the *Telecommunication Company of Iran* (TCI). We provide here an overview of this network. For more details on DCI see also Section 4.3.9.

2.2.1 ISDN and VSAT Links

Iran's IP-based Public Data Network (upgraded IRANPAC) is currently in operation in more than 170 locations nationwide based on single or multiple 64 kbps ISDN lines. Currently there are three high speed lines with bandwidths greater than 1 Mbps in this network, with no medium speed lines, about 30 in use 64 kbps, and about 100 in use 28.8 kbps lines. Almost all major cities are connected through multiple 64 kbps lines (see Fig. 2.1), though not all are being actually used.

To provide reliable data communication services to both private and government sectrs, satellite communications through VSAT have been promoted by the authorities as well. Currently this network incorporates one main station (hub) with 200 VSAT terminals.

Future plans for development in this area includes adding another hub station with 700 VSAT terminals to support medium-traffic data communication of the private sector in the next phase, followed by a third hub and 850 VSAT terminals in the last phase with the goal of meeting the needs of private businesses with high-traffic data communication applications.

2.2.2 Protocol usage

Almost 95% of Internet links in Iran use TCP/IP. However IRANPAC also supports the following: X.75, X.25, X.3, (X.28, X.29), BSC, SNA/SDLC, ASYNCH and frame relay. Support of ports up to speeds of 28.8 kbps is provided. Additional support exists for 64 kbps–2 Mbps through leased lines. DCI has recently implemented a trial ATM network as well.

Figure 2.1: Iran's inter-city 64 kbps ISDN lines, as of 1997. The network has since been expanded to include many other cities, including Yazd, Orumieh, Zahedan, Arak, and Rasht.

2.2.3 Reliability

In general reliability of VSAT links in Iran has been below average (below 75% uptime). This is in contrast to generally good (but by no means exceptional) reliability of ISDN leased links (uptime of 75%–90%).

2.3 External Internet Connectivity

Currently external Internet connectivity is provided exclusively through satellite links. Iran's major external internet connections are as follows:

- *IPM:* Currently IPM has a full duplex, symmetric 512 kbps to Burum, The Netherlands. This line will be upgraded soon to 512 Mbps transmit, 1.544 Mbps (T1) receive.

- *DPI:* Data Processing of Iran currently has a 256 kbps full duplex, symmetric connection to Burum, The Netherlands. This connection will be upgraded soon to 512 kbps. DPI also supports about 70 corporate entities and organizations through California-Subic-Bay-Iran Digital Video Broadcast DVB-MPEG2 simplex (receive only) satellite terminals with bandwidth of 200 kbps for each connection.

- *DCI:* The Data Communication company of Iran now has three links to the Internet: a satellite link via Teleglobe and Intelsat 342.5^OE to Canada; a 256 kbps satellite link via Intelsat 006^OE to a Point of Presence (POP) in Kuwait operated by GulfSat, a joint venture of the Kuwait Ministry of Communications and Hughes Network Systems (USA); and a 2 Mbps satellite link via Eutelsat 010^OE to NetSat in France (see Fig. 2.2).

  The Teleglobe link was installed during Phase I of the Iran National IP Project (IranNet) and replaces a link to Interlog, in Ontario, Canada, that used the X.75 protocol, having originally been established to support international communications via Iranpac (see Fig. 2.3).

  Although the X.75 link was very slow (9.6 kbps), it offered the advantage of being relatively inexpensive. The bandwidth of the current link was not reported, although there is a 2 Mbps link between one of IranNet's two gateway routers and the Boumehen earth station near Tehran where the Teleglobe link terminates. DCI's link to GulfSat was installed during Phase II of the IranNet project, and provides connections via GulfSat's VSAT hub near Kuwait City, but subscriptions cost IR 5 million per month on top of a US $30,000 set-up fee. The newest link, to Paris-based NetSat/SDCV, was added during 1998 and provides the highest-speed connection to the Internet (see Fig. 2.4).

- *IRIB:* Islamic Republic of Iran Broadcasting currently has a 2 Mbps full duplex, symmetric connection from The Netherlands to Tehran. However, this line soon will be downgraded to 1 Mbps due to mounting expenses.

- *MFA:* The Ministry of Foreign Affairs currently has a 64 kbps full duplex, symmetric, and encrypted connection through Kuwait-Canada-Tehran, serving secure communication needs with Iranian diplomatic missions abroad.

- *ISC:* Informatic Services Company has a 256 kbps full duplex, symmetric connection through Kuwait-Canada-Tehran.
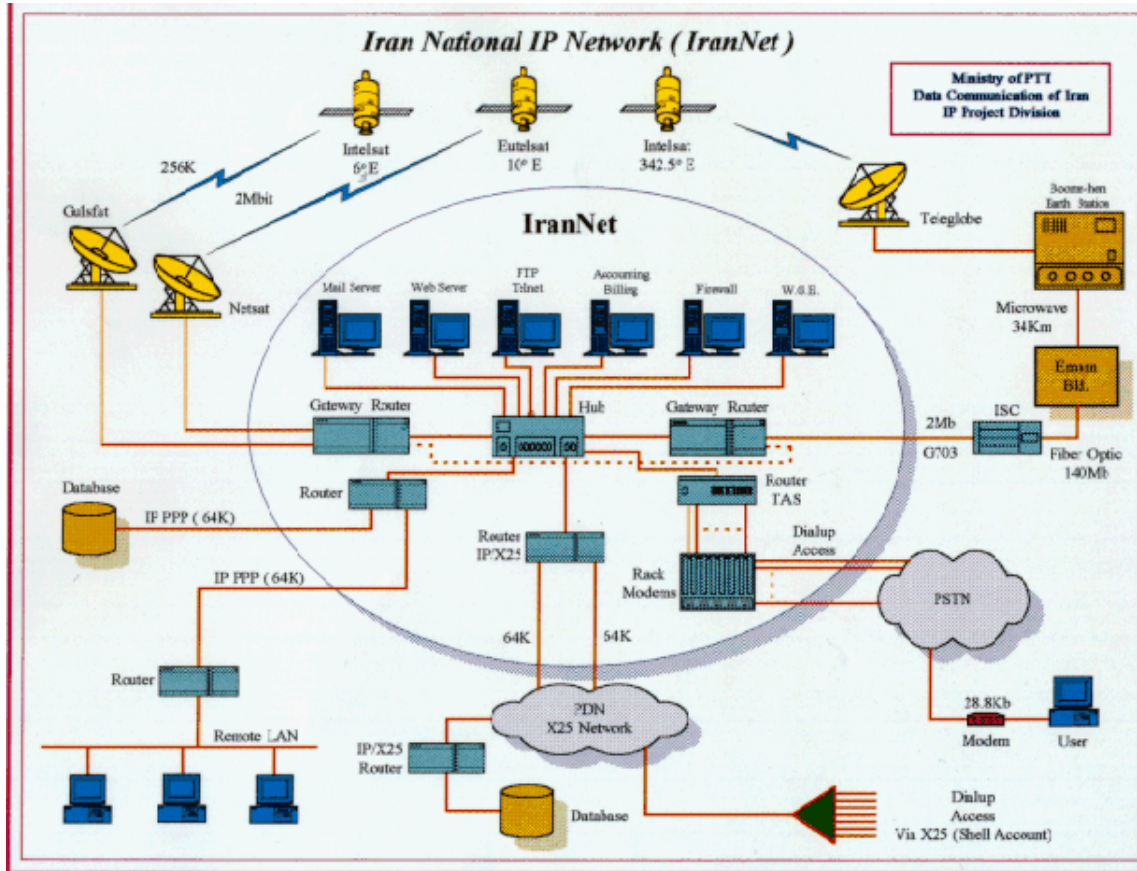
Figure 2.2: Iran's National IP Network
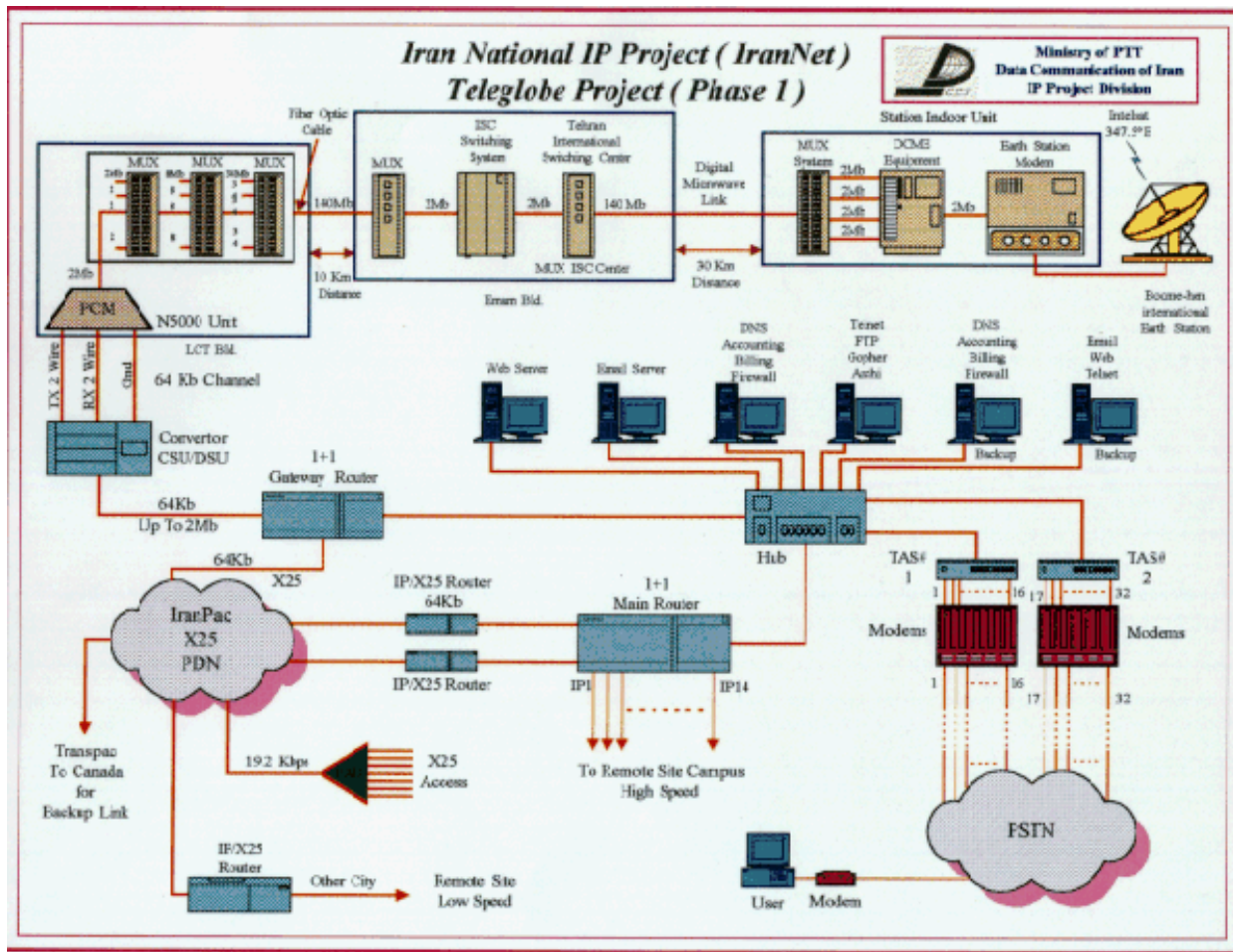
Figure 2.3: Teleglobe Project
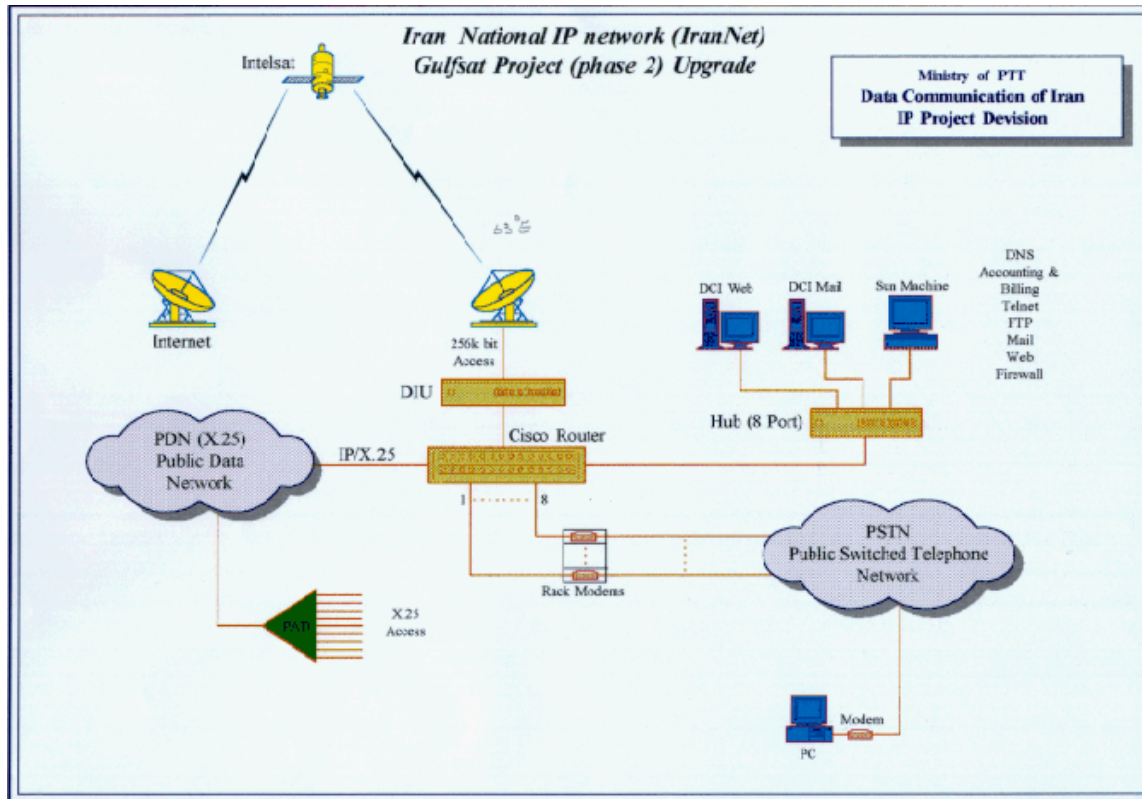
Figure 2.4: Gulfsat Project

- *ISIRAN:* Information Systems of Iran has a 256 kbps full duplex, symmetric connection through Kuwait-Canada-Tehran.

- *Sirjan Special Economic Zone:* is a semi-free zone at Sirjan and has a 256 kbps full duplex, symmetric connection to Finland.

- Others: There are more than a dozen other receive only links of DVB-MPEG2 simplex type to other companies and institutions with download speeds of 200–400 kbps, and uploads of 56 kbps via a v.90 modem.

Growth in the number and bandwidth of external links has been better during the past couple of years since President Khatami's election, and more links are expected to be operational in the near future.

2.3.1 Protocol usage

Iran's external Internet links use TCP/IP over satellite exclusively.

2.3.2 Reliability

External Internet connectivities through satellite have exhibited a very high reliability (uptime of 95–99%).

Chapter 3

Telecom Connectivity Infrastructure

3.1 Internal Telecom Connectivity

3.1.1 Fixed Telephone Lines

One of the main indicators for dimension and size of a telephone network is the number of fixed main lines in the network. A *main line* is a telephone line that connects a subscriber's terminal equipment to the Public Switched Telephone Network (PSTN). It could be an exclusive exchange line or a shared line. However, the number of main lines in a network does not include subscribers' extension lines or private branch exchange lines, and therefore it is not affected by the number of subscribers' operating stations. This is what differentiates between the number of main lines and the number of access lines or the number of subscribers in a telephone network.

Installed Main Lines

Iran's telecommunication network enjoys the highest growth rate in the Middle East. One of the indicators that clearly illustrates this growth rate is the increase in the number of installed main lines. In 1978 there were only about 850,000 fixed lines installed in Iran. This number rose to about 1,767,000 by 1986 and to about 2,380,000 by 1989.

One of the objectives of the first five-year development plan (1989–1994) for the telecommunication sector was to add one million new fixed lines to the network. However, due to the establishment and expansion of many low-capacity and high-capacity exchanges, the actual growth rate that was achieved was considerably higher. In fact more than 3.1 million new main lines were installed during the period of the first five-year plan. Four million new lines were expected to be added by the end of the second five-year plan (1994–1999), which would increase the number of installed main lines to about 9,510,000 fixed lines. Table 3.1 shows the number of installed main lines in Iran for different years.

By March 1999 (end of the Iranian year 1377), there were about 8,285,000 main fixed lines in Iran. Even though this shows an almost 11% growth relative to the 1998 figure, about 1,225,000 additional lines should be installed by March 2000 in order to meet the objectives of the second five-year plan.

Along with the expansion of the size of Iran's telecom network, utilizing advanced methods in traffic measurement, maintenance and operational activities has resulted in considerable efficiency and network reliability enhancements in recent years. According to the annual report of the *Telecommunication Company of Iran* (TCI), network reliability increased to about 98% in 1997.

Year	Installed Main Lines
1978	850,000
1986	1,767,000
1989	2,380,000
1990	2,426,835
1992	3,685,689
1994	5,509,622
1996	6,500,000
1997	7,300,000
1998	7,465,000
03/1999	8,285,000

Table 3.1: Number of installed main lines in Iran.

Main Lines in Operation

The number of installed main lines shows the total capacity of the network, i.e., the maximum number of main lines that *can* be connected. However, it is clear that not all the installed main lines are always in service. Therefore other indicators, related to the number of installed main lines, should be considered. One such indicator is the number of *main lines in operation*. Table 3.2 shows the number of main lines in operation in Iran in different years.

Year	Main Lines in Operation
1978	830,000
1986	1,480,235
1989	1,879,682
1990	2,199,285
1992	2,997,852
1994	4,319,900
1996	5,824,968
1997	6,512,993
1998	6,658,837
03/1999	7,354,000

Table 3.2: Number of main lines in operation in Iran.

Comparing the numbers in Tables 3.1 and 3.2, one observes that the percentage of operational main lines decreased during the first five-year plan while it has started increasing in the second five-year plan. This is in fact due to a higher growth rate for new line installations, and the reduced time it takes for the new lines to become operational. Also note that the number of main lines in service by March 1999 rose to 7,354,000, which shows about 10.5% increase as compared with the corresponding figure in 1998.

Another indicator, which is an important measure of accessibility, is the number of main lines per 100 inhabitants. This indicator is called the *telephone penetration factor*. Table 3.3 shows the number of main lines per 100 inhabitants in Iran in different years. Despite rapid population growth during the war years (approaching 3.8%), this figure has been increasing steadily (Iran's current population growth rate stands at

about 1.4%).

Year	Main Lines per 100 Inhabitants
1978	2.31
1986	2.91
1989	3.77
1990	4.01
1992	5.24
1994	7.21
1996	9.28
1997	10.13
03/1999	13.00

Table 3.3: Number of main lines per 100 inhabitants in Iran.

While the projection of the International Telecommunication Union (ITU) for the number of main lines per 100 inhabitants in Iran in the year 2000 is about 17.03, there were only about 13 main lines per 100 inhabitants by March 1999.

As another indicator of telecom network usage profile, we can look at the percentage of main lines which are serving residential households. This clearly excludes public telephone stations and lines used for business, government or any other professional purposes. Table 3.4 shows the percentage of main lines for residential use in Iran.

Year	% of Residential Main Lines
1979	81.00
1987	65.00
1989	70.00
1990	76.19
1992	77.00
1994	65.00
1996	74.92
1997	79.18

Table 3.4: Percentage of residential main lines in Iran.

Finally we should note that the percentage of main lines, which are equipped for direct international dialing, has been steadily increasing as well. Specifically, in 1992, only about 39.2% of main lines had direct international dialing capability, while this number rose to about 80% in 1995, and is projected to be close to 90% now.

Digital Main Lines

Along with the general expansion of the telephone network in Iran, the percentage of digital main lines has also been increasing. In 1991 only 12.58% of the main lines in operation were digital. This percentage rose to about 48% at the end of the first five-year plan in 1994 and it rose to 62.58% in 1997, which translates

to about 4,076,000 digital main lines in 1997. Table 3.5 shows the percentage of digital main lines in Iran from 1991 to 1997.

Year	% of Digital Main Lines
1991	12.58
1992	32.20
1993	37.53
1994	47.98
1995	50.66
1996	56.43
1997	62.58
1999	> 80 (estimate)

Table 3.5: Percentage of Digital Main Lines in Iran

So far TCI has converted about 55% of existing lines to digital lines, while more than 90% of newly installed exchanges are digital. The current total percentage of digital main lines is estimated to be over 80%.

3.1.2 Local Exchanges

The number of high capacity and low capacity local exchanges has been growing at a tremendous rate. This has resulted in considerable growth in the number of local exchange communication channels which has made it possible to provide telecommunication services in some of the farthest reaches of Iran.

In 1995, there were only 122 high capacity and 244 low capacity exchanges while these numbers rose to 1,051 and 1,666 respectively by 1997.

On the other hand, in 1979, there were only about 5,400 local exchange channels in Iran. This number rose to 11,429 in 1986 and to 31,442 in 1991 and is expected to exceed 100,000 by the year 2000.

3.1.3 Long-Distance Exchanges

The long-distance telecommunication network in Iran has a three-layer hierarchical structure. In other words, switching centers are operating in three levels:

- **Secondary Centers (SCs)**: These are the *regional transit exchanges* which are established in 8 major cities. Specifically, the centers are located in Tehran, Tabriz, Mashad, Isfahan, Shiraz, Ahvaz, Hamedan, and Babol. To enhance reliability of the network, redundant configurations have been deployed. Namely, in each city two SCs have been established. The two centers in Tehran and Hamedan are both digital, while other cities have one digital and one analog center each. The analog centers, however, are expected to be converted to digital centers soon.

- **Primary Centers (PCs)**: These are the *long-distance transit exchanges*. According to TCI's latest annual report, in 1997, 59 long-distance transit centers were active, 48 of which were digital. It is expected that 25 new PCs will be established which will increase the number of PCs to 84 by the end of 1999.

- **Terminating Exchanges (TXs)**: In 1997, 1,800 terminating exchanges were deployed to provide telecommunication services for the farthest reaches of Iran. The number of TXs is expected to increase to 3,600 by the end of 1999.

In 1997, the national long-distance telecommunication network provided reliable services in 1,930 nodes throughout the country using about 182,000 trunks.

3.1.4 International Exchanges

The international telecommunication network in Iran is currently based on two digital *International Switching Centers* (ISCs). Iran's second ISC with a capacity of 12,260 ports was established in 1996 in Tehran (the first ISC is also in Tehran). According to TCI's annual report, in 1997, the two ISCs had a total capacity of about 22,000 ports, 7,600 incoming trunks from the national network, and 3,900 both-way outgoing trunks. A third ISC is expected to be established in Shiraz in the near future which would increase the total capacity by about 9,840 ports.

Through the development and expansion of ISCs, the number of international circuits has clearly increased. In 1991, there were only about 1,854 international circuits in Iran. This number reached 7,021 in 1996, which shows about 279% increase in the period of five years. The total number of international circuits by March 1999 (end of the Iranian year 1377) was 7,937. Table 3.6 shows the number of international circuits in Iran.

Year	Number of International Circuits
1991	1,854
1992	2,259
1993	2,759
1994	4,586
1995	5,038
1996	7,021
03/1999	7,937

Table 3.6: Number of international circuits in Iran.

Moreover the number of network centers with international channels was 604 in 1997, which increased by about 24% to reach 750 centers in 1998.

Iran currently uses No. 5 and CCS7 (*Common Channel Signaling System No. 7*, also known as C7) signaling systems to establish direct and transit routes with different countries. These routes are established through Shahid Ghandi, Isfahan and Boumehen satellite earth stations, Iran-UAE submarine cable, Trans-Asia-Europe (TAE) optical fiber lines and terrestrial microwave links.

3.1.5 Channel Types and Usage

Microwave Channels

The national microwave network in Iran has been expanding tremendously along with other telecommunication network sectors. The number of microwave channels increased by 26,527 in 1994, by 60,320 in 1995 and by 32,000 in 1997. As of March 1999, there were about 305,550 microwave channels in Iran. Table 3.7 shows the number of microwave channels in Iran for different sample years.

Year	Number of Microwave Channels
1978	12,213
1986	27,716
1995	204,417
1997	272,000
03/1999	305,550

Table 3.7: Number of microwave channels in Iran.

Moreover, the aggregate length of the microwave transmission lines was about 60,700 km in 1991, which increased to 65,287 km by 1997 and is expected to reach 137,000 km by the year 2000.

According to TCI's annual report, in 1997, the microwave network in Iran consisted of about 4,400 microwave stations and provided about 97% of the national long-distance services, showing almost 10% growth as compared with 1996 figures. The overall capacity of this network, 70% of which was digital, was about 137.5 million ch×km for main routes and about 45.5 million ch×km for spur routes.

One problem with the current microwave network in Iran is that except the T6 center in Tehran, which is based on Siemens technology, the existing systems can not provide effective and reliable service on all channels.

Optical Fiber Channels

Optical fiber channels are rapidly gaining an important foothold in the Iranian telecom network, partly due to cost-effective, fully domestic production of a variety of fiber optic cables and systems. In 1996, 2,010 km of fiber optic cable interconnected some major local exchange centers. The total length of the long-distance fiber optic cable network in Iran is currently 12,000 km.

At the end of the second five-year development plan, (20 March 1999), an extensive nationwide fiber optic network became operational that provides high-bandwidth connections between all provincial capitals and major cities. Transmission systems use *Synchronous Digital Hierarchy* (SDH) technology with a capacity of 155 Mbps for radio equipment and 2.4 Gbps for optical equipment. This enables the establishment of 30,000 voice circuits through each fiber optic cable pair.

As part of future plans for development of the optical communication network in Iran it is expected that the total length of the long-distance fiber optic cable network will increase to 15,000 km of buried cable for the main network; 14,000 km of aerial cable for the alternate routes; and 2,200 km of main cable network for the international Trans-Asia-Europe (TAE) project which provides approximately 900,000 circuits.

The Trans-Asia-Europe (TAE) "Silk Road" fiber optic network, connecting Shanghai, PRC, with Frankfurt-am-Main, FRG, via two redundant lines through northern Iran, currently puts 33 Iranian cities directly on line with Europe and the Far East and provides high-bandwidth access for the rest of the country. The system comprises 1,550 nm mono-mode fiber optic cable using SDH transmission technology operating at the STM-4 (622.080 Mbps) data rate, with the possibility of being speeded up to STM-16 (2.488 Gbps). The system as currently configured can carry 7,560 channels of traffic. All of the cable and transmission equipment used in the Iranian and Turkmen sections of the TAE was manufactured in Iran.

Satellite Channels

For the remote areas of the country where facilities other than satellite would not have been economical, a domestic satellite communication facility has been implemented. Currently there are six main stations in six provinces with 192 channels, and 55 remote stations operational in Iran.

The next phase of the development of domestic satellite communication in Iran is expected to be complete by mid-1999 and it will incorporate 18 main and 831 remote stations.

3.1.6 Geographic Coverage

Rural Communications

Development and expansion of rural communication has been one of TCI's major objectives. Following this goal, different types of systems such as point-to-point and point-to-multipoint digital radio, aerial optical fiber cable and satellite systems have been used in order to provide communication facilities for rural areas in Iran. It should also be mentioned that TCI has mostly used domestically manufactured products for small switching centers for villages. Also recently there has been some tendency towards transferring the management and control of the switching centers with less than 2,000 lines to the private sector. Even though this plan has attracted some attention among Iranian companies, so far it has not proven commercially attractive, mainly due to the subsidized costs of telecommunication services in Iran.

TCI's development plans for rural communication has resulted in a high growth rate in the number of villages covered by the telephone network. Table 3.8 shows the number of villages connected to the national telecommunication network, excluding those under satellite coverage.

Year	Number of Villages
1979	313
1987	3,220
1994	8,700
1995	12,100
1997	16,175
1998	16,457
03/1999	18051

Table 3.8: Number of villages connected to the national telecommunication network in Iran, excluding those under satellite coverage.

Only in 1997, 1,625 villages joined the network which resulted in about 11% growth rate, bringing the total number of connected villages to 16,175, which comprises more than 80% of the rural population. Moreover, the number of villages covered by satellite systems was reported to be 3,137 by August 1997 which then increased by about 13% in a year and resulted in the total number of 3,556 villages, under satellite coverage, by August 1998.

The target figure for the end of the second five-year development plan was to provide 20,000 villages with communication facilities. However, the current number of villages, including those under satellite coverage, already exceeds this figure.

Urban Communications

Along with the increase in the number of villages under service, urban communication has also shown considerable growth. The number of regions with a city code increased from 1,748 in August 1997 to 2,005 in August 1998, which shows about 14.7% increase. On the other hand, the number of cities which are equipped with inter-city telephone lines increased from 384 in 1991 to 750 in 1998. Table 3.9 shows the number of cities with inter-city phone lines for four sample years.

Year	Number of Cities
1978	70
1986	218
1991	384
1998	750

Table 3.9: Number of cities equipped with inter-city telephone lines in Iran.

Another indicator for assessing the status of urban communications in Iran is the percentage of the main lines in urban areas. Table 3.10 shows this percentage for a period of five years. Considering the total number of main lines in operation, as given in Table 3.2, the total number of urban main lines and the corresponding growth rate can be explicitly obtained.

Year	% of Urban Main Lines
1991	97.60
1992	95.51
1993	94.05
1994	88.00
1995	87.00
1996	92.00

Table 3.10: Percentage of urban main lines in Iran.

As another indicator, Table 3.11 shows the number of main lines in Tehran, as the largest city, for the period 1991–1996.

Year	Number of Main Lines
1991	735,125
1992	881,721
1993	1,043,404
1994	1,241,045
1995	1,478,030
1996	1,615,276

Table 3.11: Number of main lines in Tehran as the largest city in Iran.

3.1.7   Area Codes

As mentioned in the previous subsection, the total number of regions with a city code increased from 1,748 in August 1997 to 2,005 in August 1998. Table A-1 in Appendix A includes area codes for most major localities in Iran.

3.2   External Telecom Connectivity

3.2.1   Fiber Optical Links

Trans-Asia-Europe Project

Agreed in 1993, the world's longest overland fiber-optic system, the Trans-Asia-Europe (TAE) line crosses 27,000 kilometers and provides digital circuits for transmitting voice, data, fax and video information from Shanghai to Frankfurt and hundreds of other cities on the way. Most of the route follows the ancient Silk Road trading route linking China to Europe. Built by a consortium of telecom companies, including *Deutsche Telekom* and *China Telecom*, the cable will be able to carry voice telephony and data traffic with a 155 Mbps capacity, equivalent to between 13,000 and 15,000 simultaneous telephone calls. The total investment on the TAE runs up to about US $560 million.

Participants in the project include China, Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan, Turkmenistan, Iran, Turkey, Ukraine, Belarus, Poland, Romania, Hungary, Austria, Germany, Georgia, Azerbaijan, Armenia, Pakistan and Afghanistan.

Siemens provided most of the equipment for the trunk line passing through the former Soviet Union. An opening ceremony was held by video-conference among the participating countries on October 14, 1998 after years of preparation.

The cable begins in Shanghai, travels 6,000 kilometers (3,750 miles) from Shanghai to the Chinese border with Kazakhstan, and passes through southern Kazakhstan.

The Kazakh stretch of the cable is 1,750 kilometers. A trunk line of 1,500 kilometers passes from the Chinese frontier through Almaty and Dzhambul and southern Kazakhstan to Uzbekistan. The Kazakh Optical communication system provides speeds of up to 622 megabits per second and traffic of up to 7,560 telephone calls at a time. The Kazakh stretch of the cable and its infra- structure cost $25 million, including DM 18.7 million provided by Siemens.

The Uzbek stretch of the cable traverses the republic from the Kazakh frontier via Tashkent, Dzhizak, Samarkand and Alat to the Turkmen frontier. The Uzbek stretch cost 2 billion Sums ($1=106.18 Sums) and was paid for using a DM 25 million credit from Kreditanstalt fur Wiederaufbau, the German export credit agency, under guarantees from the Uzbek government.

The line then goes through Turkmenistan, Iran and Turkey. The Turkmenistan connection was fully implemented by the Telecommunication Company of Iran in one year and involved the installation of 721 kilometers (432 miles) of optic fiber in the stretching from Iran's Bajgiran border crossing to Ashkhabad, Tajan, Merv and Charju and from there to the fiber optic network of Uzbekistan. Six kilometers of the network is linked with aerial grid, but the rest of the 715-km network is connected with underground cable. Forty kilometers of the grid on the mountainous area is steel-coated cable laid on the surface.

From Turkey the TAE cable forks, continuing to Germany via Ukraine, Belarus, Poland, Romania, Hungary and Austria. The end point is Frankfurt.

Figure 3.1: The Trans-Asia-Europe "silk road" map.

Submarine Links

Another fiber optic link connects TCI's network at Jask on Iran's southern coast, to Fujairah in the UAE. This underwater line, 172 km in length, is a direct connection with no repeaters, supporting up to 140 Mb/s bit rate over 6 fiber pairs. It was implemented by Alcatel (see Fig. 3.2).

Such unrepeatered systems are mainly used to cross short stretches of water in different types of connections: mainland to mainland, mainland to island or island to island. Because there is no submerged electronics, unrepeatered systems offer cost-effective solutions, competitive with microwave, land cables and satellite alternatives.

3.2.2   Satellite Channels

Since 1991, Iran's satellite connection to the international network has been established though three satellite earth stations, six antennas and approximately 1000 channels.

Iran's largest satellite station is the Inmarsat land earth station at Boumehen, near Tehran, operating in A and C bands which routes calls beamed from mobiles via the Indian Ocean satellite to and from terrestrial telephone networks. The station was inaugurated by President Rafsanjani on May 20, 1995, and was billed as the largest satellite telecommunication center in the Middle East at the time. It is located 35 kilometers northeast of Tehran, and serves 1,250 telephone channels and international telex lines. The satellite center enables a range of domestic communication and signal dispatch as well as extended access to direct telephone and telex links with sea bound vessels in Europe, Africa and Asia.

Another large station is in Astarabad, Hamedan.

A Memorandum of Understanding (MOU) signed on November 24, 1998 between Inmarsat (the global mobile satellite communications operator) and Thuraya (the Middle Eastern organization building a regional satellite system due for launch in 2000) provides a framework for discussing the development of Mobile Satellite Services (MSS) in the Middle East. According to this MOU it is forecast that Inmarsat Band M services will also be provided in the Bumehen station.

Figure 3.2: Alcatel's Indian Ocean and Middle East optical fiber submarine systems.

Future Developments

Since the 1970's Iran has considered establishing a GEO (Geostationary Earth Orbit) communications satellite network. After several abortive attempts, Iran reached a tentative agreement in 1993 to purchase a pair of western satellites for its *Zohreh* (Venus) system. France and Italy are said to be involved in manufacturing of the satellites. However, the Chinese Space Agency will be the launch partner.

Zohreh will be used to provide telecommunications facilities to remote areas in Iran; to support terrestrial telephony; to provide military and data communications; and to develop Iran's broadcasting capacity. With spacecraft stationed at 26 degrees E and 34 degrees E, the Zohreh system will provide both L-band (INMARSAT-compatible) and Ku-band (14 transponders) links. The 1,800 watts, 1,850-kg spacecraft are to be furnished by Alcatel Espace and Aerospatiale with design lifetimes of 10 years. In the meantime, Iran is leasing Ku-band capacity on INTELSA spacecraft.

The telecommunications capacity supported by these two satellites is expected to be 12,000 telephone and 4 television channels. The provisions considered for these satellites include five land stations with antennas between 1.5 to 5.5 meters in diameter, 135 primary and secondary stations, 27 zonal stations, 31 community stations and 1,374 rural stations.

Head of Iran Telecommunications Research Center (ITRC) announced on March 6, 1999 that a small low earth orbiting (LEO) communication satellite, called *Mesbah*, is currently under design by his center, in cooperation with the *Iranian Research Center for Science and Technology* (IROST), and the *Iranian Remote Sensing Center* (IRSC). This will be a test light-weight satellite operating in the radio amateur band.

Iran is expected to have domestic launch capability for low earth orbiting satellites by 2001, as part of the *Shahab-4* rocket system under development by research divisions the *Defense Industries Organization*.

Chapter 4

Internet Organizational Infrastructure

4.1 Domain Name Providers

4.1.1 IPM

Domain names under the .ir top level domain are assigned by the Institute for Studies in Theoretical Physics and Mathematics (IPM), which also operates Iran's largest Internet Service Provider, IRANET, at

> IRANET/IPM
> P.O. Box 19395–1795
> Tehran, Iran
> Fax: +98 21 229–8656
> registry@ipm.ac.ir
> http://www.iranet.net.ir

Who May Apply?

The following categories of entities may apply for a .ir domain name:

1. Organizations legally represented within the geographical boundary of Iran.
2. Organizations connected with the legal representations of Iran abroad.
3. Individuals residing officially in Iran.
4. Other Individuals engaged in activity connected with Iranian interests.

IPM reserves the right of determination, within national legal limits and normal international practice, of whether an applicant fulfills one of the above criteria. For the purposes of domain name reservation, IPM may waive the above requirements if the applicant presents sufficient evidence that it is in the process of establishing necessary conditions.

Types of Registration Service

The Following types of registration under the DNS top-level domain .ir are available:

1. Fully delegated domains

2. Mail Exchanger (MX/only) registration.

Reservations for the above types of domain, as well as renewal and modification of them are handled by IPM. The relevant forms are available online at the IRANET Network Information Center at http://www.iranet.net.ir/question.html.

Types of Subdomains

- .ac.ir – For academic organizations under supervision of the Ministry of Culture and Higher Education or the Ministry of Health and Medical Education of the Islamic Republic of Iran.

- .gov.ir – For non-academic governmental organizations.

- .or.ir – For other recognized non-profit organizations and international organizations of which the Government of the Islamic Republic of Iran or an institution thereof is a member.

- .net.ir – For network and data service providers only.

- .co.ir – For all other non-governmental organizations, companies and individuals.

Requirements

1. IPM may ask for documents or other evidence supporting the requested classification. In particular, applicants for net.ir must provide their network map with the application form, and must also provide legal evidence of being an authorized provider.

2. One-letter domain names, two-letter country codes and certain other names are forbidden or reserved as domain names.

3. The requested domain name should refer in a reasonable way to the name of the organization/company/individual seeking registration.

4. The administrative contact (referenced in the .ir application form) should be a person empowered by the applicant to deal with legal and financial matters arising from this registration.

5. At least two name servers (or one mail exchanger if a fully delegated domain is not requested) *must* be configured to handle the domain before the application is submitted.

Application Procedure

Applicants must fill out the proper .ir application form (use only ASCII text) at

> http://www.iranet.net.ir/question.html

and send it to registry@ipm.ac.ir together with supporting documents. Within a week of receipt of the application, the applicant will be informed by email or fax of the confirmation of name assignment, reasons for incompleteness of application or its rejection.

Additionally, to obtain IP numbers, RIPE's form ripe-141.txt, available at

> http://www.ripe.net/docs/ripe-141.html

must be filled out and sent to registry@rose.ipm.ac.ir.

Instructions for filling out this form are found in the accompanying document, *Supporting Notes for the European IP Address Space Request Form*, (ripe-142), at

http://www.ripe.net/docs/ripe-142.html.

Usually, it takes one week to process requests below 3 Class C IP numbers. Any request above 3, takes at least one month.

IPM also run a WHOIS service. The corresponding form is available at

http://www.iranet.net.ir/forms/whoisreg.html.

Charges

The following fees are compulsory beginning 21 March 1998. Prior to this date, applicants were requested to donate the designated amount as assistance to the IPM Research Fund.

1. US $100.00 or IR 500,000 – Initial registration for fully delegated domain.
2. US $50.00 or IR 250,000 – Initial MX/only registration.
3. US $50.00 or IR 250,000 – Each modification.
4. US $25.00 or IR 125,000 – Name reservation (yearly).
5. US $75.00 or IR 375,000 – Maintenance fee (for three years) for (1) and (2).

Applicable fees are due within a month after the confirmation of registration.

Notes

1. .ac.ir users are granted 50% reduction in (1) and (5).

2. IPM takes no responsibility for any legal issues arising from the use and application of the given name.

3. All payments are non-refundable.

4. Domain names inactive for one year may be deleted unless prior arrangements are made. Any re-application should be preceded by the settlement of outstanding fees.

5. Registered names are non-transferable.

6. Regulations outlined here are effective for domains already registered according to a schedule that has been announced to each registered entity.

7. IPM honors the currently operative procedures of Internet Domain Name Servers as outlined in RFC documents.

4.1.2 Network Solutions

Reservation and registration of .com, .net, and .org domains residing physically in Iran is possible as well (for instance irib.com for the state broadcasting authority), and handled via Network Solutions, the global registrar for these domains. For policy and fees, refer to Network Solutions' web site at http://www.networksolutions.com.

4.2   Registries

A number of registries serve the IR domain. The primary one is the RIPE Network Coordination Center. Others are either RIPE members, or independent operators.

4.2.1   RIPE NCC

RIPE NCC	Tel: +31 20 535–4444
Singel 258	Fax: +31 20 535–4445
1016 AB Amsterdam	Email: ncc@ripe.net
The Netherlands	http://www.ripe.net

Table 4.1: Contact information for RIPE NCC

The RIPE Network Coordination Center performs activities for the benefit of Internet service providers (ISPs) in Europe and surrounding areas (Middle East, and parts of Asia and Africa); primarily activities that the ISPs need to organize as a group, although they may be competing with each other in other areas.

The RIPE NCC acts as the Regional Internet Registry (RIR) for Europe and surrounding areas. The Internet Assigned Numbers Authority (IANA) allocates blocks of IP address space to Regional Internet Registries. RIPE NCC allocates blocks of IP address space to its Local Internet Registries (LIRs), who assign the addresses to end users. At the moment RIPE NCC supports over 1100 Local Internet Registries, who provide funds for its services.

Local Internet Registries that offer services in conjunction with RIPE NCC in Iran are the following.

4.2.2   IPM

This registry has the RIPE NCC contribution category: *Medium*.
Its RIPE NCC Association Membership status is: *Full*.

Institute for Studies in Theoretical	Tel: +98 21 229–1812
Physics & Mathematics (IPM)	Fax: +98 21 229–8656
Pasdaran Avenue, Northern Ekhtiarieh	Email: registry@rose.ipm.ac.ir
Mehran Alley	http://www.iranet.net.ir
P.O. Box 19395–1795, Tehran, Iran	

Table 4.2: Contact information for IPM

IPM is the primary Internet name and service provider in Iran and Iran's Representative to the Trans-European Research and Educational Networking Association (TERENA).

4.2.3   International Reliable Access Networks

This registry has the RIPE NCC contribution category: *Small*.
Its RIPE NCC Association Membership status is: *None*.

IRAN Inc. is essentially the registry arm of the Data Communication Company of Iran (DCI), originally set up as part of DCI's first Internet service site in Canada, dci.iran.com.

International Reliable Access Networks (IRAN) Inc. 4 Ahornallee A. Kaduva 31162 Bad Salzdetfurth, Germany	Tel: +1 905 889–9455 Tel: +49 506–0729 Fax: +1 905 881–790 Email: nic@reliable-access.net http://www.iran.com http://www.reliable-access.net

Table 4.3: Contact information for International Reliable Access Networks

4.2.4 Teleglobe International

This registry has the RIPE NCC contribution category: *Small*.
Its RIPE NCC Association Membership status is: *Candidate*.

Teleglobe International Corporation 1751 Pinnacle Drive Suite 1600 McLean, Virginia 22102, USA	Tel: +1 703 821–4849 Fax: +1 703 821–4885 Email: ipasha@teleglobe.net http://www.teleglobe.com http://www.teleglobe.net

Table 4.4: Contact information for Teleglobe International

Teleglobe was DCI's first service provider, managing links to Canada and France.

4.2.5 Gulfsat

This registry has the RIPE NCC contribution category: *Small*.
Its RIPE NCC Association Membership status is: *Full*.

GulfSat P.O. Box 2400 Safat, Kuwait	Tel: +96 5 240–2201 Fax: +96 5 240–2200 Email: venu@gulfsat.com prasad@gulfsat.com http://www.gulfsat.com

Table 4.5: Contact information for Gulfsat

4.2.6 Origin BV

This registry has the RIPE NCC contribution category: *Small*.
Its RIPE NCC Association Membership status is: *Full*.

4.2.7 Al-Multajahat

This registry has the RIPE NCC contribution category: *Small*.
Its RIPE NCC Association Membership status is: *Full*.

Origin BV	Tel: +31 40 278–5747
Building HWO	Fax: +31 40 278–9081
P.O. Box 218	Email: mark.vanlinder@nl.origin-it.com
5600 MD Eindhoven, The Netherlands	http://www.origin-it.com

Table 4.6: Contact information for Origin BV

Al-Multajahat Inc.	Tel: +96 2 669–8631
Amman Central Post Office	Fax: +96 2 669–8632
P.O. Box 926375	
Amman, Jordan	

Table 4.7: Contact information for Al-Multajahat

4.2.8   Holy See – Vatican city state

This registry has the RIPE NCC contribution category: *Small*.
Its RIPE NCC Association Membership status is: *Full*.

Holy See – Vatican City State	Tel: +39 06 69.88.23.54
Internet Office of the Holy See	Fax: +39 06 69.88.20.67
Cortile del Triangolo	Email: lir@vatican.va
00120 Vatican City State	http://www.vatican.va

Table 4.8: Contact information for the Holy See – Vatican city state

4.3   Internet service providers

As of the date of this report, some 32 Internet Service Providers (ISPS) operate in Iran. Only a handful however can be considered major players, and most others simply offer offline or email services only. Descriptions of all of them, along with details of their services and fees, are provided below.

4.3.1   0 and 1 Processing

0 and 1 Processing is a new ISP, not yet fully established. It is only offering email services at this point.

Background Information

Name	Sefr'o Yek Pardaz
	0 and 1 Processing
Address	19 Seoul Street, Vanak Street
	Tehran, Iran
Tel	+98 21 254–1326-7
Fax	+98 21 254–1329
Homepage	http://0and1p.com
Founders	Kambiz Mizanian
Contact	administrator@kanoon.net
Type	Private

Table 4.9: 0 and 1 Processing Background Information

4.3.2 Abdi Network

Background Information

Abdi Networks offers industrial information databanks, news services, databases and Persian language software programs. These services will be available in English by the end of summer 1999.

Name	Abdi Industrial Information Network
Address	45 Amir Bazar, Marlik, Karaj, Iran
Tel	+98 261 656–669
Fax	+98 261 659–992
Homepage	http://www.abdnet.com
Founders	Dr. Abdi
Contact	info@abdnet.com
Type	Private

Table 4.10: Abdi Network Background Information

Hardware and Software Capabilities

Operating systems	Windows NT 4.0
Hardware platforms	Pentium II

Table 4.11: Abdi Network Hardware and Software Capabilities

International Link Specifications

Typical upload speeds	Leased line: 33,600 bps
Typical download speeds	600 kbps
Link type (VSAT, fiber, ...)	
Number of links	2
Connection network and node in Iran	DPI, DCI

Table 4.12: Abdi Network International Link Specifications

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	
Data banks	Yes
Advertisements	Yes
Realaudio/video streaming/on demand	Yes
Fax over internet service	Yes
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	Yes
International web service	
Number of dial-up lines	32
Domain name registration service	
Other services	BBS, IRC

Table 4.13: Services Provided by Abdi Network

Content Provision

e-magazines	Yes
News services	Yes
Chat rooms	Yes
Other	Dictionary

Table 4.14: Content Provision by Abdi Network

4.3.3 Aftab

Background Information

Aftab is a new ISP, not yet fully established.

Name	Aftab
Address	
Tel/Fax	
Homepage	http://www.aftab.net.ir
Founders	
Contact	postmaster@aftab.net.ir
Type	Private

Table 4.15: Aftab Background Information

4.3.4 Apadana

Background Information

Apadana is among the most popular ISPs in Iran. The company is in the process of developing its own internal information network and unique content. Present plans call for establishment of teleconferencing, Iranian newsgroups, and a *Yahoo!*-like search and indexing service.

Apadana is currently connected to the Internet by IP over satellite and also by a leased lined through DPI.

Name	Apadana
Address	955 Shariati Avenue (Apadana Building), 2nd floor
	Box 16325–894
	Tehran, Iran
Tel	+98 21 285–1020, 221–4493/4
Fax	+98 21 285–1024, 221–4494
Homepage	http://www.apadana.com
	http://www.apadana.net.ir
Founders	Mr. Mohammadi, Managing Director
Contact	info@apadana.com
Type	Private

Table 4.16: Apadana Background Information

Hardware and Software Capabilities

Operating systems	Windows NT 4.0
Hardware platforms	PC

Table 4.17: Apadana Hardware and Software Capabilities

International Link Specifications

Typical upload speeds	
Typical download speeds	
Link type (VSAT, fiber, ...)	
Number of links	2
Connection network and node in Iran	DPI

Table 4.18: Apadana International Link Specifications

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	No
Data banks	No
Advertisements	Yes
Realaudio/video streaming/on demand	Real audio only
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	Yes
International web service	Yes
Number of dial-up lines	
Domain name registration service	Yes
Other services	Offline email, telnet, mail forwarding, forums, guestbook, local BBS

Table 4.19: Services Provided by Apadana

Content Provision

e-magazines	No
News services	No
Chat rooms	No
Other	

Table 4.20: Content Provision by Apadana

Fees

Service Category	Services Provided	Fees
Bronze	Domestic only Internet access, homepage, ftp and email	IR 100,000 annual
Silver 0	International Internet access and email one hour of connection per day	IR 300,000 annual + IR 10 per kbyte (minimum of IR 100,000)
Silver 1	International Internet access and email one hour of connection per day	IR 700,000 annual + IR 7 per kbyte (minimum of IR 700,000)
Silver 2	International Internet access and email two hours of connection per day	IR 1,000,000 annual + IR 6.5 per kbyte (minimum of IR 1,400,000)
Silver 4	International Internet access and email four hours of connection per day	IR 1,600,000 annual + IR 6 per kbyte (minimum of IR 2,800,000)
Gold	All Silver services + homepage http://www.apadana.com/username/ http://www.apadana.net.ir/username/ with no size limit	Charges are as in Silver + IR 300,000
Domain registration	www.companyname.com or networkname.net.ir Email forwarding	IR 2,650,000 annual
Domain Service	Domain registration + email, ftp, web, hypernews guestbook, chat room, majordomo	IR 7,550,000 annual
Other charges for all except Bronze	Email sending/receiving (50% discount for emails larger than 50 kb)	IR 40/10
	File transfer to Internet for Gold and Domain Service only	IR 300 per kb

Table 4.21: Apadana Fees

4.3.5 Arayandeh

Background Information

Name	Arayandeh
Address	25 North Sohrvardi Avenue, East Hoveyzeh Alley
	Tehran, Iran
Tel	+98 21 873–8305, +98 911 203–1698 (mobile)
Fax	+98 21 876–3574
Homepage	http://www.arayandeh.net
Founders	Ali Enteshari, pars@www.dci.co.ir
Contact	postmaster@arayandeh.net
Type	Private

Table 4.22: Arayandeh Background Information

4.3.6 Avand

Background Information

Name	Avand
Address	P.O. Box 19985–554, Tehran, Iran
Tel	+98 21 206–8757
Fax	+98 21 206–1684
Homepage	http://www.avand.net
Founders	Shahvand Yousefizadeh, shahvand@yahoo.com
Contact	webmaster@avand.net
Type	Private

Table 4.23: Avand Background Information

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	
Data banks	No
Advertisements	Yes
Realaudio/video streaming/on demand	No
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	Yes
Domestic only web service	Yes
International web service	Yes
Number of dial-up lines	
Domain name registration service	No
Other services	Cyber mall, Chat room, netmeeting

Table 4.24: Services Provided by Avand

Content Provision

e-magazines	No
News services	No
Chat rooms	Yes
Other	

Table 4.25: Content Provision by Avand

4.3.7 Central Net

Background Information

Name	Central Net
Address	P.O. Box 15875–3748, Tehran, Iran
Tel	+98 911 230–5430, +98 911 202–0309 (mobile)
Fax	+98 21 299–4498
Homepage	http://www.iran-central.net
Founders	Ali Enteshari, pars@www.dci.co.ir
Contact	central@iran-central.net
Type	Private

Table 4.26: Iran Central Network Background Information

Provided Services

Online/Offline	
Web access	Yes
Usenet news/NNTP server	
Data banks	
Advertisements	
Realaudio/video streaming/on demand	
Fax over internet service	
Telephone over internet service	
Postal mail over internet service	
Domestic only web service	Yes
International web service	
Number of dial-up lines	
Domain name registration service	Yes
Other services	

Table 4.27: Services Provided by Iran Central Network

Content Provision

e-magazines	
News services	Yes
Chat rooms	
Other	BBS

Table 4.28: Content Provision by Iran Central Network

4.3.8 Chapar Rasaneh

Background Information

Name	Chapar Rasaneh
Address	16 Apadana Alley, Chamran Junction
	Vali-asr Ave, Tehran, Iran
Tel	+98 21 204–3803
Fax	+98 21 204–3513
Homepage	http://www.chapar.net
Founders	Payam Davai, payamd@www.dci.co.ir
Contact	info@chapar.net
Type	Private

Table 4.29: Chapar Rasaneh Background Information

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	
Data banks	
Advertisements	
Realaudio/video streaming/on demand	Yes
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	
Domestic only web service	Yes
International web service	Yes
Number of dial-up lines	
Domain name registration service	No
Other services	

Table 4.30: Services Provided by Chapar Rasaneh

Fees

Service Category	Services Provided	Fees
Plan I	Unlimited Internet access and email	IR 250 per minute
Plan II	Unlimited Internet access and email	IR 1,950,000 annual
Plan I WH	Unlimited Internet access and email 200 Mb space, ftp 72 Gb data transfer per year	IR 5,800,000 annual
Plan II WH	Unlimited Internet access and email 5 Mb space, ftp 12 Gb data transfer per year	IR 1,950,000 annual
Other charges	2 Gb per month 5 Gb per month 10 Gb per month 15 (and more) Gb per month	IR 7,000,000 IR 13,000,000 IR 20,000,000 IR 20,000,000

Table 4.31: Chapar Rasaneh Fees

4.3.9 DCI

Background Information

In 1995, the Telecommunication Company of Iran (TCI) petitioned the Majles (Iranian Parliament) to be allowed to establish a public joint stock company, the Data Communication Company of Iran (DCI), to take over responsibility for the already established X.25 packet switching network known as *Iranpac* (DNIC number 4321) and further development of data services on a monopoly basis.

Internet services are now being offered to the public by DCI, albeit on a limited and expensive basis. While commercial Internet access was developing slowly, DCI was pursuing its own goals. Phase I of DCI's "Internet project" provided the capability to support 20,000 Internet users via Iranpac.

The network was contracted to Alcatel in 1992 and uses 24 1100 PSX nodes, which enable X.75, X.25, X.8, X.28, X.29, BSC, SNA/SDLC, and asynchronous frame relay capabilities. It has also recently been expanded to handle some 300,000 subscribers at more than 170 localities. Internal port speeds are at present 28.8 kbps and projected to increase to 64 kbps during the second expansion phase.

In 1997 DCI put out a public tender for supply of 850 VSAT stations, as well as a pager system for Tehran and 25 provinces for 1 million subscribers. Further expansion plans call for implementation of an X.400 messaging system (code named Iran 400). DCI also offers a Persian/English domestic only email service. DCI's minitel service known as IVTX has been terminated. DCI rates for Internet access were slashed by 40% last year to attract new subscribers and to become more competitive with private ISPs.

Name	Data Communication Company of Iran
Address	Shahed Communication Complex, Kordestan Highway
	South Shiraz Street, Tehran, 14358 Iran
Tel	+98 21 802–9430
Fax	+98 21 800–0199
Homepage	http://www.dci.co.ir
Contact	mohebali@www.dci.co.ir
Type	Goverment

Table 4.32: DCI Background Information

Hardware and Software Capabilities

Operating systems	Windows NT, Solaris, Linux
Hardware platforms	Sun Workstations, PC

Table 4.33: DCI Hardware and Software Capabilities

International Link Specifications

Typical upload speeds	Ranges from 28.8 kbps to 2 Mbps
Typical download speeds	Ranges from 28.8 kbps to 2 Mbps
Link type (VSAT, fiber, ...)	Satellite to Europe, VSAT to Kuwait
Number of links	3
Connection network and node abroad	NetSat to France
	Teleglobe to Canada
	GulfSat to Kuwait

Table 4.34: DCI International Link Specifications

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	No
Data banks	Yes
Advertisements	No
Realaudio/video streaming/on demand	No
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	Yes
International web service	Yes
Number of dial-up lines	
Domain name registration service	Yes
Other services	

Table 4.35: Services Provided by DCI

Content Provision

e-magazines	No
News services	Yes
Chat rooms	No
Other	

Table 4.36: Content Provision by DCI

4.3.10 DPI

DPI could be the oldest computer company in Iran, established in 1957. DPI was an official branch and representative of IBM in Iran before the Islamic revolution of 1978/79, and was creatively called "Iran Business Machines". Following a cut in commercial ties between the US and Iran in 1980, it became an independent entity, and was renamed DPI (Data Processing of Iran) in 1984.

DPI has maintained different levels of connection with IBM during the past two decades. The size of DPI alone is comparable to combined sizes of several other Iranian hardware and software companies. DPI provides a wide range of services such as total solutions on a nationwide scale, sales and rentals of mainframes and minicomputers, customer support and engineering services for mainframes and minicomputers, design, manufacture, sales, and maintenance of PCs and other hardware and peripheral parts, feasibility studies, design and implementation of application softwares, data processing services, Internet and email services, general and specialized courses in many computer fields, B.A. degree courses in computer technology, consulting services, developing MIS applications, and design and manufacture and implementation of data communication hardware and services.

DPI has several branches in Iran:

Service Type Type	Computer Center	Distance from Tehran (km)	City
A, B	8	881	Ahvaz
A	288	337	Arak
A,C	1	337	Hamedan
A,B	9	414	Isfahan
A,C	3	1,064	Kerman
A,B,C	5	924	Mashad
A,B	2	323	Rasht
A	2	250	Sari
A,B,C	6	895	Shiraz
A,C	4	624	Tabriz
B	1	677	Yazd
C	1	677	Yazd

Table 4.37: DPI Branches in Iran: A – DPI offers local DP/CE services; B – DPI has its office on PC/OP sales and services; C – DPI has an independent sales partner.

Other cities under DPI's support umbrella from Tehran or other nearest cities are: Bandar Imam Khomeini, Bandar Abbas, Bandar Mahshar, Karaj, Orumieh, Ardabil, Ghom, Haft-Tapeh, and Sar-Cheshmeh.

DPI has two major departments: *Application Development*, and *MIS Development*. DPI has 40 years of experience of ongoing activities on the informatics technology scene and offers professional services to organizations, companies, institutes, universities, and the banking network throughout the country. DPI also offers a wide range of system development as homepages and web sites, including texts, graphics, sound, animations and films, database access methods, and client/server approaches.

DPI claims that it is a pioneer in the software technology of the country, applying proficiency and experience of more than one hundred professional programmers and experts working with the application software engineering division. However more than a few newcomers always blame DPI for its slowness, use of old mainframes and having a bureaucratic and outdated system.

Several government organizations, banks and industrial companies currently are DPI customers. To name a few: Ministry of Commerce, Ministry of Health and Medical Education, Ministry of Roads and Transportation, Ministry of Industries, Iran Statistical Center, The Presidential Office, Ministry of Energy, Ministry of Oil, Bank Tejarat, Bank Sepah, Bank Saderat Iran, Agricultural Bank, Bank Melli Iran, Kerman Regional Electricity Corporation, Tehran Regional Electricity Corporation, Iran Insurance Company and TCI.

Background Information

Name	Data Processing of Iran (DPI) (DPIRAN)
Address	256 Ostad Nejatollahi Avenue, Tehran 15987, Iran
Tel	+98 21 890–3252 – 890–3259
Fax	+98 21 890–1710 – 890–1713
Homepage	http://www.dpi.net.ir
Director	Alireza Bagherzadeh, Managing Director
Contact	Massood Saffari, saffari@dpi.net.ir
Type	30% Private, 70% Government

Table 4.38: DPI Background Information

Hardware and Software Capabilities

Operating systems	VAX VMS, Unix, Solaris, NT, AS400
Hardware platforms	IBM mainframes, AS400, PCs

Table 4.39: DPI Hardware and Software Capabilities

International Link Specifications

Typical upload speeds	256 kbps, soon to be upgraded to 512 kbps
Typical download speeds	256 kbps, soon to be upgraded to 512 kbps
Link type (VSAT, fiber, ...)	One Satellite link, 70 ZakNet links
Number of links	71
Connection network and node abroad	AT&T-Unisource, Amsterdam - Holland
Main site in Iran or abroad	Iran

Table 4.40: DPI International Link Specifications

Provided Services

Online/Offline	Both
Web access	Some trial web hostings
Usenet news/NNTP server	No
Data banks	IRI Law System: http://dls.dpi.net.ir, http://dls2.dpi.net.ir
Advertisements	Not yet
Realaudio/video streaming/on demand	Yes
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	No
International web service	Not yet
Number of dial-up lines	100
Domain name registration service	Yes
Other services	email , ZakNet

Table 4.41: Services Provided by DPI

Content Provision

e-magazines	No
News services	No
Chat rooms	No
Other	

Table 4.42: Content Provision by DPI

Fees

Connection fee	0	$1,500	$3,000	$3,000
Annual fee	$5,00	$ 7,000	$4,000	$15,000
Charge per Kbyte	0	$ 0.80		
Charge per minute	$2			
Service programs				

Table 4.43: DPI Fees – General

Plan	Free time	Charge per hour	Connection fee
A	60 hr	IR 16,000	IR 4,600,000
B	120 hr	IR 16,000	IR 9,000,000

Table 4.44: DPI Fees – Modem Connections

Plan	Speed	First Year	Second Year	Third Year
A1	28,800	IR 40,000,000	IR 20,000,000	20,000,000
A2	28,800	IR 60,000,000	IR 10,000,000	5,000,000
B1	33,300	IR 44,000,000	IR 23,000,000	23,000,000
B2	33,300	IR 65,000,000	IR 12,000,000	7,000,000
C1	64,800	IR 95,000,000	IR 80,000,000	80,000,000
C2	64,800	IR 180,000,000	IR 30,000,000	20,000,000

Table 4.45: DPI Fees – Leased Line

4.3.11   Hafez

Background Information

Name	Shayestegan Sana'te Rayaneh Tehran
Address	4th Floor, No.34, Sam Blind Alley
	Ramsar Avenue, Enghelab Street
	Tehran, Iran
Tel	+98 21 884–8397
Fax	+98 21 884–8398
Homepage	http://www.hafez.net
Contact	admin@hafez.net
Type	Private

Table 4.46: Hafez Background Information

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	
Data banks	
Advertisements	Yes
Realaudio/video streaming/on demand	
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	Yes
International web service	No
Number of dial-up lines	
Domain name registration service	
Other services	

Table 4.47: Services Provided by Hafez

Content Provision

e-magazines	No
News services	No
Chat rooms	No
Other	

Table 4.48: Content Provision by Hafez

Fees

Annual fee	IR 3,500,000	IR 2,700,000	IR 800,000
Charge per Kbyte	IR 6.6	IR 6.8	IR 7.1
Charge per minute	Optional	Optional	Optional
Service programs			

Table 4.49: Hafez Fees

4.3.12   IPM

Background Information

The "founder" of the Internet in Iran is the Institute for Studies in Theoretical Physics and Mathematics (IPM), which is also the .ir national TLD manager, the hub of an academic and research network in Iran, and until recently the host of the only international gateway to the Internet.

In mid-1994, IPM modified its BITNET gateway to TERENA (formerly EARN), a MicroVAX 3100/20E, to support the TCP/IP protocol suite, establishing an Internet connection for IREARN members (vax.ipm.ac.ir). The network was assigned 512 IP addresses (194.225.70.0–194.225.71.255) and used the same 9.6 kbps link to Vienna as had been used by IREARN. The slow connection was explained by Ebrahim Mashayekh, then director of IPM, as being due to the poor quality of the telephone lines available. Thus, the universities that had IREARN connections gained access to the Internet, although applications were limited to principaly email, due to the slowness of the international link. At least 18 government universities and research centers were connected to the Internet via IPM. Other universities gained dial-up access to the Internet via IPM at this time. Due to the lack of LANs at most universities, however, Internet access was generally limited to some faculty and graduate students, who used a single computer terminal or a small LAN.

Name	Institute for Studies in Theoretical Physics and Mathematics
Address	Pasdaran Avenue, Northern Ekhtiarieh
	Mehran Alley, Tehran, Iran
	Also: P.O. Box 19395–1795, Tehran, Iran
Tel	+98 21 229–1812
Fax	+98 21 229–8656
Homepage	http://www.iranet.net.ir
Founders	Dr Mohmmad Javad Larijani
	Dr. Siavash Shahshahani shahshah@ipm.ac.ir
Contact	ipminfo@rose.ipm.ac.ir
Type	Non-profit Educational

Table 4.50: IPM Background Information

Hardware and Software Capabilities

Operating systems	Netware, Unix, Vax VMS, Solaris, Linux and NT
Hardware platforms	Vax, PC, Sun Workstations

Table 4.51: IPM Hardware and Software Capabilities

International Link Specifications

Typical upload speeds	512 kbps
Typical download speeds	1 Mbps
Link type (VSAT, fiber, ...)	Satellite to AT&T Unisource, Amsterdam
Number of links	1
Connection network and node abroad	

Table 4.52: IPM International Link Specifications

Provided Services

Online/Offline	Yes
Web access	Yes
Usenet news/NNTP server	No
Data banks	No
Advertisements	
Realaudio/video streaming/on demand	No
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	
Domestic only web service	No
International web service	No
Number of dial-up lines	
Domain name registration service	Yes
Other services	

Table 4.53: Services Provided by IPM

4.3.13 Iranet

Background Information

Name	Informatic Services Corporation
Address	140 Mirdamaad Avenue, Tehran 15875, Iran
Tel	+98 21 225–0510
Fax	+98 21 225–7582
Homepage	http://www.iranet.net
Founders	Mehrdad Givmanesh
Contact	Farhang Sharifi, farhang001@yahoo.com
Type	Private

Table 4.54: Iranet Background Information

4.3.14 IRNET

Background Information

Name	IRNET
Address	P.O. Box 15875–3748 Tehran, Iran
Tel/Fax	+ 98 21 200–4498
Homepage	http://www.irnet.net
Contact	Ali Enteshari, pars@www.dci.co.ir
Type	Private

Table 4.55: IRNET Background Information

4.3.15 IROST

Background Information

The Iranian Research Organization for Science and Technology is afiliated with the Ministry of Culture and Higher Education. It was established in 1980 for the following goals:

- Supporting researchers, inventors and innovators by financial and non-financial assistance.
- Conducting and implementing research projects.
- Coordinating scientific research activities.
- Discovering and nuturing the country's educational and industrial talents.
- Defining the technology needs of the country.

Name	Iranian Research Organization for Science and Technology
Address	Ferdosi Square, 71 Forsat Avenue, Tehran 15819, Iran
Tel	+98 21 882–8051-7 ext. 410
Fax	+98 21 883–8340
Homepage	http://www.irost.com
Founders	Ministry of Culture and Higher Education
Contact	orangian@istn.irost.com
Type	Government

Table 4.56: IROST Background Information

Provided Services

Online/Offline	
Web access	No
Usenet news/NNTP server	
Data banks	Yes
Advertisements	No
Realaudio/video streaming/on demand	No
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	
International web service	
Number of dial-up lines	
Domain name registration service	No
Other services	

Table 4.57: Services Provided by IROST

Content Provision

e-magazines	No
News services	Yes
Chat rooms	
Other	teleconference, Forum,BBS

Table 4.58: Content Provision by IROST

4.3.16 Jame-e Jam

Background Information

Name	Jame Jam
Address	38 Babak Sharghi Street, Vahid Dastjerdi Street
	Tehran, Iran
Tel	+98 21 880–2781-6
Fax	+98 21 891–1710
Homepage	http://www.jamejam.net
Contact	Nader Atoofi, naderat@yahoo.com
Type	Private

Table 4.59: Jam-e Jam Background Information

4.3.17 Kafa System

Background Information

Name	Kafa System
Address	
Tel/Fax	
Homepage	http://www.kafa.net
	(view with MS Internet Explorer)
Contact	Cirus Jahanzad, crystal@emirates.net.ae
	webmaster@kafa.net
Type	Private

Table 4.60: Kafa System Background Information

4.3.18 Kanoon

Background Information

Name	Kanoon Informatic
Address	#3, 7th Golestan Avenue, Pasdaran Avenue
	Tehran 16686 , Iran
Tel	+98 21 254–1326-7
Fax	+98 21 254–1326-7
Homepage	http://www.kanoon.net
Contact	administrator@kanoon.net
Type	Private

Table 4.61: Kanoon Background Information

4.3.19 Mavara

Mavara's managing team claims that they would like to be a unique information gateway in future. They are attempting to establish a wide range of services including information services, data banks, chatrooms, forums, and teleconferencing on Internet. Recently they made a contract with Gooya Services to develop an online bookstore. Prior to its web presence, Mavara operated the largest BBS in Iran (and still does). The company is thus in a good postion for hosting Iranian virtual communities on the web.

Background Information

Name	Mavara
Address	#12, 3rd floor, 185, Shahid Beheshti Avenue
	Tehran 15547, Iran
Tel	+98 21 874–5347
Fax	+98 21 874–6470
Homepage	http://www.mavara.com
Contact	Afshin Emami, kayvan@mailcity.com
Type	Private

Table 4.62: Mavara Background Information

Provided Services

Online/Offline	
Web access	Yes
Usenet news/NNTP server	Yes
Data banks	Yes
Advertisements	
Realaudio/video streaming/on demand	
Fax over internet service	
Telephone over internet service	
Postal mail over internet service	
Domestic only web service	
International web service	
Number of dial-up lines	
Domain name registration service	
Other services	

Table 4.63: Services Provided by Mavara

Content Provision

e-magazines	No
News services	Yes
Chat rooms	Yes
Other	Forum

Table 4.64: Content Provision by Mavara

4.3.20 MZ3

Background Information

MZ3 Communication Services provides Zaknet satellite connections and access to the Internet in Iran and Cyprus. MZ3 Communication is affiliated with MZ3 Oil Services, a company with over seventy years (1925-present) of experience working in conjunction with the National Iranian Oil Company (NIOC).

Name	MZ Communication Services
Address	458 Ayatollah Behbahani Boulevard, Mostofizadeh Garage Ahvaz, Iran 61836
Tel	+98 21 225–6410
Fax	+98 21 227–3952
Homepage	http://www.mz3.com
Contact	Ali Mostofi, mostofi1@aol.com bmostofi@mz3.com
Type	Private

Table 4.65: MZ3 Background Information

4.3.21   Nasim

Nasim Network is an affiliate of Nasim Parang Co. Ltd. and operates in the fields of network engineering and communication. Nasim's site is located in the US. Services provided include:

- Full Internet services (includes email, Web space, and registration of special Domain)
- Online Access
- Email
- Intranet development
- Homepage design and web hosting (dynamic HTML, live audio)
- Open or private training classes and seminars on the Internet
- Custom Internet Search (offline)

Nasim uses Windows NT and the Microsoft BackOffice platform for its development efforts.

Background Information

Name	Nasim Computer Services Center
Address	P.O. Box 15875–4451, Tehran 15617, Iran
Tel	+98 21 752–7305-6
Fax	+98 21 752–7307
Homepage	http://www.nasim.net
Contact	Faegh Hossaini, webmaster@nasim.net
	Heidar Amini, amini@nasim.net,
	info@nasim.net
Type	Private

Table 4.66: Nasim Background Information

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	Yes
Data banks	Yes
Advertisements	
Realaudio/video streaming/on demand	Yes
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	Yes
International web service	
Number of dial-up lines	
Domain name registration service	Yes
Other services	Web design , Intranet,

Table 4.67: Services Provided by Nasim

Content Provision

e-magazines	
News services	Yes
Chat rooms	
Other	Internet class

Table 4.68: Content Provision by Nasim

4.3.22   Neda Rayaneh

The first commercial Internet service provider in Iran was the Neda Rayaneh Institute (NRI) (http://www.neda.net.ir), a non-profit company affiliated with Tehran municipality, which started a BBS in early 1994 and Internet access in February 1995 via two 9.6 Kbps SLIP leased lines. One of these lines connected its LAN to IPM, and the other used a satellite link to connect to a Canadian ISP, Cadvision. NRI is the largest ISP in Iran, hosting an extensive array of business and news web pages, all of which are mirrored in California by the Global Publishing Group (http://www.gpg.com).

NRI's basic offerings include extensive domestic news and information services and email. A basic email and BBS ("Neda-1") account costs IR 300,000 ($100) per year; access to the Internet is a premium service, open only to Neda-1 subscribers, that costs an additional IR 50,000 ($16.67) per 200 kb of traffic.

NRI also maintains the Tehran "Yellow Pages" and commercial and private telephone directories, as well as city information and an interactive map of Tehran. The company hosts numerous corporate web pages, for which it provides the design expertise, as well as a full version (Persian hypertext and graphics) of the Tehran daily newspaper Hamshahri. NRI formerly offered domain name registration and hosting services for a flat fee of IR 2,000,000 ($667), but had to discontinue the service due to the congestion this caused the network. The company still offers web hosting services on its intranet (i.e., with no Internet link). All services are available in English and Persian.

In early August 1995, all 200 of NRI's dial-up lines were disconnected by TCI, ostensibly due to the misuse of the network by NRI subscribers looking for mates via the Internet, but more likely related to attempts by the Ministry of Post, Telegraph, and Telephone to stifle competition to its own companies, including DCI. The connections were restored within a week, but NRI was required to post a message warning subscribers to refrain from inappropriate activities. Only 16 of the dial-up lines were initially allocated for Internet access, but these have been expanded to 100. NRI also has a full-time connection to IranPac.

In early 1996, the Central Library of the Foundation of the Holy Shrine of Imam Reza,*Astan Qods Razavi*, announced that it would join the Internet in the near future, apparently via NRI.

Background Information

Name	Neda Rayaneh
Address	No. 528, North Ostad Hassan Bana
	Ressalat Highway
	Tehran 16719, Iran
	Also: P.O. Box 569, Tehran, Iran 16315
Tel	+98 21 250–8600, 250–9700-5 (sales)
Fax	+98 21 253–1399, 250–9707
Homepage	http://www.neda.net, http://www.neda.net.ir
Founders	Nasser A. Sa'aadat, nasser@neda.net
Contact	Saeed Vahid, svahid@neda.net
International Partnerships	Babak Davarpanah, davar@neda.net

Table 4.69: Neda Rayaneh Background Information

Hardware and Software Capabilities

Operating systems	Windows NT 4.0
Hardware platforms	Pentium II

Table 4.70: Neda Rayaneh Hardware and Software Capabilities

International Link Specifications

Typical upload speeds	64 kbps
Typical download speeds	400 kbps
Link type (VSAT, fiber, ...)	DirecPC
Number of links	2

Table 4.71: Neda Rayaneh International Link Specifications

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	Yes
Data banks	Yes
Advertisements	Yes
Realaudio/video streaming/on demand	Yes
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	Yes
International web service	Yes
Number of dial-up lines	68 active (1000 reserved)
Domain name registration service	Yes
Other services	Cyber Cafe, Web design, Persian email and chat

Table 4.72: Services Provided by Neda Rayaneh

Content Provision

e-magazines	Yes
News services	Yes
Chat rooms	Yes
Other	

Table 4.73: Content Provision by Neda Rayaneh

Fees

Plan	Description	Annual charge (IR)
N-02	Neda BBS, Off-line e-mail	700,000
W-01	Domestic web, Internet, homepage (5 Mb + 5 Mb)	3,500,000
W-02	Domestic web, Internet, homepage (100 k + 100 k)	1,200,000
W-03	Domestic web, site at Neda (5 MB)	IR 900,000
D-01	Domain Registration, 1 Mb free e-mail, unlimited data transfer	2,500,000

Table 4.74: Neda Rayaneh Fees 1

Plan	Speed	Time/Mb free per month (IR)	Charge per kb (IR)	Annual charge (IR)
OD-01	33,600	60 hr/300 Mb	15	3,500,000
OD-02	33,600	90 hr/545 Mb	14	6,500,000
OD-03	33,600	120 hr/670 Mb	13	8,000,000
OD-04	33,600	180 hr/1,060 Mb	12	12,500,000
OD-05	33,600	360 hr/1,830 Mb	15	22,500,000
OD-06	33,600	(lease line) 3,000 Mb	12	4,200,000

Table 4.75: Neda Rayaneh Fees 2

4.3.23 Parand

Parand is new ISP, offering email only services at this point.

Background Information

Name	Parand Institute
Address	P.O. Box 19395–7481, Tehran, Iran
Tel	+ 98 21 316–5711
Homepage	http://www.parand.com
Contact	Babak Farrokhi, farrokhi@apadana.com
Type	Private

Table 4.76: Parand Background Information

4.3.24 Pars Supala

Pars Supala offers a variety of online databases, records, and libraries through a link to the AT&T Network in The Netherlands. Its users are mostly government agencies. Monthly subscription fees are IR 200,000, plus IR 400,000 one-time fee for communication software and training.

These fees do not include fees for usage of various databases abroad – those are billed separately. Presently there are some 100 users on Supala's network.

Pars Supala's Internet email service has been suspended due to the low number of subscribers (due to competition and their high prices).

Background Information

Name	Pars Supala
Address	31, 7th Daryayeh Noor Street
	Tehran 15876, Iran
Tel	+98 21 873–0013
Fax	+98 21 873–9258
Homepage	http://www.supala.com
Founders	Farzaneh Niknam, Saied Habibi
Contact	Ahmad Habibi, supala@erols.com
Type	Private

Table 4.77: Pars Supala Background Information

4.3.25 Peyam network

Background Information

Name	Peyam Network
Address	Idehnegar Computer Development Company
	16th Gandi Street, # 7, Valiasr Avenue,
	Tehran 15875, Iran
	Also: P.O. Box 15875–5177, Tehran, Iran
Tel	+98 21 877–5526, 877–3625
Fax	+98 21 877–4359
Homepage	http://www.peyam.net
	(view with MS Internet Explorer)
Contact	Mohammad Bahrololoum, ep3mhb@yahoo.com
	webmaster@peyam.net
Type	Private

Table 4.78: Peyam Network Background Information

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	
Data banks	
Advertisements	
Realaudio/video streaming/on demand	Yes
Fax over internet service	
Telephone over internet service	No
Postal mail over internet service	No
Domestic only web service	
International web service	
Number of dial-up lines	
Domain name registration service	
Other services	Guestbook, forums, files library

Table 4.79: Services Provided by Peyam Network

4.3.26 Safineh

Background Information

Safineh is among the pioneers in information technology in Iran. It's web site provides up-to-date news and information online, and a variety of services. Safineh had about 40,000 hits per day in June 1999, and is rapidly positioning itself as a major ISP in Iran, posing a serious challenge to established names such as DCI or Neda Rayaneh. Safineh's customer service is also reputed to be among the best in the industry in Iran, with turn-around times of an hour or two for user problems, as late as 3:00 am!

Name	Safineh
Address	No 4, 8th Street, Ghaem Magham-e Farahani Avenue
	Tehran, Iran 15868
Tel	+98 21 873–8681, 875–2166, 873–9731
Fax	+98 21 891–710
Homepage	http://www.safineh.net
Founder	Mohammad K. Ghanbari
Contact	Mohammad K. Ghanbari, ghanbari@safineh.net
Type	Private

Table 4.80: Safineh Background Information

Hardware and Software Capabilities

Operating systems	RedHat Linux 5.2 and Windows NT
Hardware platforms	Pentium II

Table 4.81: Safineh Hardware and Software Capabilities

International Link Specifications

Typical upload speeds	64k to be upgraded to 1 Mb/s soon
Typical download speeds	800 kb–2 Mb/s
Link type (VSAT, fiber, ...)	Leased line and Zaksat
Number of links	2
Connection network and node abroad	Served by DPI via Archway SRL, Italy
Main site in Iran or abroad	in Iran

Table 4.82: Safineh International Link Specifications

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	Yes
Data banks	Yes
Advertisements	Yes
Realaudio/video streaming/on demand	Yes
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	Yes
Domestic only web service	Yes
International web service	Yes
Number of dial-up lines	150
Domain name registration service	Yes
Other services	Web hosting, online shopping–registration, IRC, live radio, online dictionary, videoconferencing

Table 4.83: Services Provided by Safineh

Content Provision

e-magazines	Yes
News services	Yes
Chat rooms	Yes
Other	Software databanks, film and music databanks, online maps

Table 4.84: Content Provision by Safineh

Fees

Plans	Domain	Details	Annual Fee
ED1	mydomain.safineh.net	10 email addresses 1 MB free email transfer/month IR 20 for each additional kbyte	IR 1,500,000
ED2	.org, .net, .com, .edu, .ir	As in ED1	IR 2,500,000

Table 4.85: Safineh Email Domain Registration Fees

Plans	S1	S2	S3	S4
Annual fee	IR 100,000	IR 250,000	IR 4,500,000	IR 1,100,000
Charge per Kbyte		IR 20	IR 300	IR 7.5
Service program details	Internal-only email, IRC, ftp, music and film databanks, online shopping, live radio online maps, 5 MB personal web space Videoconferencing	All S1 services plus Internet email	All S2 services plus Internet web page	All S3 services plus full Internet access

Table 4.86: Safineh Usage Fees

Plans	Domain	Details	Annual Fee
SD1	http://www.safineh.net/mydomain	One email address 1 MB web space IR 300,000 for each additional MB Online Internet service	IR 1,100,000
SD2	http://mydomain.safineh.net	10 email addresses IR 100,000 for each additional email 10 MB web space IR 300,000 for each additional MB 1 MB free email transfer/month IR 20 for each additional kbyte Online Internet service	IR 4,500,000
SD3	.org, .net, .com, .edu, .ir	As in SD2	IR 7,500,000

Table 4.87: Safineh Web/ftp/email Domain Registration Fees

4.3.27   Sahlan

Background Information

Sahlan is a new ISP, connected to the AT&T Unisource in Amsterdam, and offering email only services at this point.

Name	Sahlan Computer
Address	64 Soleyman Khater Street, across Diba Street
	Motahhari Avenue, Tehran, Iran
	Also: P.O. Box 15875–7388, Tehran, Iran
Tel	+98 21 882–8716
Fax	+98 21 884–3326
Homepage	http://www.sahlan.net
Contact	Arman Goldarreh, sahlan@kanoon.net
Type	Private

Table 4.88: Sahlan Background Information

4.3.28   System Group

System Group was established in 1988 by a merger between two industry leaders in software and management. The company works in areas such as office automation, finance, operations management and software technology, with an emphasis in development of database applications. It employs more than sixty engineers, active in five departments.

Platforms used include Windows NT and Linux. Expertise exists in SSADM methodology, Paradox and Interbase engines, Visual Basic, Visual C++, MS-SQL, and SELECT Enterprise.

System Group has recently entered the ISP business as well, and is only offering email services at this point via its mail server systemgroup.net (192.10.10.2 in Iran). Charges are IR 300,000 annual (IR 200,000 prepayment plus 50 Rials per kilobyte).

Background Information

Name	System Group
Address	28 Shohada Street, Ghaem-magham Avenue
	Tehran 15867, Iran
Tel	+98 21 871–5116, 871–5821, 871–3366
Fax	+98 21 871–5638
Homepage	http://www.systemgroup.net
Founder	Mahmood Nazzari, systemgroup@neda.net
Contact	Nooshin Naderi, Web Administrator
	nooshinn@systemgroup.net, info@systemgroup.net
Type	Private

Table 4.89: System Group Background Information

4.3.29 Tavana

Background Information

Tavana provides full-duplex dial-up Internet connections to utilize all Internet services including email, ftp, gopher, web, IRC, Netmeeting, and video conferencing. However due to their present limited number of dialup lines, the server has been experiencing long delays. There are plans to increase the number of dial-up lines for subscirbers by more than 10-fold soon.

Name	Tavana
Address	No. 85 Africa Square, next to Azadegan Park
	Resalat Expressway, Tehran, Iran
Tel	+98 21 876–1315
Homepage	http://www.tavana.net
Founders	Hossein Rastegar
Contact	sysop@tavana.net
Type	Private

Table 4.90: Tavana Background Information

Hardware and Software Capabilities

Operating systems	Windows NT 4.0
Hardware platforms	2 Pentium II workstations
	128 MB RAM, 10 GB Hdd

Table 4.91: Tavana Hardware and Software Capabilities

International Link Specifications

Typical upload speeds	From full-duplex 8 Mb/s (satellite) to
	full-duplex 64 Kb/s leased line
Typical download speeds	From full-duplex 8 Mb/s (satellite) to
	full-duplex 64 Kb/s leased line
Link type (VSAT, fiber, ...)	IntelSat, leased
Number of links	1
Connection network and node abroad	NetSat/SDCV France
Main site in Iran or abroad	in Iran

Table 4.92: Tavana International Link Specifications

Provided Services

Online/Offline	Online
Web access	Yes
Usenet news/NNTP server	No
Data banks	No
Advertisements	Yes
Realaudio/video streaming/on demand	Yes
Fax over internet service	Yes
Telephone over internet service	Yes
Postal mail over internet service	No
Domestic only web service	No
International web service	Yes
Number of dial-up lines	16 lines to be expanded to 200
Domain name registration service	Yes
Other services	

Table 4.93: Services Provided by Tavana

Content Provision

e-magazines	No
News services	No
Chat rooms	No
Other	

Table 4.94: Content Provision by Tavana

Fees

Class	Time Limitation	Annual fee (IR)	Charge/minute (IR)	Note
A1	24 hours a day	300,000	350	50 hour Prepayment
A2	8:00 am–8:00 pm	300,000	300	50 hour Prepayment
A3	8:00 pm–8:00 am	300,000	100	50 hour Prepayment

Table 4.95: Tavana Fees

Notes:

- A "Class B" service is offered also, for a subscription term of 1 year, IR 500 per kilobyte, and prepayment for a minimum of 1 MB.

- Domain registration service for http://www.userpage.{com,org,net} is IR 1,000,000 per year.

- Charge for registration of IP addresses is IR 200,000 (one time).

Leased Line Services

Class	Connection Speed	Deposit (IR)	Monthly Charge (IR)
C1	33 kbps	10,000,000	5,000,000
C2	64 kbps	50,000,000	15,000,000
C3	128 kbps	50,000,000	25,000,000
C4	256 kbps	50,000,000	50,000,000
C5	512 kbps	50,000,000	100,000,000
C6	1 Mbps	50,000,000	200,000,000
C7	2 Mbps	50,000,000	300,000,000

Table 4.96: Tavana Leased Line Services

Internet Phone/Fax Services

Class	Annual fee	Advanced payment (IR)	Charges (IR)
D	100,000	100,000	Depending on destination country and air time
E	100,000	100,000	Depending on destination country and air time

Table 4.97: Tavana Tel/Fax Services

4.3.30   Virayeshgar

Virayeshgar (Vira) is a Tehran based software engineering firm (major products are Persian DataEase and WordPerfect) that also has a local BBS providing Internet email service. The BBS is served by two 33,600 baud modems and uses UUCP twice a day to receive and transmit emails via HOLONET in the U.S. (San Francisco bay area). Internet services began in June 1994.

Vira's one-time registration fee is 200,000 rials and it charges 2,200 rials per each mail sent or received (about 1 kb in size). Vira's dialup numbers in Iran are:

+ 98 21 884–1316
+ 98 21 883–9620
+ 98 21 884–1317
+ 98 21 883–9619

Standard user emails at Vira are provided as firstname.lastname@vira.com. Various offline services such as ftp/archie/www/news via email are also part of the package. Vira also echos some of the more technical USENET newsgroups.

Background Information

Name	Virayeshgar Inc.
Address	c/o Noble Inc., 1501 Beach Street Suite 301
	San Fransisco, CA 94123
Tel	+98 21 882–9217, 884–1315 in Iran
	(415) 567–6046 in the US
Fax	+98 21 882–8927
Homepage	No web presence – email services only.
Contact	Mohammad Salehi, postmaster@vira.com
Type	Private

Table 4.98: Virayeshgar Background Information

4.3.31   Wireworm

Background Information

Name	Wirewom Internet Solutions
Address	
Tel	+98 21 253–3902
Fax	+98 21 253–3902
Homepage	http://www.wireworm.com/ir
Founders	
Contact	Sevan Baghdasarian, support.iran@wireworm.com
Type	Private

Table 4.99: Wireworm Background Information

Provided Services

Online/Offline	Both
Web access	Yes
Usenet news/NNTP server	
Data banks	No
Advertisements	No
Realaudio/video streaming/on demand	
Fax over internet service	No
Telephone over internet service	No
Postal mail over internet service	
Domestic only web service	Yes
International web service	Yes
Number of dial-up lines	
Domain name registration service	
Other services	Persian mailing list

Table 4.100: Services Provided by Wireworm

Content Provision

e-magazines	No
News services	No
Chat rooms	No
Other	

Table 4.101: Content Provision by Wireworm

Fees

A full range of services and account packages are offered by Wireworm. Details are at
http://wireworm.com/ir/web.html for web services
http://wireworm.com/ir/mail.html for mail services
http://wireworm.com/ir/add.html fpor add-on options
http://wireworm.com/ir/special.html for special offers.

4.3.32   Zavosh

Zavosh Rayaneh is a computer company providing a wide range of networking, Internet and intranet services in Iran. Zavosh claims to be currently involved in a number of major networking and intranet projects. Zavosh's primary server is located in San Jose, California. Services include:

- Design and installation of LANs – all topologies.

- WAN Installation using leased lines and VSAT.

- Development of web based applications.

- Providing access to applications data on the web.

- Porting existing applications to the web.

- Domain Registration.

- Web/ftp/email servers.

- Setting up Internet connections.

Background Information

Name	Zavosh Rayaneh Engineering Company
Address	3rd Floor, No. 14 Ramsar Street
	Enghelab Avenue, Tehran, 15819 Iran
	Also: P.O. Box 15815–3657 Tehran, Iran
Tel	+98 21 882–9354, 832–137
Fax	+98 21 884–2167
Homepage	http://www.zavosh.com
Directors	Mohammad Kheirkhah, Managing Director
	zavosh@tavana.net
	Ali Karamat, Technical Director
Contact	webmaster@zavosh.com
Type	Private

Table 4.102: Zavosh Background Information

Hardware and Software Capabilities

Operating systems	Novell Netware 3.x & 4.x, Windows NT
Hardware platforms	PC

Table 4.103: Zavosh Hardware and Software Capabilities

Chapter 5

Telecom Organizational Infrastructure

5.1 Telecom Providers

5.1.1 Telecommunication Company of Iran

TCI is the national telecommunication service provider in Iran for all telephone related matters. It oversees a variety of supporting research and development divisions, the entire telecom infrastructure of the country, as well as other engineering and spectrum management activities. It is a division of the Ministry of Posts, Telegraph and Telephone (PTT), headed by Dr. Mohammad Reza Aref, with Dr. Mehdi Tabeshian serving as Deputy Minister for International Affairs. One of the oldest Iranian companies, it joined the International Telecommunications Union in 1869, three years after its formation.

TCI Administration	TCI Board of Directors
Mr. Emamgholi Behdad	Dr. Sayed Abdollah Mirtaheri
Director General of Telecommunications	Chairman of the Board
Ministry of Posts, Telegraph and Telephone	and TCI Managing Director
P.O. Box 15875–4415	Dr. Shariati Avenue
Dr. Shariati Avenue	Tehran 15598, Iran
Tehran 15598, Iran	
Tel: +98 21 840–3612	Tel: +98 21 8111
Fax: +98 21 867–999	Telex: 088 212799 TCI IR
behdad@ties.itu.int	

Table 5.1: Contact Information for TCI.

5.1.2 GlobalTel

At least one company now offers international callback services from Iran to abroad. GlobalTel is a division of Interactive Media Technologies, Inc., an international telecommunications services company. GlobalTel operates under a Section 214 license issued by the US Federal Communications Commission. It provides

international calling rates from Iran ranging from $2.02 per minute (to neighboring Tajikistan), to $0.88 per minute (to the US). There are no monthly fees and GlobalTel offers charges for actual minutes of calling, billed in 6-second increments after the first minute. The company claims to have had two years of rapid growth with a rojected gross revenue for fiscal year 1998 of $9,120,000.

More details, including rates, are available on the company web page at http://ld.net/globaltel.

5.2 Government Research and development

5.2.1 Shahid Ghandi Communication Cables

No. 29, Khaje Abdollah Ansari Street	Tel: +98 21 284–3008-9
P.O. Box 15875–3589	Fax: +98 21 284–9394
Tehran 15875, Iran	Telex: 21 3269 SGCC
Email: sgcc@neda.net	
Web: http://neda.net/sgcc	

Table 5.2: Contact Information for SGCC.

Shahid Ghandi Communication Cables Company is a subsidiary of the PTT Ministry, established in 1985 with the goal of attaining industrial self sufficiency in meeting the growing needs of the telecommunication network of the country. Situated near the city of Yazd, the company occupies an area of 100 hectares and has a superstructure of 200,000 square meters. It employs about 750 people.

The construction of the plant was started in April 1988. Phase one of the plant, for production of optical fiber cables was implemented in February 1989 and phase two, for production of copper cables, was put into operation in 1990.

Phase three, which involves expansion of phase two has been implemented, making the the total annual capacity of the plant 8000 Million Conductor Meters (MCM) of copper cables, 8000 km of optical fiber cable, and 60,000 km of different kinds of air wires.

All the production units of the plant apply advanced technology. The quality control unit is also an important part of the plant. It utilizes state-of-the-art machinery and equipment to carry out the final stage of production, with care and regard to the international standards. SGCC has recently received ISO 9001 and 9002 certification by SGS international Certification Services AG for its design and manufacturing processes. Apart from copper, which constitutes 50% of the complex's raw material requirement, the company claims to be self-sufficient in meeting all other raw material requirements.

As the largest manufacturer of cables in the Middle East, SGCC is involved in production of a variety of optical fiber cables, as well as copper telephone cables. The optical fiber varieties include duct-type jelly filled, and buried jelly filled. The copper telephone cables include air core up to 2400 pairs, buried, jelly filled up to 600 pairs, duct type jelley – filled up to 600 pairs, and self supported up to 100 pairs.

SGCC now meets all the cable needs of Iran's telecommunication network, in contrast to less than 10% domestic production of needs prior to commissioning of this company.

5.2.2 Optical Fiber Manufacturing Company

Optical Fiber Manufacturing Company (OFMC) was formed in 1989 and was officially inaugurated by former president Rafsanjani in 1994. Its products are optical fibers and solar cells. This company supplies

SGCC with the necessary fibers and produces solar system equipment for rural communication. The company has a nominal capacity of 50,000 km of optical fiber with 2.4 million/3MWP of solar cells.

The company's products and capacities are as follows:

- Single mode and dispersion-shifted fiber optic core with an annual nominal production capacity of 50,000 km. These products are utilized in long distance communication.

- Solar cells of silicon poly-crystal type with an average electrical efficiency of over 12.5 per cent and an annual nominal production capacity of 2,400,000 cells.

- 45-watt solar modules according to DIN standards with an annual nominal production capacity of 67,000 modules.

5.2.3 Karaj Optical Fiber Cable Facility

On May 25 of this year Iran inaugurated a $2.3 million fiber-optic cable plant in the city of Karaj, near the capital, Tehran. The plant is currently operating with a 50 to 60 percent capacity that will increase in the coming two years.

An official of the Energy Ministry claims that the plant, described as the first of its kind in the Middle East, has a production capacity of 1,000 km of cables per year, and relies on raw materials produced in Iran and others imported from abroad.

The price of one meter of cables produced by the plant is put at between $8 and $10 in world market while its price locally does not exceed $3.70 per meter, according to published reports.

5.2.4 Iran Telecommunications Research Center

Research and development programs are conducted by ITRC. It puts its engineering prototypes at the disposal of manufacturing centers. The center's strategies were re-designed and its plans re-organized in 1994. In order to operate effectively as a research center oriented towards advanced and applied technologies, ITRC has focused its programs on the following areas with the co-operation of universities and other research centers:

- Intelligent networks
- ATM
- High capacity digital switching
- Security
- Rural telecommunications telephony system
- Optical networks
- B-ISDN
- VSAT
- SDH technology

The technologies and production facilities used by ITRC in its activities are

- SMD technology

- Thick and thin film technology

- Computer aided engineering, design and manufacturing

- Automated measurement

- Support projects

- Computer services

- PCB design and manufacturing SMD circuits

- Design and production of mechanical parts for telecommunications equipment

- Application software for data networks and automation

- Optical switching

- Waveguide

According to its own data, ITRC has been developing methods and technologies for domestic application in the following fields since 1994:

- Digital switching
- Testers
- Mobile telephony (GSM)
- PCM radio
- Low capacity microwave radios
- High capacity microwave radios, SDH
- Power suppliers

ITRC's current research projects focus on the following fields:

- High-capacity digital exchanges

- ATM switching and intelligent networks' equipment

- ISDN

- Cellular telephone system (GSM)

- SDH microwave system

- Satellite communication systems

- Rural communication telephony systems

- 34 and 155 Mb/ S FOC terminals

- Multiplex equipment

- Provision of national standards in the field of telecommunications

- ATM in high capacity exchanges, satellite systems and fiber optics.

More details on ITRC are available on its web page at http://www.itrc.ac.ir.

5.2.5 Sharif Electronics Research Center

The Electronic Research Center (ERC) was founded in 1972 as an independent research organization. Its main activities were devoted to signal processing and digital communications. In 1979, the center merged with the Sharif University of Technology and its management and financial affairs came under the university's general research policies.

At present, the main areas of research the center are:

- Speech ciphering

- Speech processing and recognition

- Cryptography and data security

- Digital and radar signal processing

Electronics Research Center	Tel: +98 21 600–551
Sharif University of Technology	Fax: +98 21 603–0318
Azadi Ave	Email: erc@sina.sharif.ac.ir
Tehran, Iran	http://sina.sharif.ac.ir/~erc

Table 5.3: Contact Information for Sharif Electronic Research Center.

- VLSI circuit design and testing
- Radio communication circuits andsubsystems
- Design of programmable logic controllers

The center's staff comprises twelve researchers with a supporting staff of seven technicians and three secretaries. In addition it has five part-time researchers and a number of graduate students. Close cooperation exists between the center and the departments of Electrical engineering and Computer engineering at Sharif.

5.2.6 Iran Electronic Industries

Sanaye Eletronik-e Iran (*Sairan* or IEI) was established in 1972. With six subsidiaries and 5,000 experienced personnel including 700 qualified and highly trained engineer in different disciplines, IEI has developed a high potential in research and development which is the technological backbone of the company.

IEI is an amalgamation of different manufacturing plants and companies in different parts of the country and has 27 years of experience in electronics, optics, electro-optics, communications, computers and semiconductors. The six subsidiaries of IEI and their fields of activities are follows:

1. Shiraz Electronics Industries (SEI) – *Electronic Technology*
2. Iran Communications Industries (ICI) – *Communications Technology*
3. Information Systems of Iran (ISIRAN) – *Information Technology*
4. Electronics Components Industries (ECI) – *Microelectronics Technology*
5. Iran Electronics Research Center (IERC) – *Research & Development*
6. Isfahan Optics Industries (IOI) – *Optics Technology*

Detail of the first four divisions are provided in following sections.

In Shiraz	In Tehran
P.O. Box 71265-1589	P.O. Box 19575-365
Shiraz, Iran	Tehran, Iran
Tel: +98 71 641–000	Tel: +98 21 254–9272
Fax: +98 71 641–061	Fax: +98 21 254–8065
Telex: 332232 IEI IR	Telex: 212199 IEI IR
http://iran-export.com/iei	

Table 5.4: Contact Information for IEI.

IEI is essentially a giant government owned group active in manufacturing and assembling products. IEI is a huge manufacturer of electrical and electronic equipment of all sorts. Its telecom products include the assembly of mobile handsets under licence from the Belgian company Sagem.

IEI is seeking technology from foreign companies and is open to co-operation with new companies. Until now it has relied on South-East Asian companies for most of its product range.

5.2.7   Shiraz Electronics Industries

P.O. Box : 71365–1589	Tel: +98 71 644–831, 649–869, 646–253
Shiraz, Iran	Fax: +98 71 642–000
	Telex: 332232 IEI IR

Table 5.5: Contact Information for SEI.

For more than 23 years, Shiraz Electronics Industries (SEI) has been engaged in professional electronic production and projects. It employs more than 2,000 skilled personnel (300 of whom have graduate degrees), whose combined experiences, together with advanced equipment, and organization result in a powerful technological industrial group. The company currently offers over 45 products and services.

SEI is a subsidiary of IEI, and consists of the following divisions:

1. Electronic Warfare Division
2. Avionics Division
3. Radar & Microwave Division
4. Naval Electronics Division
5. Mechanical Parts Divisions
6. Electro-Optics Division
7. Computer and Peripherals Division
8. Engineering and Technical Support Division

Examples of projects that have been supervised by SEI are:

- Design and implementation of communication networks
- Overhaul of Tele-Optically-Wired (TOW) missile launchers
- Reconstruction of microwave tubes
- Overhaul of various radar systems
- Manufacture of night-vision equipment
- Manufacture of hand-held laser rangefinders
- Reconstruction of radar CRTs
- Design of advanced QC & QA systems
- Calibration of electronic test equipment
- Production of consumer electronics

P.O. Box 15875–4337	Tel: +98 21 254–8080
Tehran, Iran	Fax: +98 21 254–8076, 254–1194
	Telex: 214417 ICIT IR

Table 5.6: Contact Information for ICI.

5.2.8 Iran Communication Industries

Iran Communications Industries was established in 1978 to produce SMD circuits and digital PABX centers. It employs over 2000 skilled personnel (12% of whom are engineers). This fully state-owned company works in claims to rely fully on research and development carried out at the ITRC. ICI has been awarded 6 awards at the annual Kharazami Science Competition and has been granted international and local patents for its technological innovations.

ICI consists of the following divisions:

1. Tactical Communication Division
2. Communication Security Division
3. Telecommunication Division
4. Mechanical Parts Division
5. Electronic Component Division

It's Telecommunication Division and produces the following products:

- Digital PABX centers with CCITT standard, with a capacity range from 120-5,000 lines;
- Electronic invoicing machines, or ANI's, that have been installed in more than 200 telecommunications centers;
- Digital transmitting equipment, PCM-4, PCM-8 and PCM-30.

Consumer products in the telecommunications field include:

- SAMA-68 – a multi-featured, microcomputer controlled and programmable phone patch system that can connect a public or private telephone system to a simplex radio network.
- SAMA-110 – a full-featured base/repeater station radio with 99 synthesized channels, duplex and remote control operation, and 136- 520 MHz (8 bands) frequency range.
- SAMA-1209 and SAMA-1109 microprocessor controlled chargers.
- An emergency roadside telephone system consisting of emergency roadside telephone installed in pairs along the highway, the ERTs are and all connected to a Call Control Unit by a dedicated 4-wire (quad) link.
- RC-620, RC-715, RC-720, and RC-730 GSM mobile phones with up to 100-number phone book, 256 memory dials in SIM, calculator, and PCMCIA card for data/fax.
- SAMA-105, 106, 107 and 208 VHF/UHF mobile radios and the Payam mobile transciever.
- SAMA-PA-26 alphanumeric Pager and SAMA-PN-4 numeric pager.
- Card accessed outdoor payphone, with remote monitoring, software updates, synthesized voice (5 languages) emergency calls (5 numbers) securing the payment of calls line tapping protection card checks and socket connection (for fax and portable computers.) and multi-card reader.

- SAMA-109, SAMA-IS-250, SAMA-209, 309, and 971 VHF/UHF portable radio (walkie-talkie) and Portable Radio Trunking, with optional secure operation and military standards.

ICI enjoys state-of-the-art facilities, and with 25 years of experience, it is also the country's leading manufacturer of military communication equipment and systems. More than 75 products in the field of tactical communication and encryption systems meet a wide range of the army's requirements, while a forceful R&D center with 20 production lines boosts the industry with "custom-made" projects as well as a stream of new products.

ICI enjoys use of a number of well-equipped R&D facilities including CAD-CAM laboratories, SMD assembling facilities, advanced QA facilities, and MIL-STD and advanced military QC test laboratories.

Examples of other projects that have been supervised by ICI are execution of various large-scale communication projects, multilayer PCB design and production, microcontroller development, fire alarm systems, and electronic proximity and delay fuses.

5.2.9   Information Systems of Iran

ISIRAN is one of the largest and most experienced information technology companies in the country with expertise with mainframes, minicomputers and PC hardware, software and maintenance as well as total solution turn-key projects.

The company's background boasts plenty of successful, grand scale projects in the military, public and private sectors.

ISIRAN Institute (a subsidiary of ISIRAN) offers professional training for interested individuals in order to provide the required skills and mastery needed in computer science, information technology and system development occupation.

ISIRAN's main activities are as follows:

- Setting up of computer sites
- Design and establishment of local area networks (X.25 and TCP/IP)
- Maintenance of mainframes and minicomputers
- Development of a relational database development (SUPRA/Server)
- Development of an object relational database management system.
- Development of application development tools (AD/Advantage)
- Offering total solution turn-key projects
- High-grade training programs
- Software migration
- Handling of large scale information technology projects
- Consultation services

P.O. Box 15875-4337	Tel: + 98 21 873–8811
Tehran, Iran	Fax: +98 21 873–9197

Table 5.7: Contact Information for ISIRAN.

5.2.10   Electronic Component Industries

The Electronic Components Industries (ECI) was founded in 1976. This company, having 3500 square meters of clean room space at its disposal in various areas of the plant with classes of 100 to 100,000, is among the most comprehensive electronic component manufacturing companies in the region.

ECI has, over the years, taken measures to meet the country's industrial and commercial electronic component needs and by continuing production and expanding lines it supports domestic industry in such areas as: active parts, thick film hybrid microelectronics, quartz crystals, piezoelectric ceramics, credit cards, multilayer,single, and double sided printed circuit boards, and semiconductor devices (transistor and ICs). ECI is a subsidiary of IEI.

Integrated Circuits

ICs were first manufactured by ECI in 1985 with the production of 14 and 16 pin linear ICs, and from 1990 digital ICs with CMOS technology including gates, inverters, and counters were introduced into the production line. By expanding and completing its IC production line, ECInow has the capability to produce various types of ICs in 8, 14, 16, 20 and 24 pins packages.

More recently, by combining FPGAs and hybrid circuits the design and production of mixed signal circuits is carried out at ECI.

Printed Circuit Boards

ECI began production of printed circuit boards since 1980 with the manufacture of single-sided and double-sided boards. By expanding its production lines and using advanced automatic equipment it now supplies the world markets with an appreciate amount of products which meet commercial (IPC, IEC) standards and include double-sided, metallized, multilayer with fine board lines and flexible boards of the polyester and polyamide kind.

Quartz Crystals

In ECI, most quartz pieces are AT-CUT and manufactured in (HC43/U, HC6/U, HC18/U HC25/U, HC49/U) packages.

Silicon Transistor, Thyristor and Triacs

EC1 is the manufacturer of small signal silicon transistors in To-92 packages with variability in breakdown voltage, current, power and HFE. In addition, PNPN devices (Triac and SCR) made of silicon are also produced and supplied to the market in To-92, To-220, To-3 and To-18 packages for general applications.

Credit and Smart Cards

ECI as a producer of credit cards using chips, began production of phone-cards in mid 1994 and has met all the telecommunication needs of the country since then. In addition plans are under way for cards for parkometers, gas stations, chain stores, public buses, subways, highway tolls, mobile phones, and I.D. cards, to be made available in the near future.

P.O. Box : 71955–887	Tel: + 98 71 644–714, 644–712, 642–758
Shiraz, Iran	Fax: +98 71 644-711
	Telex: 332435 ECI IR

Table 5.8: Contact Information for ECI.

5.2.11   Iran Electronic Research Center

Continuous research and development has been a major goal of IEI in order to maintain its leading role by introducing new models and launching new products to meet new requirements.

Electronics, communications, microprocessors, microelectronics, optics and electrooptics are the titles of research groups at the IERC. The center, established 16 years ago, is capable of handling the multi-technology range of large products through an advanced PERT system.

IERC is known for

- 6 prizes at the Kharazmi scientific festival

- 2 international patents

- 3 patents registered in Iran

- Creation of more than 20 production lines

- Its fast turn-around time

5.2.12   Telecommunications Manufacturing Company

The PTT affiliated Iran Telecommunications Manufacturing Company (ITMC) is situated in a 95,000 square metres facility in Shiraz. It was established in 1967 and produces parts for high capacity digital exchanges EWSD and S12. It has an annual output of 1.2 million parts. It also produces low capacity exchanges branded Fajr (400 line capacity) and Asr (256 lines), telephone sets, and some other equipment. The assembly line for NEAX61E digital exchanges is also based at this factory. The company's software center, which is equipped with an IBM 4381 main frame computer, produces the databases and software necessary for the above stated exchanges. It also provides the necessary support during the operation of the exchanges. Other products include power supply sets, different types of telephone sets, MDF and DDF accessories etc.

ITMC's source of technology is mainly SEL and Siemens of Germany. ITMC is currently pursuing a technology transfer project for the TCI in collaboration with NEC of Japan.

The company's majority shareholder is TCI. The Iranian Bank of Mines and Metals and Siemens are minority shareholders.

5.2.13   Iran Telephone Planning and Development

Iran Telephone Planning and Development Company is active in building different concrete structures such as manholes, concrete poles, and metallic structures such as guyed towers, telephone booths, cross-connect cabinets and Main Distribution Frames (MDF). The company also produces telecommunications towers, is heavily involved in executing cabling projects, and is active in implementing cable networks. In 1996 the company won the tender to implement the 700-km long TAE fiber-optic cable project in Turkmenistan.

5.3   Private or Semi-Private Commercial Entities

5.3.1   Iran Telecommunications Industries

Iran Telecommunications Industries (ITI) was established in 1973 in Shiraz as a fully owned subsidiary of TCI. Within the past 20 years ITI has equipped the telecommunications network, manufactured the analogue and digital transmission equipment, and has also contributed to the communications developments in Iran. ITI currently employs over 2000 staff. ITI claims to be constantly upgrading its technologies to keep in line with international standards. The company is responsible for maintaining and expanding Iran's telecom network and providing all the necessary hardware and software in this field. A look at some of the products manufactured or assembled by ITI indicates that it has attempted to concentrate on domestic production of the necessary products:

- Analogue and digital multiplex systems (PDH-SDH) in different capacities 1920 ch, 7680 ch, 30720 ch, and the relevant terminals.

- Subscriber carrier system (SCS)

- 4-channel PCM system

- Digital radio systems in different capacities 30 ch, 60 ch, and single channel

- SDH radio systems

- Rural radio equipment (DRMASS) radio systems

- Optical line terminals with capacities up to 1920 ch, copper cable terminals with capacities up to 30 ch.

- Chargers with 13.8v, 24 and 60v.

- Hand-held wireless mobile and fixed radio systems

- Solar chargers controls

- Different types of coil and transformers with low power (signal) and high power.

ITI also manufactures power supplies and low capacity digital switching systems.

5.3.2   Pars Tel Kar

Valie-Asr Square	Head Office: +98 21 646–1501, 646–3612, 646–9592
No.637 Valie-Asr Avenue	Sales: +98 21 646–9223, 646–9595, 640–3888, 649–2342-3
Seventh Floor, Suite 704	Technical Support: +98 21 649–2370, 641–5108
Tehran 15938, Iran	Factory: +98 2256 2843
Email: parstelkar@neda.net	Fax: +98 21 646–6256
Web: http://neda.net/parstelkar	Telex: 226053 PTKC IR

Table 5.9: Contact Information for Pars Tel Kar.

Pars Telephone Kar (PTK), a privately owned company, is a major developer, manufacturer and supplier of PABX, public exchanges, personal computers and computer networks in Iran. It has been in business for 15 years, has more than 200 employees, and operates a country-wide network of 75 dealers. PTK enjoys a very strong relationship with the PTT and the Telecommunications Company (TCI).

Traditionally, the major thrust of PTK's business had been in PABXs. The company has a growing base of more than 3500 installed systems, most of which are computerized. Major products are the PDX-1, PSX-104, PSX-600, and PSX-36 systems (details and technical specifications are on the company web page).

The rapid growth of the computer and communications fields in Iran has resulted in PTK's participation as distributors/installers of these systems. PTK is also experienced in developing software and hardware designs and solutions in the field of communications.

5.3.3 Keresm Communications Research

Established in 1991 and employing only 20 people, KCR is one of the few high-tech Iranian companies with a growing international presence KCR is a R&D company specializing in the fields of mobile communications, IC design, industrial automation, and instrumentation. KCR prides itself on leading edge technology Research and Development for its clients.

The company was originally setup to provide high technology consulting services to clients in the field of mobile, RF communications and electronics. With growth rates almost doubling every year, KCR has been very successful in completing its projects. These projects have ranged from analog RF communications IC design in the field of mobile telephony, mobile handset solution, production ready design of measurement instruments and complete design and implementation of a factory monitoring system with remote access.

Specific strengths includes development of GSM/PCN/DECT and other personal communications products, as well as advanced custom IC's and circuits for clients in the areas of:

• RF Communications	• Tx, Rx, Synthesizer
• Signal processing	• Base-band A/D and D/A
• VLSI	• Multi-media
• ASIC	• Smart cards

KCR has demonstrated a number of critical strengths and solid growth based purely on R&D over the past seven years:

- Proven IC design capability of the most advanced integrated circuits with many innovations.

- Strong record for excellent performance in doing complex designs working simultaneously with 4 teams in 3 continents.

- Proven SCADA technology with proprietary features.

- Extremely motivated and well trained engineers.

- Excellent documentation of all work.

- Transfer of several patents a year to clients.

5.3.4 Hi Tel Kar

Hi Tel Kar is a small company involved in preparation, production and sale of communication equipments including cable networks, M.D.F. equipment and metallic parts of long distance air lines, and cable accessories for the non-pressurized telephone network.

Canada Representative Unistar Micro Technology 44 East Beaver Creek Road, Suite 13 Richmond Hill, Ontario, Canada L48 IG8	Tel: + 905 731–3105 Fax: + 905 780–1574
UK Representative ASUTEC Grange Ind. Estate Cwmbran NP44 8HQ, United Kingdom	Tel: + 44 1633 838–811 Fax: + 44 1633 872–329
Email: fotowat@holonet.net Email: mivechi@pc.jaring.my Web: http://www.keresm.com	

Table 5.10: Contact Information for Keresm Communication Research.

Dey Alley, No. 9, 4th floor	Tel: +98 21 882–5350, 883–4707
North Kheradmand Street	Fax: +98 21 883–4707
Karimkhan Avenue	Email: hitelkar@neda.net
Tehran 15859, Iran	Web: http://neda.net/hitelkar

Table 5.11: Contact Information for Hi Tel Kar.

5.4 Foreign Companies

5.4.1 Siemens

By far the best represented foreign company in the Iranian telecom scene, Siemens' relationship with Iran has a long history dating back to 1926. In 1956 Siemens delivered the first telephone switching and communications technology to Iran.

Factories

In 1967 Siemens made a substantial contribution in support of the national industry by signing a licensing agreement in return for a 20% share of the newly founded Iranian Telecommunication Manufacturing Company (ITMC) in Shiraz. From 1969 to 1990, ITMC had a significant impact on the expansion of the Iranian telecommunications network. Approximately 1.25 million lines of the Siemens analog switching system EMD were commissioned during this period. The company's added net value rose continuously up to 80% at a mean production level of 50,000 lines per annum. Following the conversion from analog to digital switching technology, Siemens has delivered or contracted for 1.6 million digital electronic switching system (EWSD) ports to date.

Sales

In 1989/1990 Siemens was involved in two other significant projects designed to upgrade the Iranian telecommunications network: one for the conversion from analog to digital switching and communications technology, and the other for expansion and modernization of local Iranian production activities in the telecommunications sector. The majority of switching center equipment was manufactured in Shiraz by ITMC. In the same year Iranian Telecommunications Industries (ITI) and Siemens signed a 15-year know-how transfer

Siemens 32 Ayatollah Taleghani Avenue Siemens House P.O. Box 15875-4773 Tehran 15936, Iran	Technical Manager: Mr. Mazhar Tel: +98 21 614–2200 Fax: +98 21 640–2294 postmaster@siemens.co.ir
	Training Manager: A. Djafari Tel: +98 21 614–2246 Fax: +98 21 640–2294 a.djafari@siemens.co.ir

Table 5.12: Contact Information for Siemens.

contract for the production of digital transmission equipment, including the 140 Mbit/s PCM 30 Multiplexer 2 and optical fiber communications equipment with up to 140 Mbit/s, primarily designated for regional networks.

In 1993 TCI signed a DM 6 million contract with Siemens for purchase and installation of software necessary to make changes in TCI's digital systems and also to help with design of new systems.

Currently Siemens and ITMC have contracted for more than 2 million ports in 125 projects including an international gateway exchange. At the same time, ITI Shiraz implemented several important projects involving digital communications technology with Siemens and TCI.

A pilot project for conversion from the plesichronous digital hierarchy (PDH) to the synchronous digital hierarchy (SDH) featuring the bit rates 155 (STM1) = 622 (STM4) = 2,500 (STM16) Mbit/s are currently underway at TCI. In order to support the practical application of this new technology both in planning and implementation, ITI, TCI and Siemens are currently developing a joint training program. Other major contracts were awarded to Siemens in the communications cable sector.

5.4.2   Nokia

In 1992 Nokia was chosen to supply TCI with a complete GSM 900 network. Commercial services were first launched in the city of Tehran. Since then, coverage has been extended to major provincial cities and fax and data services have been added as well.

Nokia Telecommunications No. 10 and 12, Third Street Khaled Eslamboli Avenue Tehran 15136, Iran	Tel: +98 21 872–3562 Tel: +98 21 872–3563 Fax: +98 21 872–3559 postmaster@nokia.co.ir

Table 5.13: Contact Information for Nokia.

5.4.3   Alcatel

Alcatel has been involved in installing various switching system in Iran. The most notable is the Alcatel 1000 S12 involving 2,597,000 terminations and 156 exchanges.

Besides supplying a good portion of Iran's digital switches, as well as the X.25 data network of DCI, Alcatel was also involved, in 1992, in a major submarine optical fiber cable laying project between Iran (TCI) and the UAE (Etisalat).

Alcatel SEL AG	KH. Beilfuss, Director
Building No. 1	Tel: +98 21 875–7323
24 Novak Street	Fax: +98 21 875–7324
Africa Expressway	
Tehran, 15186, Iran	

Table 5.14: Contact Information for Alcatel.

5.4.4 Ericsson

Ericsson Iran	Philippe Durand, Director
133 Molla Sadra Avenue	Tel: +98 21 803–7654
Tehran, Iran 19945	Fax: +98 21 803 3113
Ulf Avrin, Director, Middle East Market Unit	Tel: +46 8 719–1120
Public Networks Business Unit	Tel: +46 70 519–120
Ericsson Infocom Systems	ulf.avrin@etx.ericsson.se

Table 5.15: Contact Information for Ericsson.

Ericsson has been established in Iran since 1992. Today, Ericsson has 45 employees in Tehran. It's Tehran office is currently considering an Internet link-up with Ericsson Data to Ericsson's Corporate Network (ECN).

In May 1998 Ericsson was awarded its first AXE contract in Iran valued at approximately US $45 million. The equipment, bought by TCI, is in the process of being installed in Tehran.

In addition to AXE, the contract includes training, transfer of technology, repair center as well as a support center.

Ericsson cited Iran's large demand for telephony services, and an opening economic climate as factors contributing to making Iran a very important market for the company.

Ericsson's AXE provides an open architecture that supports all fixed and wireless telecoms, datacoms and interactive services. AXE is the most widely-deployed switching system in the world, supporting well above 120 million users of fixed network services in more than 120 countries. The system is also supporting well above 60 million users of wireless network services in more than 90 countries worldwide.

Earlier in 1997, Ericsson was the recipient of an order for 51,000 DRX lines from TCI. DRX is a downscaled version of the MD110 telephone exchange used for public traffic in several markets.

The order, valued at $5.2 million, expanded Iran's existing 54,000-line DRX exchange, making Iran one of the largest markets for DRX systems from Ericsson Business Networks.

More than 30 communities throughout Iran were connected by a unified telecom network based on DRX equipment. A large percentage of the materials was produced in Sweden. The remaining portion was made in Iran by ICI, that has also been contracted for installation and start-up at customer sites.

Ericsson is also involved in Iran's mobile communication network, supplying GSM 900 equipment for the Kish Island Free Trade Zone, and the city of Isfahan (operated by Celcom), in January 1996 and 1995 respectively. As of January 1997, the number of people being served by Ericsson mobile in Iran stood at 23,500.

Even earlier in 1991, Ericsson received an order for a long-distance fiber-optic communications network from the Iranian Islamic Republic Railways (RAI). The contract, valued at $21 million, was placed with

Ericsson's Turkish subsidiary, based in Istanbul.

The network was installed between the cities of Ghazvin and Razi in northwest Iran, a distance of 860 km. The project included the installation of 12-fiber optical cable, seven Ericsson MD110 digital private branch exchanges (PBX's) with 6,500 lines, transmission equipment, network planning and project supervision.

The network was later expanded to cover the entire Iranian railway network, with work on the northeastern region railway being finished in Spring 0f 1996, and other regions after this date.

5.4.5   ItalTel

On February 1, 1999 the Iranian Minister of Post, Telegraph and Telephone Dr. Mohammad Reza Aref signed a cooperation agreement with Italian Post and Telecommunications Minister Salvatore Cardinale to expand bilateral cooperation in telecommunications.

The two companies, TCI, and Italtel are to cooperate in areas relating to research and transfer of technology, production and export of various technical equipment as well as exchange of technical expertise. Telecommunication channels between the two countries are to increased, and joint work and research in fiber optics technology in particular was agreed upon.

Appendix A: Iranian Area Codes and Domestic Rates

More than 1,850 cities and villages in Iran have access to direct long distance dialing. The rates are different for daytime (7:00 am to 8:00 pm) and nighttime (8:00 pm to 7:00 am). The daytime rate varies from IR 98 to 651 per minute and night rates span IR 98 to 326 per minute.

The following table contains the area codes (add 0 at the beginning for dialing inside Iran) and the rates (IR/min) for major cities. A more comprehensive list is available upon request, encompassing many smaller localities and villages.

City	Area code	Day rate	Night rate
Abadan	631	391	195
Abadeh	751	391	195
Abhar	2438	261	130
Ahvaz	61	391	195
Arak	861	261	130
Ardabil	451	261	130
Astara	1854	261	130
Babol	11	195	130
Babolsar	1291	195	130
Bam	3447	521	261
Bandar Abbas	761	651	326
Bandar Anzali	181	261	130
Bandar Ganaveh	7734	391	195
Bandar Mahshahr	6532	391	195
Bandar Torkaman	1753	261	130
Behbahan	671	391	195
Birjand	561	521	261
Borujerd	6621	261	130
Bumehen	2256	98	98
Bushehr	771	521	261
Chahbahar	5423	651	326
Chalus	191	195	130
Damghan	2333	261	130
Dezful	641	391	195
fasa	731	521	261
Fasham	2223	98	98
Ferdows	534	391	195
Garmsar	2252	130	98
Gorgan	171	261	130
Hamedan	81	261	130
Heydarabad (Jahrom)	791	521	261
Ilam	841	391	195
Isfahan	31	261	130
Islamabad (West)	8343	391	195
Jahrom	791	521	261
Jajerud	2251	98	98
Jiroft	3449	521	261
Karaj	261	98	98
Kashan	361	195	130
Kazerun	721	391	195
Khansar	371	261	130
Kerman	341	521	261
Kermanshah	831	391	195
Kharg Island	7735	521	261
Khomein	865	261	130
Khorramabad	661	261	130
Khorramshahr	6324	391	195
Khoy	461	391	195

Table A-1: Major Iranian area codes and long-distance rates from Tehran. All numbers are in Iranian Rials per minute ($1=IR 3,000 at the official exchange rate). Continued on next page.

City	Area code	Day rate	Night rate
Lahijan	14122	261	130
Lar	781	521	261
Lavasan	2222	98	98
Mahan	3479	52 1	261
Mashad	51	521	261
Masjed Soleiman	681	391	195
Malayer	851	261	130
Mehrshahr	261	98	98
Miyandoab	481	391	195
Naein	3267	261	130
Najafabad	331	261	130
Neishabur	551	391	195
Noshahr	191	195	130
Orumieh	441	391	195
Parandak	2265	130	98
Poledokhtar	6638	391	195
Qamsar	3665	261	130
Qazvin	281	195	130
Qom	251	195	130
Quchan	581	391	195
Rafsanjan	3431	521	261
Ramhormoz	691	391	195
Ramsar	1942	195	130
Rasht	131	261	130
Rudhen	2248	98	98
Sari	151	195	130
Saveh	2554	195	130
Sabzevar	571	391	195
Sanandaj	871	261	130
Sarab	431	391	195
Sarakhs	5284	521	261
Sarband	651	391	195
Sardorud	41	391	195
Semnan	231	195	130
Shahrekord	381	261	130
Shahrud	2731	261	130
Shiraz	71	391	195
Sirjan	3452	521	261
Tabriz	41	391	195
Torbat Heidarieh	531	521	261
Yasuj	741	391	195
Yazd	351	391	195
Zabol	5421	651	326
Zahedan	541	651	326
Zanjan	241	261	130
Zarrinshahr	334	261	130

Table A-1: (Continued from previous page): Major Iranian area codes and long-distance rates from Tehran. All numbers are in Iranian Rials per minute ($1=IR 3,000 at the official exchange rate).

Appendix B: International Long-Distance Rates

Americas	Rates	Tax	Total
Venezuela	1,523	609	2,132
Guam	2,573	1,029	3,602
Brazil	2,641	1,057	3,698
Aruba, Belize	3,045	1,218	4,263
USA	3,214	1,286	4,500
Peru	3,426	1,370	4,796
Alaska, Nicaragua	3,857	1,542	5,400
Colombia	4,060	16,23	5,684
Canada	4,286	1,714	6,000
Argentina, Bahamas, Barbados, Bolivia Costa Rica, Cuba, Dominican Republic Ecuador, El Salvador, Falklands French Guiana, Guadeloupe, Guatemala Paraguay, Panama, Suriname, Tuvalu Mexico, Montserrat	4,568	1,827	6,395
Uruguay, Puerto Rico, Jamaica Haiti, U.S. Virgin Islands	5,076	2,030	7,106
Antigua and Barbados, Anguilla, Chile Bermuda, Dominica, Grenada, Honduras Saint Kitts and Nevis, Saint Lucia Saint Vincent and The Grenadines Turks & Caicos Island, Trinidad and and Tobago, Cayman Islands	6,091	2,436	8,527

Table B-1: International long-distance rates from Iran to the Americas. All numbers are in Iranian Rials per minute ($1=IR 3,000 at the official exchange rate).

Europe	Rates	Tax	Total
Austria, San Marino	2,331	932	3,263
Bulgaria, Switzerland, Liechtenstein, Monaco	1,864	746	2,610
Spain, Sweden, Finland	2,020	808	2,828
Estonia, Lithuania	2,030	812	2,863
Germany, Russia	2,643	1,057	3,700
France	3,857	1,543	5,400
Iceland	4,055	1,622	5,677
Ireland	3,553	1,421	4,974
Italy	3,571	1,429	5,000
Netherlands	4,286	1,714	6,000
Turkey	1,429	571	2,000
Ukraine	2,643	1,057	3,700
United Kingdom	2,284	914	2,198
Albania, Andorra, Belgium, Slovakia Bosnia and Herzegovina, Czech Republic Croatia, Cyprus, Denmark, Greece Hungary, Luxembourg, Latvia, Macedonia Moldova, Norway, Poland, Portugal Romania, Slovenia, Vatican City Yugoslavia (Serbia and Montenegro)	3,045	1,218	4,262
Oceania and Caribbean	Rates	Tax	Total
Australia	2,284	913	3,197
New Zealand	2,331	932	3,263
Hawaii	3,214	1,286	4,500
Cocos Island, Norfolk Island	3,806	1,523	5,329
Solomon Islands, Cook Islands, Kiribati	4,060	1,624	5,684
American Samoa	6,091	2,426	8,527
Rapa Nui (Easter Island), Papua New Guinea Vanuatu, Western Samoa	3,045	1,218	4,263
Antigua, Tonga, Fiji, Caroline, Cariaco Northern Mariana Islands	3,857	1,543	5,400
New French Polynesia, Pitcairn Island New Caledonia, Marshall Islands, Wallis and Futuna Islands, Midway Islands, Nauru	4,568	1,827	6,395

Table B-2: International long-distance rates from Iran to Europe, Oceania, and the Caribbean. All numbers are in Iranian Rials per minute ($1=IR 3,000 at the official exchange rate).

Africa	Rates	Tax	Total
Egypt	4,659	1,864	6,523
Libya	761	305	1,066
Sudan	1,523	609	2,132
Burundi	1,864	746	2,610
Algeria	2,030	812	2,842
Uganda	2,331	932	3,263
Madagascar	5,279	2,111	7,390
Zimbabwe	2,538	1,015	3,553
Swaziland, Malawi	3,558	1,423	4,981
Cote d'Ivoire, Morocco,	3,554	1,422	4,976
Rodrigonez, Moris	3,806	1,523	5,329
Tunisia, Togo, Gibraltar, Lesotho, Malta, Zimbabwe, Gabon, Comoros, Cameroon	2,045	1,218	4,263
Angola, Acension, Spith Africa, Benin, Botswana, Tanzania, Tristan Dakonha, Chad, Rwanda, Reunion, St. Pole and Amsterdam, St. Helena, Senegal, Somalia, Seychelles, Sahara, Ghan, Congo, Gambia, Guinea, Liberia, Mali, Mauritania, Mozambique, Niger, Nigeria, Namibia	4,568	1,827	6,395
Ethiopia, Eritrea, Central African Republic, Burkina Faso, Djibouti, Zaire, Sierra Leone, Kenya, Guinea Sierra Leone, Kenya, Guinea	5,076	2,030	7,106
Sao Tome and Principe, Cape Verde, Guinea-Bissau,	6,091	2,436	8,527

Table B-3: International long-distance rates from Iran to Africa. All numbers are in Iranian Rials per minute ($1=IR 3,000 at the official exchange rate).

Asia	Rates	Tax	Total
Pakistan	1,429	571	2,000
Georgia	1,523	609	2,132
Brunei, Malaysia	1,864	746	2,610
Bahrain	2,000	800	2,800
Afghanistan, Tajikistan	2,030	812	2,842
Turkmenistan	2,142	857	3,000
Uzbekistan, Kyrgyzstan	2,334	923	3,267
South Korea	2,486	994	3,480
Bangladesh, Bhutan, Thailand	2,538	1,015	3,553
Oman,	2,643	1,057	3,700
Azerbaijan, Armenia	2,786	1,114	3,900
United Arab Emirates, Jordan, Taiwan, Iraq, North Korea, Maldives, Hong Kong, Yemen,	2,857	1,143	4,000
Laos, Nepal,	3,045	1,218	4,263
Philippines,	3,107	1,243	4,350
Kazakhstan	3,143	1,257	4,400
Qatar, India	3,214	1,286	4,500
Saudi Arabia,	3,429	1,371	4,800
Lebanon,	3,501	1,401	4,902
Kuwait	3,571	1,429	5,000
Japan	3,961	1,585	5,546
Indonesia, Sri Lanka, Cambodia, Christmas Island	4,060	1,624	5,684
East Timor, Singapore, Makao, Mongolia, Myanmar, Vietnam,	4,568	2,193	6,395
Syria	7,674	2,193	5,481
China	4,434	1,774	6,208

Table B-4: International long-distance rates from Iran to Asia. All numbers are in Iranian Rials per minute ($1=IR 3,000 at the official exchange rate).

Appendix C: Satellite Broadcasting in Iran

Usage of International Satellite Network for Broadcasting in Iran[9]:

Table C-1.
Satellites used by IRIB (Islamic Republic of Iran Broadcasting)
Intelsat 602 at 62,0 Degree E

```
-----------------------------------------------------------------
  Tp      Channel Name                    Video        Audio
-----------------------------------------------------------------
10964 V  IRIB TV 4                         PAL         6,80 Fa
 tp 71L
-----------------------------------------------------------------
10998 V  IRIB TV 2                        SECAM        6,80 Fa
tp 71U   VIRI (Voice of Is. Rep. of Iran)             6,20 A
         IRIB Radio 2                                 7,40 Fa
         Radio Mashad                                 8,00
-----------------------------------------------------------------
11043 V  Color bars                       SECAM        6,60
 tp 72L
-----------------------------------------------------------------
11096 V  IRIB TV 3                        SECAM        6,80 Fa
 tp 72U  Radio Youth & Sports                         6,20 Fa
         Radio Quran                                  7,40
-----------------------------------------------------------------
11128 V  Sahar Universal Network          PAL         6,80 Fa
 tp 73A  Radio Tehran                                 6,20
-----------------------------------------------------------------
11172 V  IRIB TV 1                        SECAM        6,80 Fa
 tp 73B  VIRI (Voice of Is. Rep. of Iran)             5,94
         IRIB Radio 1                                 6,20 Fa
         VIRI (Voice of Is. Rep. of Iran)             7,20
         Radio Shiraz                                 7,38
-----------------------------------------------------------------
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                         Table C-2.
              Satellites used by Jaam-e-Jam TV Network


              Hot Bird 3 at 13,0 Degree E

----------------------------------------------------------------
   Tp       Channel Name                  Video        Audio
----------------------------------------------------------------
12437 H   Jaam-e-Jam TV Network           PAL          6,60 Fa
 tp 88    VIRI (Voice of Is. rep. of Iran)             7,02
----------------------------------------------------------------


              Telstar 5 at 97,0 Degree W

----------------------------------------------------------------
  Tp       Channel Name                   Video        Audio
----------------------------------------------------------------
12152 H   Jaam-e-Jam TV Network2          PAL           48 Fa
 tp 26
----------------------------------------------------------------
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