



**COMMENTS OF CISCO SYSTEMS, INC. on
Telecom Regulatory Authority of India consultation paper**

Issues Related to Internet Telephony

Cisco Systems, Inc. (“Cisco”) welcomes the opportunity to offer its views on the consultation questions posed by the TRAI concerning the liberalization and regulation of Internet Telephony in the domestic market in India. TRAI’s Consultation Paper on Internet Telephony recognizes that technology is steadily moving toward the provision of services over Internet Protocol (IP) networks. Indeed, TRAI has already taken important steps to liberalize the provision of Internet Telephony services in India. TRAI now seeks comments on the possible liberalization of Internet Telephony in the domestic market in India, and poses important questions about how Internet Telephony should be regulated. As we discuss in greater detail below, Cisco supports the proposed liberalization of Internet Telephony interconnected to the PSTN. The proposed liberalization will serve the interests of consumers, businesses, and the Indian economy as a whole. In particular, enterprise customers will realize immediate gains in efficiency and productivity from the introduction of interconnected Internet Telephony.

Cisco is a global technology and services company, headquartered in San Jose, California, USA with a large and growing campus in Bangalore that serves as our globalization hub. Cisco currently employs more than 4,000 people in India, including engineering staff that develop new technologies that Cisco sells worldwide. In late 2007, Cisco purchased Navini Networks, Inc., a Richardson, Texas, USA-based maker of WiMAX technology, also with a large engineering presence in Bangalore. Since our campus officially opened on October 30, 2007, construction of new buildings has advanced, and Cisco continues to build on its plan to make our staff in India a key part of our technology development initiatives.

Cisco also supports 160 Networking Academies in India in cooperating with leading educational institutions throughout the country, and Cisco and its partners has trained more than 75,000 students in IP-based networking technologies. In addition to our direct investment in India, Cisco has established valued partnerships with other companies that lead the Indian economy, such as Infosys, Wipro, Tata, and others. Our commitment to India and to our Indian employees, partners, and customers remains strong and we view our presence in India as an important part of Cisco’s future success.



The Benefits of Liberalizing Domestic Internet Telephony

At the very outset of its Consultation Paper, TRAI notes that

Use of Internet telephony for calling Public Switched Telephone Network (PSTN) / Public Land Mobile Network (PLMN) abroad has already generated competition in the International Long Distance (ILD) sector and enabled the reduction in tariff for the benefit of subscribers. Similar impact of opening of Internet telephony is expected in the National Long Distance (NLD) sector also.

Consultation Paper at 2. Cisco believes that TRAI is clearly correct in this assessment – the introduction of Internet telephony in the NLD sector certainly will benefit consumers by producing greater competition and therefore lower tariffs for services, and this will benefit the Indian economy as a whole.

For many customers, however, particularly for enterprise customers, reduced tariffs will likely not be the most important benefit of the introduction of Internet telephony, although this will surely be attractive. Instead, technological innovation and enhancements in productivity may well be more important, especially for businesses but possibly for consumers as well, than the significant cost savings that Internet telephony will likely produce.

Moreover, as the Consultation Paper discusses, Internet telephony is growing rapidly in many parts of the world. Other countries are reaping the rewards of the technical innovation and price competition that Internet telephony affords. But due to regulations that have not kept pace with technology advancements, India has not. As a result, the Indian economy as a whole is being disadvantaged.

These important benefits, which we describe more fully below, will only be achieved if TRAI allows Internet telephony to be interconnected to the PSTN, as the Consultation Paper discusses doing.

As we have noted, technical innovation and the efficiencies that it creates will be especially significant benefits to enterprise customers from the availability of Internet telephony interconnected to the PSTN, which, for convenience, we refer to as VoIP. For example, Cisco's operations in India will enjoy substantial benefits from the liberalization of VoIP for domestic as well as international services in the following ways. We believe that these examples are illustrative of the benefits that other enterprise customers will derive from VoIP liberalization.

The current regulatory environment in India has imposed limitations on service providers, end users, and businesses. Besides impeding normal, healthy economic growth, the government regulations severely limit the technical solutions that can be introduced to achieve overall collaborative capabilities for businesses that are operating out of India.



Some services cannot be offered locally at all. For example, the current regulations make it impossible to introduce IP-based audio conferencing services in India due to the current prohibition on interconnection between Internet telephony services and the PSTN. IP-based conferencing services offer a rich suite of features not available on circuit-switched conferencing services, including web-based capabilities to list attendees, reveal the types of access attendees are using, as well as replay and search tools once the call completes. But these services cannot be made broadly available because, as we have seen in other countries, some attendees will participate on access platforms that include PSTN. As a result, subscribers connect with out-of-country conferencing services in order to access audio conferencing services, thereby increasing operational expenses of the businesses operating out of India.

More significantly, businesses in India are severely hindered in their ability to take advantage of many enterprise solutions that are commonplace in other countries. The design complexity for these IP solutions, when they cannot be interconnected with PSTN infrastructures, overrides the cost benefits.

Enterprise solutions that fall into this category, including Cisco Unified Communications, provide an integrated communications strategy and architecture and enable the secure combination of voice, video, data and mobility applications within an integrated and intelligent network. They support employees' ability to collaborate anytime, anywhere, using any device. In an environment where VoIP can be interconnected to the PSTN, Unified Communications permits fixed-mobile convergence, giving mobile users the convenience of using available fixed wireless networks in addition to cellular networks. Unified Communications can also allow businesses to integrate different device modes and communication applications in order to dramatically improve collaboration between employees and among offices. For example, employees can have access to their own telephone extension, no matter where in India they are located. In addition, interconnected VoIP would also allow businesses to use tail-on/hop off routing of traffic, allowing businesses to more efficiently use the data networks they have already invested in.

Under current regulatory climate in India, however, these services cannot be provided and as a result the gap continues to widen between services available inside and outside of India. Indeed, the gap is widening more rapidly as companies around the world race to globalize. The need to compete on a worldwide scale makes it more crucial than ever to integrate business practices and technology solutions that facilitate communications and collaborations for teams that are distributed in different countries and time zones. This integration can only be achieved through VoIP services interconnected to the PSTN.



In order to make use of VoIP services today, businesses operating in India must deploy logically separated phone systems, that is, separate systems that segregate VoIP traffic and applications from traditional PSTN facilities. As a result, two phone lines are required for each phone, and users cannot conference calls from the PSTN with VoIP calls. The requirement for two separate phone lines also restricts the deployment of collaborative tools such as Cisco Unified Communications. The costs and inefficiencies of the current arrangement discourages businesses, especially Information Technology intensive businesses, from locating in or expanding in India when other countries have adopted much more liberal policies for VoIP.

In addition, the increasing globalization of the business world has introduced a fast-growing demand for teleworkers. By working from home, employees can connect with geographically remote team members and make allowances for time zone differences. Unfortunately, current Indian telecommunications regulations place severe limitations on the business services that can be extended to residences. Companies do not allow home-users to connect to enterprise PSTN calling systems, or extend other business calling features out to the home offices because current regulations do not permit interconnection of VoIP services to the PSTN.

The availability of interconnected VoIP is also of great value to the large Business Process Outsourcing industry. In addition to facilitating teleworking, interconnected VoIP would allow call centers to rapidly and efficiently transfer traffic in the event of call center overflow. As India lags behind other competing nations in its regulation of VoIP, it risks losing these businesses to other countries in Asia and around the world such as China, Sri Lanka, Malaysia, Singapore and Brazil, that allow full convergence of VoIP and PSTN services.

In India, in contrast to countries that have allowed full convergence of VoIP and PSTN services, some service providers have designed highly specialized offerings to enable telework on a limited basis.

It is important to note that, although incumbent service providers will face new competition from the availability of interconnected VoIP, incumbent service providers will also derive benefits. First, interconnected VoIP will likely stimulate increased traffic on the service providers networks, owing to faster adoption of enterprise voice solutions by their customers throughout India. In addition, interconnected VoIP will increase leased line and managed data service penetration in the Indian market due to the adoption of converged voice solutions by corporate customers, especially multinational companies and software service companies.



Moreover, interconnected VoIP will stimulate demand for broadband connections throughout India, which will not only benefit service providers, but will advance TRAI's regulatory objectives as well. In its recent Consultation Paper on Allocation and Pricing for 2.3-2.4 GHz, 2.5-2.69 GHz & 3.3-3.6 GHz bands, TRAI made it plain that it believes these bands will boost broadband deployment, especially in rural areas. Among other services that are likely to be deployed is WiMAX, which is the first wireless broadband platform offering a converged package of VoIP, data and video capabilities. WiMAX thus has the potential to dramatically stimulate broadband adoption but this is only likely to occur if such services can be interconnected to the PSTN.

Appropriate Regulation of Liberalized VoIP

In its Consultation Paper TRAI asks many questions that are essential to crafting appropriate regulations for liberalized VoIP. Based on its long experience with both the technology and with the regulation of VoIP, Cisco offers the following specific comments on the regulatory issues posed by TRAI.

Section 4.1: Whether Internet service providers should be permitted Internet Telephony services to PSTN/PLMN within India? If yes, what are the regulatory impediments? How such regulatory impediments can be addressed? Please give you suggestions with justifications.

As we have already discussed, Cisco strongly urges TRAI to permit Internet Service Providers to provide Internet telephony services interconnected to the PSTN within India in order to ensure that consumers and businesses in India enjoy the full economic and technical benefits of these services. Cisco believes that TRAI has enumerated the key regulatory impediments to the provision of Internet telephony in its Consultation Paper, but that chief among these is the inability to interconnect such services to the PSTN. Other critical issues include access to numbering resources, application of lawful intercept requirements, and application of emergency calling requirements. Cisco discusses these issues below.

Section 4.2: Whether allowing ISPs to provide Internet Telephony to PSTN/PLMN within country will raise issues of non-level playing field? If so, how can they be addressed within present regulatory regime?

The main issue discussed in the Consultation Paper in regard to leveling the playing field between incumbent operators and ISPs that provide interconnected VoIP is whether they should pay the same licensing and regulatory fees. As a general matter, Cisco notes that regulations that apply to the PSTN have developed over decades, and were developed with the nature of the distance-sensitive, circuit switched fixed line network in mind. These considerations are often not appropriate to the modern packet switched IP based networks that are being deployed today and regulators should avoid imposing legacy PSTN rules to IP services in the name of "balance."



Rather, regulators need to identify the core public policy objectives that they wish to achieve and then consider, for each such objective, the need to tailor rules for IP-based networks. Regulators may reasonably decide, for example, that IP-based networks should make some contribution to universal access programs, but should refrain from reflexively applying existing PSTN rules to IP-networks without carefully considering how best to achieve both their universal access objectives and the policy objectives that support liberalizing VoIP services in the first place. Other, similar issues, such as application of lawful intercept obligations, which is discussed below, should also be addressed from this perspective – that is, the regulator should seek to ensure the achievement of core public policy goals (such as appropriate support for law enforcement) without simply applying PSTN based rules and technical standards to IP networks.

Section 4.3: ISPs would require interconnection with PSTN/PLMN network for Internet telephony calls to PSTN/PLMN. Kindly suggest Model/ architecture/ Point of Interconnection between ISPs and PSTM/PLMN?

Cisco recommends that TRAI rely on commercial negotiations to establish both the technical and commercial terms on which ISPs would interconnect to the PSTN, although TRAI should make it clear that operators are required to interconnect. Commercial interconnection negotiations have generally functioned successfully in many countries although plainly problems still arise. Therefore, TRAI should retain the authority to monitor the interconnection process in order to ensure that agreements are negotiated that will serve the interests of consumers.

Section 4.5: What should be the numbering scheme for the Internet telephony provider keeping in view the limited E.164 availability and likely migration towards Next Generation Networks? Please give you suggestions with justifications.

The tremendous success of the mobile industry in India, currently growing at a rate of 8 million subscribers per month, according to the Consultation Paper, will surely require a complete overhaul of the national numbering plan. With this in mind, Cisco recommends that VoIP and all other services have access to numbering resources on the same terms. In particular, Cisco recommends that TRAI not impose a separate dialing code for VoIP services, as Italy, for example, has done. Allowing VoIP and all other services to obtain numbers from a common pool of numbers, in a common format, will facilitate number portability between platforms and thus promote the integration of VoIP services into the Indian telecom industry.



Section 4.8: Is it desirable to mandate Emergency number dialing facilities to access emergency numbers using Internet telephony if ISPs are permitted to provide Internet telephony to PSTN/PLMN within country? If so, should option of implementing such emergency number dialing scheme be left to ISPs providing Internet telephony? Please give your suggestions with justifications.

Cisco believes it is reasonable to require ISPs to provide emergency number dialing access if they are providing Internet telephony interconnected to the PSTN. Such access should be similar to that provided by fixed and mobile operators although the technology and techniques used to achieve this goal may be different for interconnected VoIP providers than it is for either fixed or mobile operators. In general, Cisco does not believe that TRAI should mandate the details of how this is to be achieved, but should instead make clear that it expects ISPs to make emergency dialing access available and allow the operators to determine how best to achieve this result. In addition, the issue of how to ensure that mobile or nomadic phones can appropriately route calls to emergency call centers is being actively considered in other jurisdictions and in standards bodies. Cisco recommends that TRAI carefully monitor those developments before developing rules to address this issue. In any case, while access to emergency services is obviously an important concern both for consumers and for regulators, remaining uncertainty in this regard should not delay the liberalization of interconnected VoIP.

Section 4.9: Is there any concern and limitation to facilitate lawful interception and monitoring while providing Internet telephony within country? What will you suggest for effective monitoring of IP packets while encouraging Internet telephony? Please give your suggestions with justifications.

The ability to provide appropriate lawful interception and monitoring functions on IP networks is obviously an important concern for regulators. Fortunately for TRAI, this issue has been dealt with successfully in other countries. As with other issues we have discussed, Cisco urges TRAI not to simply adopt legacy PSTN regulations and apply them to interconnected VoIP. Cisco also recommends that TRAI avoid attempting to craft a unique and detailed Indian solution to this issue. Rather, TRAI should consider adopting an existing, internationally accepted standard for lawful interception for broadband and IP-based networks. For example, the European Telecommunications Standards Institute (ETSI) has developed such standards, which can be reviewed at ETSI's website (see <http://www.etsi.org/website/technologies/lawfulinterception.aspx>). Cisco believes that TRAI should require IP-based service providers to support internationally-recognized standards, such as those already adopted by ETSI.



Section 4.10: Is there a need to regulate and mandate interoperability between IP networks and traditional TDM networks while permitting Internet telephony to PSTN/PLMN within country through ISPs? How standardization gap can be reduced to ensure seamless implementation of future services and applications? Please give your suggestions with justifications.

Cisco believes that this is an issue that the industry can resolve on its own. If IP networks are not interoperable with existing TDM networks, then there can, by definition, be no interconnection VoIP. Moreover, IP voice services already support SS7 signaling and IP-based networks have in other respects been designed to be compatible with TDM networks in order to allow them to complete calls. As a result, Cisco does not believe this is an issue that TRAI needs to deal with further.

Section 4.11: Is there a need to mandate QoS to ISPs providing Internet telephony to PSTN/PLMN with country? Please give your suggestions with justifications.

Cisco does not recommend that TRAI adopt QoS standards for interconnected VoIP. Such standards could serve as a barrier to entry to low cost service providers and therefore deny consumers, especially low income residential consumers, access to service. In general, Cisco believes that the issue of quality of service can be effectively addressed by the market, allowing consumers and businesses to choose among service providers on the basis of cost, quality, features, and other considerations. At the same time, however, Cisco believes it is appropriate to require service providers to inform consumers of specific terms and conditions of service, including meaningful descriptions of data rates.

Conclusion

As many telecommunications markets are responding to customer demands for converged services, India still intentionally separates the two voice communication worlds by regulatory fiat. Enterprises operating in India must isolate traditional PSTN voice traffic from VoIP traffic, making it necessary to deploy and maintain duplicate infrastructures. This presents users with multiple calling systems and requires phone systems with logical partitioning for PSTN and VoIP. For reasons explained in these comments, Cisco urges TRAI to allow the use of VoIP interconnected to the PSTN for traffic within India as well as for International Long Distance traffic. This important modernization of India's regulatory regime that will allow Indian companies as well as international businesses operating in India to achieve telecommunications parity with the rest of the world and will pay large dividends to the Indian economy as a whole.



Cisco commends TRAI for moving forward toward the liberalization of interconnected VoIP services. Cisco appreciates the opportunity to share its views on these important issues and stands ready to work with TRAI and other stakeholders to continue to move these issues forward.

Respectfully submitted,

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Dated: 16 June 2008