

ESTIMATING INTERNET TRAFFIC

The Internet is expanding rapidly in India. Unless we have reliable traffic data, the quality of service cannot be improved

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We wish there were devices acting like Internet traffic policemen, consolidating traffic reports every second so that accurate bandwidth requirements could be available anywhere, in any segment.

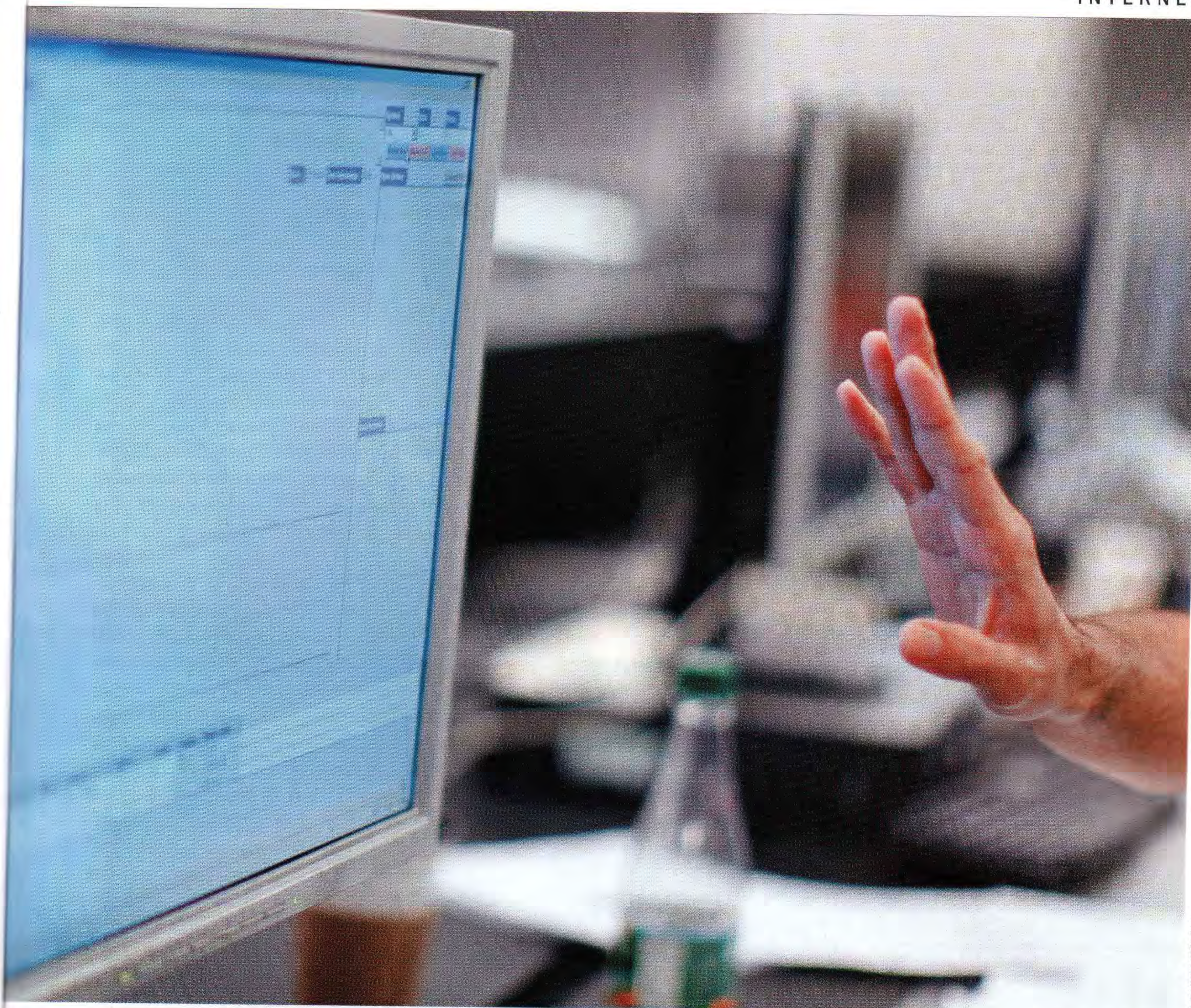
Background

A water analogy works best to demystify internet traffic aspects. Bandwidth is essentially the speed of a connection, or the amount of data that flows from a site's server out to the viewer at any given time. Imagine your internet connection as the plumbing in your home, and the web page you are trying to view like a bucket that gets filled with water. The wider the pipe, the more the water that can flow through it into the bucket, and the faster you will be able to use it. On the internet, the speed of data transfer depends on the number of subscribers us-

ing the same pipe and the applications being used. If someone is downloading a large number of MP3 songs, one after the other, and at the same time you are trying to send an email, the pipe will be full of MP3 data, leaving very little room for your email data. Hence you will experience a very slow connection.

The ISPs (Internet Service Providers) are bandwidth generators. In a region, if there are only two ISPs, A and B, they can peer with each other to exchange their domestic and international traffic. Now, if a third ISP comes into the picture, in order to exchange traffic, it needs to connect to ISPs A and B. So, twice the amount of cable will be required to peer. As the number of ISPs increases, it is not beneficial to connect each ISP with every other ISP. Hence the need for an internet exchange so that a customer from one ISP can access the content of another ISP without international routing.

The National Internet Exchange of India (NIXI) was set up in 2003 as a non-profit organisation



PHOTOS: REUTERS

with the primary objective of facilitating domestic bandwidth traffic within the country. This is vital as this helps in improving the Quality of Service (QoS) by reducing latency and enables efficient utilisation of international bandwidth. This means more foreign exchange is saved in the country. More importantly, it enables reduction in Internet usage prices, thus catalysing the process of bridging India's digital divide.

Research problem

The Internet is changing rapidly and one of the consequences of this change is a growing need for higher quality of service. A corollary of the need for higher quality of service is the need for measurement of demand for bandwidth.

NIXI already has seven functioning internet ex-

changes (also called nodes) at Mumbai, Delhi, Chennai, Kolkata, Bangalore, Hyderabad and Ahmedabad. Work is in progress in setting up new exchanges in Mohali and Lucknow; however the decision to set up these two new nodes was based more on gut feel. The client was keen to assess the domestic internet traffic demand at all state capitals and other major cities and then prioritise the centres. Setting up more exchanges would enable traffic optimisation and allow faster and cheaper internet access via load balancing of traffic. In order to optimise the usage of the total bandwidth available in the country, it is essential to distribute the domestic internet traffic so that international bandwidth is utilised only wherever necessary. Imagine the precious dollars wasted when an email meant for your neighbour travels all the way to Singapore

Reduction in Internet usage prices is essential to bridge India's digital divide

and then back to New Delhi. Internet traffic varies by segments and geography across the length and breadth of India. Hence there was a need to identify the current (2008) and future demand (in the next five years, ie by 2013) of bandwidth in different cities, so that NIXI could set up the next exchange in the city where demand for domestic bandwidth was the highest.

The challenges

Estimating the bandwidth for a large and heterogeneous country like India is a complex task. Bandwidth consumption is dependent on various factors such as type of internet owners, type of connection used and port capacity of the connection. Other key challenges in this study were:

- 1) No one is aware of the precise inflow and outflow of bandwidth in India because of duplication of data submitted to TRAI.
- 2) The study budget did not allow the freedom to conduct a pan-India primary survey to map the de-



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mand side.

3) As discussed earlier, the business interests of the ISPs were not totally aligned with the objectives of NIXI as they wanted to carry the traffic on their own lines and charge higher for it (more than what NIXI would compensate). Thus some ISPs refused to cooperate in this study.

Research approach

We adopted the following methodology which was a unique combination of qualitative survey, usage of existing primary data intelligently and focused desk research.

■ **Qualitative Research:** for supply side data, in-depth interviews with CTOs/ marketing heads in ISP & data centres, most of which were recorded, transcribed and then content-analysed.

■ **Data mining** from two pan-India large-scale syndicated studies.

■ **Comprehensive secondary research** wherein we went through several white papers, reports, books, articles and websites. We also studied Internet traffic patterns of other developing nations such as Brazil and Thailand.

The study delved into the estimation of bandwidth chiefly in the following segments:

Home segment: ISP home segment essentially refers to demand for bandwidth at the retail level, ie in homes for Internet application. This demand is met by the ISPs. There are two components, internet penetration and access technology, that drive the bandwidth consumption in the ISP home segment.

Business segment: In the business segment, PC penetration is the primary driver for bandwidth consumption. In this segment, the mode of accessing internet and the number of internet accounts play a major role in bandwidth consumption.

Insights for business action

The current domestic bandwidth for districts where NIXI had its nodes was computed. Since each NIXI node caters to an area of about 60km radius, we calculated the total domestic bandwidth for, say, Bangalore by summing up the bandwidth consumption in all the towns falling under Bangalore district. Similarly we computed the demand for domestic bandwidth in 20 of the more populated districts where NIXI nodes were yet to be established. The cities were then arranged in order of bandwidth demand. NIXI had already set up nodes at Mohali and Lucknow. However, given the low domestic bandwidth in these districts, it is now considering dismantling them and instead setting up nodes in cities such as Pune and Jaipur where the demand is much higher — as per our study.

Since there was little difference in bandwidth demand in the recommended cities (apart from the top two), we also studied, for prioritisation, the characteristics of various potential cities on parameters such as availability of power, number of data centres and active ISPs, and emergence as an IT destination.

Thus this study helped NIXI in planning for the future for setting up internet exchanges and being in a better position to meet the growing domestic bandwidth requirement in India. IM

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