fast facts

Project: e-Mail system for Telecentres and Schools
Lead Organization: University of Moratuwa
Country: Sri Lanka

situation

Although technologies such as ADSL and 3G have brought broadband within the reach of ordinary people, many schools, telecenters and other small organizations still use kilobit-speed links. These connections are often priced based on the amount of information delivered to end users, a convention that causes users of these sites two major problems: first, severe congestion on the link to the Internet resulting in poor performance; and second, a high operational cost due to volume of data transferred. This has an observable effect on how users communicate with one another; in that any delays encountered when accessing email will multiply, and may add up to a significant amount of time lost each month in attempts to send emails and in waiting for responses.

solution

Despite the fact that web browsing, as an activity, demands a far larger amount of data be delivered to end users, email is still considered to be the single most important type of data for end users. Most users use email daily, more often than other applications, and spend a considerable amount of time reading e-mail each day. Any delays encountered when accessing email will multiply, and may add up to a significant amount of time. For example, if a total delay of 60 seconds is encountered for each email message, and a user reads 20 messages a day, this adds up to over 8 hours of wasted time each month.

To address this loss, this project's primary objectives have been to provide users responsive access to email, and to minimize the amount of email data transferred across the link from the Internet to the user's site. This allows users access to email even if the link is temporarily down. (The system is also in the process of being localized into the national languages, Sinhala and Tamil, in a separate project.)

Sri Lanka is home to a large number of telecenters and "Internet cafes", and over a thousand schools are connected to the internet through the country's "SchoolNet" system. These provide the primary means of Internet access to many Sri Lankan citizens and each location hosts up to 20 computers connected to the Internet via a low-speed 128kb-512kb link. Due to cost and geographical constraints, it is generally not possible to significantly increase the speed of the link.

Initially, the team planned to customize an open-source email client to improve the efficiency of email access at these locations. However, investigation revealed two critical unexpected behaviors. First, that school and telecenter users do not actually use such clients, but rely on webmail services such as Gmail, and second, that sites generally switch off equipment when closing the center in the evening. This meant the team needed to switch their focus to back-end email management by managing the incoming data itself, rather than modifying an existing email client.

To solve these issues, the team developed both a database-based email system, which allows the de-duplication of redundant content; and a central / proxy-based system, which permits control of email content transfer and synchronization. This allows for the identification of email priority and spam by individual users at remote sites, these user preferences are then sent forward to the email server itself so they may be used to classify future emails into desired and "junk" mail, before it's delivered.

As a result emails can now be prioritized based on user preferences and are either pre-fetched (for high performance) or fetched on request (to reduce traffic on link). This means content (such as attachments) are transferred only once, and spam can be filtered at the central server, based on individual user selections. During operational testing of the system, the team itself observed a significant reduction in the volume of superfluous data which was consistent with reports from community members, who reported greatly improved user experiences.

broader impact

The project was carried out by the Center for Localized Systems and Applications, University of Moratuwa in close collaboration with the Dept. of Computer Science and Engineering, and the LK Domain Registry. The project benefited immensely from the localization work carried out by the Center, and the awareness and dissemination work carried out by the Centre and LK Domain Registry. Their partnership with SchoolNet assisted the team in obtaining access to schools and Zonal Computer Resource Centers (CRCs). They have also built up a close relationship with the ICT Agency of Sri Lanka, which will assist in using this system at telecenters.

While the current user base of the system is still fairly small, the team is ready to accept bug reports and other observations from users as usage increases, and improve the software as needed. Eventually, this will allow the software to become more efficient, more useful, and in doing so, gain more users in the rural areas to which it can be of use. They believe that in the near future, the system will gain acceptance both in Sri Lanka and eventually in other countries.
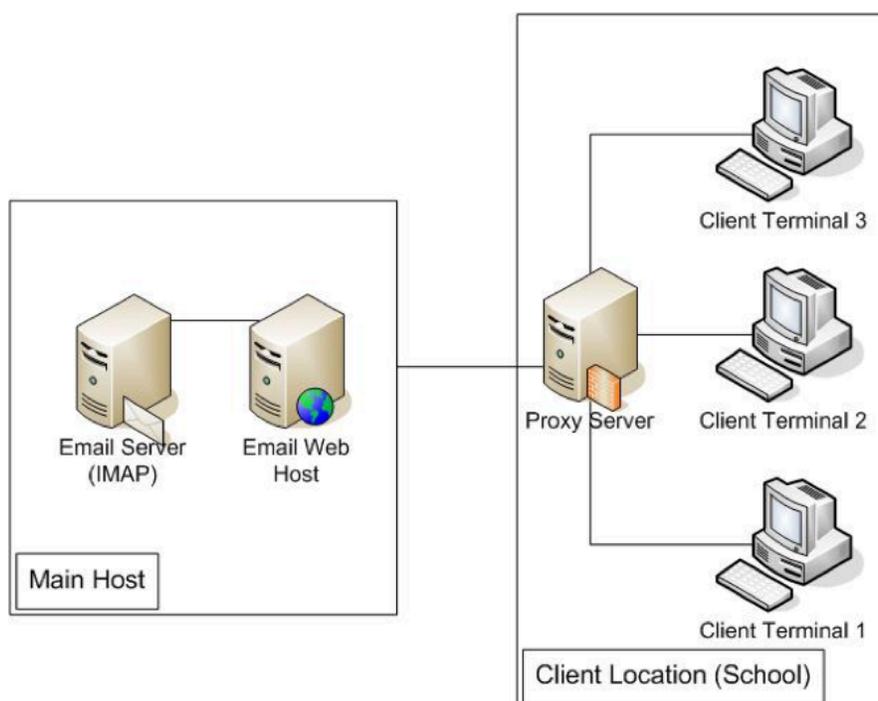
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