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fast facts

Project: VoIP as a model applicable to developing countries
Lead Organization: One Destination Center
Country: Indonesia

situation

Many communities in developing economies do not have access to communications infrastructure. In these cases alternative means of communication, such as Internet Protocol Private Branch eXchange (IP PBX) or softswitch, may be employed. These infrastructure-free alternatives can play a central role in helping these communities to gain educational, employment, and economic opportunities otherwise only afforded by conventional telephone systems. IP PBX is a telephone system designed to deliver voice or video over a data network and can be interconnected to Public Switched Telephone Networks (PTSN), allowing users registered to an IP PBX system to dial and receive calls from PSTN or Cellular to Voice over Internet Protocol (VoIP) and vice versa. However, in reality, as in the case of Indonesia, such interconnectivity is limited to one-way calling. This means that a person can only use VoIP to dial PSTN lines or cellular but not vice versa.

solution

At present, VoIP users in Indonesia can't make outgoing calls from VoIP systems due to the fact that the country's PTSN infrastructure is unable to connect calls placed from VoIP to existing phone lines (a fact which implies that the government does not fully integrate their numbers into the e164.arpa, the Electronic Number Mapping System association acknowledged by the International Telecommunication Union).

To address this disconnect, the project team developed a modified softswitch (a central device in a telecommunications network which connects telephone calls from one phone line to another) capable of connecting VoIP systems to the telephone grid to enable those with limited communications options to build their own low-cost communication infrastructure. The "Briker" softswitch developed for this project is an Internet Protocol Private Branch eXchange (IP PBX) software equipped with enum (E.164 Number Mapping) compatibility, which means the softswitch itself is able to make the connections the national infrastructure cannot.

IP PBX is a telephone system designed to deliver voice or video over a data network. Just like a normal Private Branch eXchange (PBX) or the conventional phone exchange, IP PBX also connects a number of phone lines (extensions). IP PBX may have benefits over conventional PBX, as it is based on Internet Protocol (IP). IP PBXand may be wireless, can accommodate more extensions than conventional PBX, and enables communication at a rate that is far less costly than long distance and international calling.
IP PBX can also be interconnected to Public switched telephone networks (PSTN), allowing users registered to an IP PBX system to dial and receive calls from PSTN or Cellular to Voice over Internet Protocol (VoIP) and vice versa.

The second part of this process -- translating IP addresses into network or cellular numbers -- is completed when the system connects to a public enum directory (which allows the system to turn a telephone number into a Uniform Resource Identifier URI or IP address that can be used in Internet communications). In the case of the Briker softswitch, users connect to one of Indonesia's two enum directories, depending on which is most quickly accessed when a user attempts to place a call. Through

these directories, VoIP can make and receive calls from and by any telephone number managed or tracked by these directories.
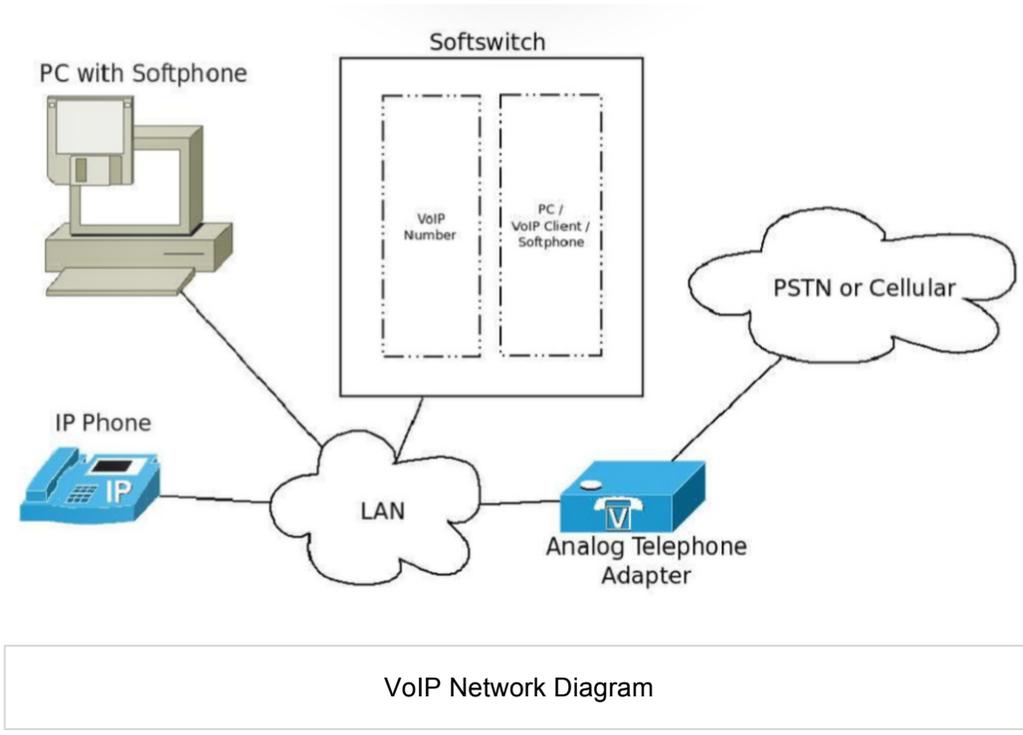
An updated version of the Bricker softswitch is bundled in a package available for download from www.briker.org. In addition to the softswitch, there is also an installation and operation manual available for users. This manual, available in Indonesian and English, can be downloaded from VR's website: http://voiprakyat.or.id/pub/manual-briker/Manual_Briker_IPPBX_Administration_en.pdf and information on the softswitch's availability has been disseminated through mailing lists and events, such as workshops and seminars throughout Indonesia.

broader impact

In the future, the project team hopes to market the Briker softswitch to more users by showing the results of an in-depth evaluation on cost savings and activities enhanced by IP PBX implementation. ODC will develop a cost-benefit analysis tool to measure how much the same calls would cost if they are dialed using VoIP, and the resulting potential cost saving against the equipment purchased, operation and maintenance costs, and the bandwidth used by the system. The tool will be based on any known available standard adopted or built by telecommunication business engagements providing VoIP service.

project contact

Anton Raharja
Email Address:
anton@ngoprek.org
One Destination Center
Jakarta, Indonesia
www.briker.org

VoIP Network Diagram