



Global Video Telephony System with Multimedia Streaming Capability

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ABOT TANAW: ASTERISK-BASED GLOBAL VIDEO TELEPHONY SYSTEM

The Abot Tanaw Project

There is an estimated number of 8 Million Overseas Filipino Workers (OFWs) working all over the world, mostly to provide and improve the quality of life of the family left in the Philippines. In Filipino culture, familial relations are very important. Most OFWs, even if far away, will find ways to communicate with their families on a regular basis. It is now possible through the readily available high-tech communication applications such as voice calls, SMS, and e-mail.

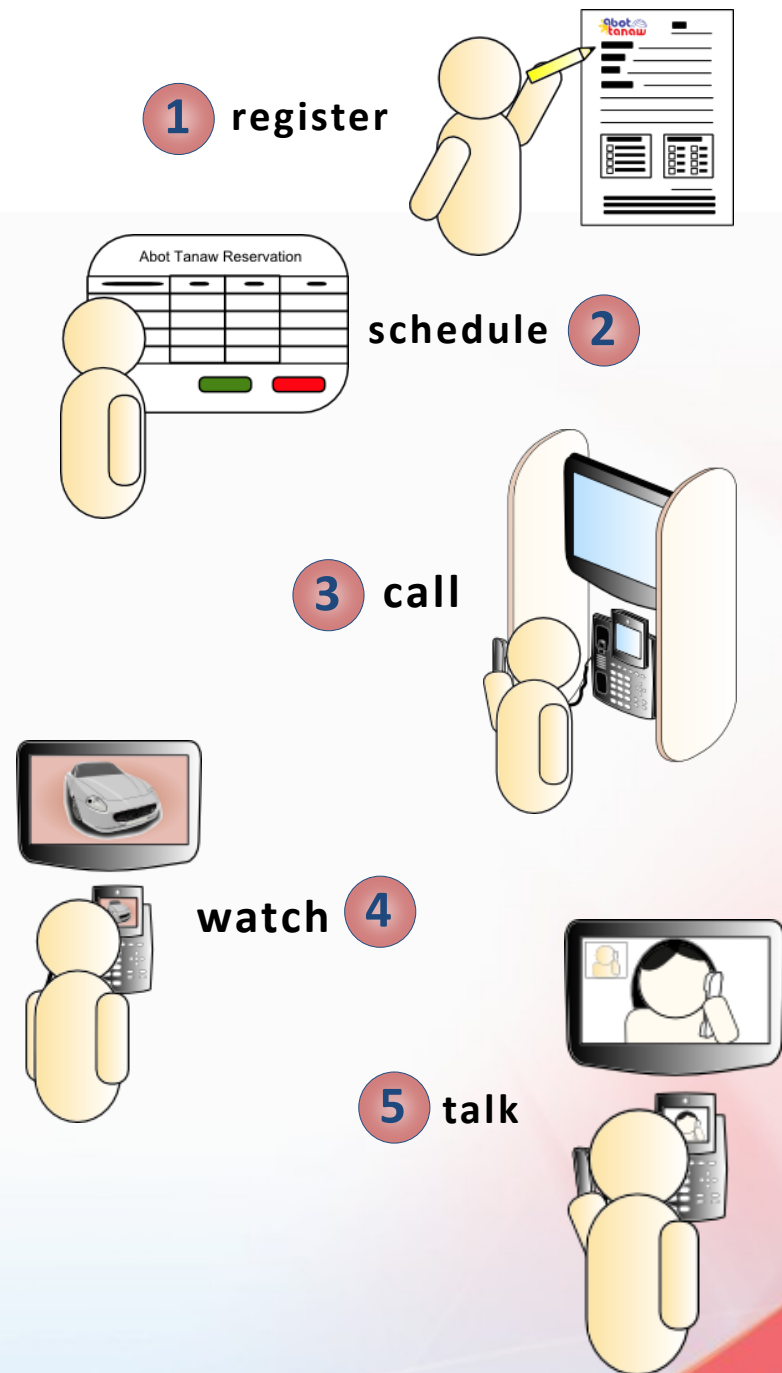
However, nothing can bridge distance better than a face-to-face conversation. There are many free Internet chat clients that support video calls or videoconferencing like Skype, Gmail video chat and Yahoo! Messenger. But the hardware needed such as computers, webcam, and Internet subscriptions comes at a cost.

Some OFWs and their families may not be able to afford their own computers, some may not even be allowed to have their own computers, while some may have their own computers and Internet setup, yet too busy to setup videoconferencing. Even with the technology Internet offers, sometimes it still becomes too complicated for OFWs and families. There must be a simpler way to talk and see their loved ones, much like a regular phone call: where one simply picks up the handset, dial, and have his loved one answer on the other side.

This is the problem Abot Tanaw attempts to solve. It is a videoconferencing system that aims to be as simple as a regular call from a phone booth, yet providing very good audiovisual quality. Moreover, the regular communication costs such as mobile and Internet subscriptions, call cards, and investments in hardware can prove to be expensive in the long run. Abot Tanaw aims to curb the cost of communication by taking full advantage of IP telephony technologies to be able to provide free video calls to OFWs.

Using Abot Tanaw

The process of using Abot Tanaw can generally be broken down into 5 processes as shown below:





Minimizing distance using High Quality Videoconferencing

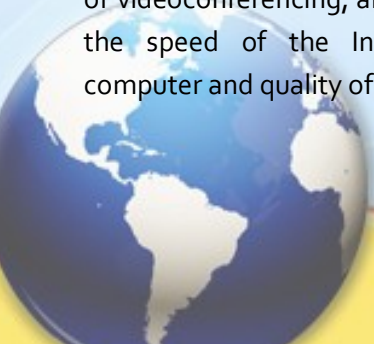
Videoconferencing provides face-to-face conversation without having to literally see another person physically. Most people choose videoconferencing because it saves time and money. However, the quality of a video call conversation can be affected by the audiovisual quality of the video itself. To feel as if you are only in front of the person you are talking to, the video must be crisp, clear and not pixelated. The sound and video must also be in sync and delivered in real-time.

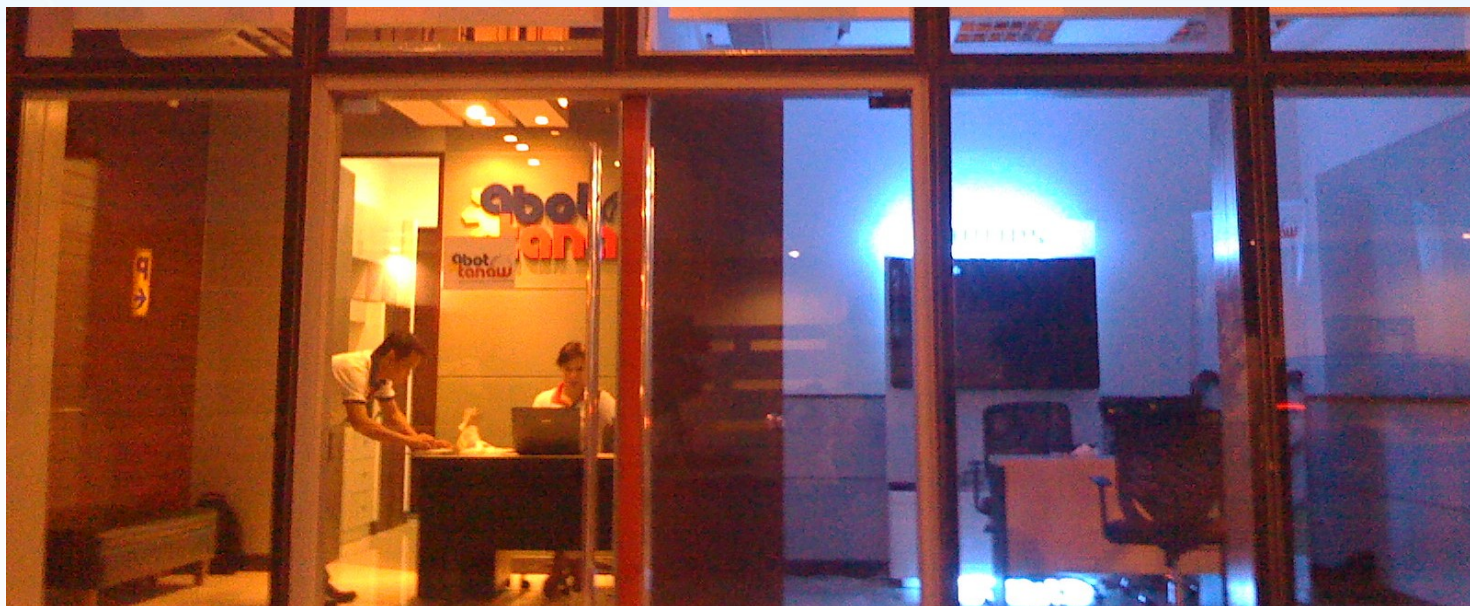
It is usually the case that the videoconferencing systems that provide the best audiovisual quality are dedicated videoconferencing systems use IP telephony and makes use of videophones, which are like regular telephones but with screens. Much better implementations have large TV screens, and high-speed Internet connections. However, it is often only large or private businesses that can afford the hardware for these videoconferencing systems.

For those who use videoconferencing for personal use, most free Internet chat clients are also already capable of videoconferencing, although the quality is limited to the speed of the Internet connection, speed of computer and quality of the webcam.

For some people who use less-than-optimal requirements, they might experience jerky and pixelated video, and sometimes choppy sound.

Abot Tanaw aims to use dedicated videoconferencing hardware setup similar to those found in businesses, but at the same time use a low bandwidth that is comparable to the commercially available DSL subscriptions. The current videophone setup of Abot Tanaw is shown on the top, which uses a Grandstream GXV3000 IP videophone. A video call on the system is allotted with 384 kbps bandwidth, and uses an average bandwidth of 141kbps on 15 frames per second. The video quality is higher than what free chat clients normally use, since Abot Tanaw uses a popular and widely-used video format called H.264. H.264 is now the most common format in digital video distribution in the Internet. Because of the very high compression of H.264, it can deliver high-quality videos with low bandwidth requirement.





Minimizing distance using High Quality Videoconferencing

H.264 video support on Asterisk system

Although Asterisk is one of the most popular implementation used in IP telephony, vanilla Asterisk, which Asterisk using the simplest configuration, is very limited in features and lacking in video support, especially H.264. Problems may arise regarding video codec negotiation especially with different endpoints. This is one of the challenges Abot Tanaw overcame by being able to support H.264 using an Asterisk-based server.

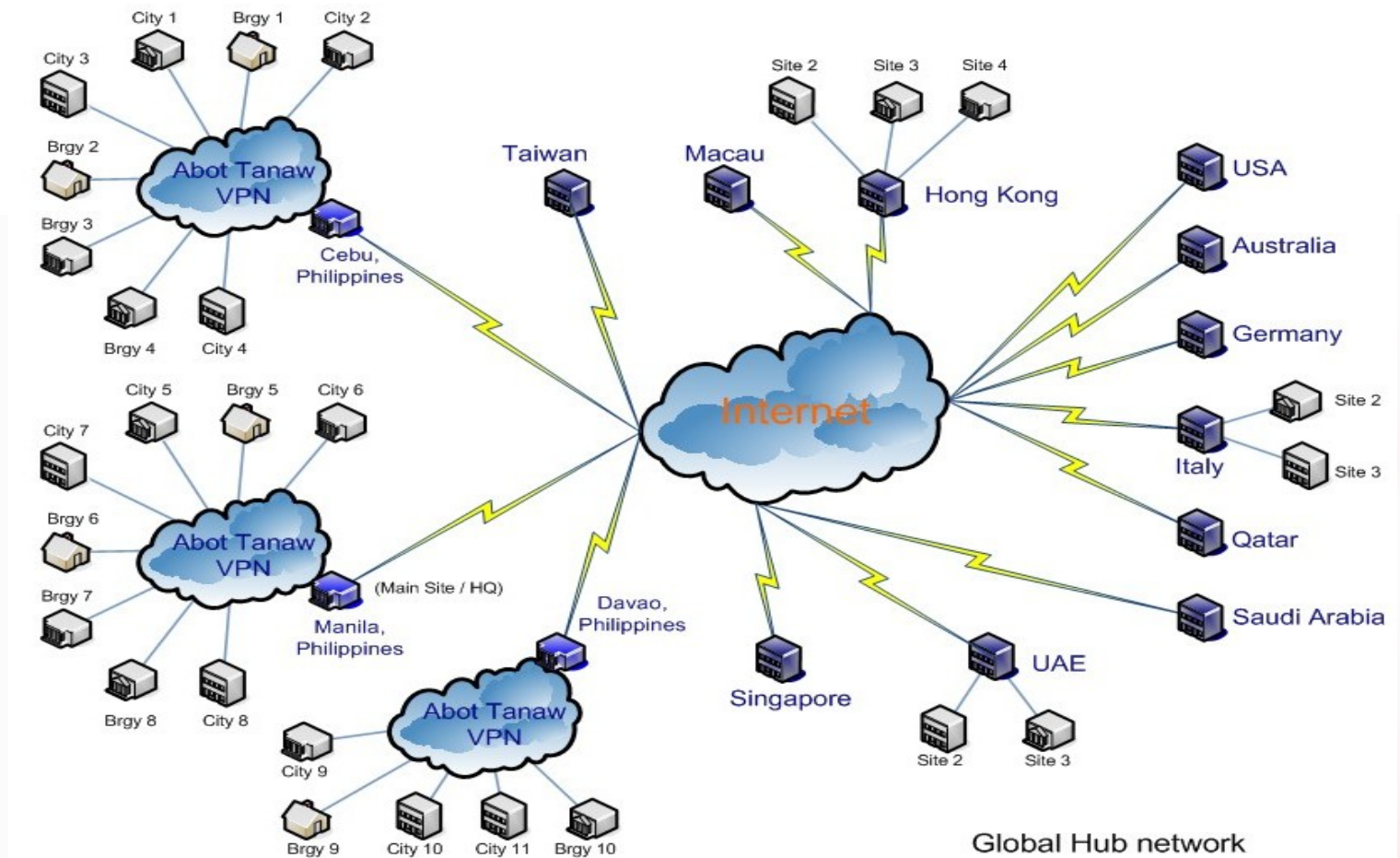
The **Next|IX INF**, which is an Asterisk-based IP PBX server, overcomes challenges and maximizes the video support beyond what vanilla Asterisk can do. It fixes the issues of codec negotiations on Asterisk and has been customized to offer H.264 video support. This was done by modifying the vanilla Asterisk implementation and adding other open source video solutions to provide seamless integration of H.264 media streaming.

The add-ons and modifications used include Videocaps. Con fiance, Asterisk Video Resources, Vmukti and FFAsterisk. Each Grandstream GXV3000 endpoint used are then configured to use the given codecs and parameters to work well with the Asterisk setup.



Network Implementation

Abot Tanaw Global Network



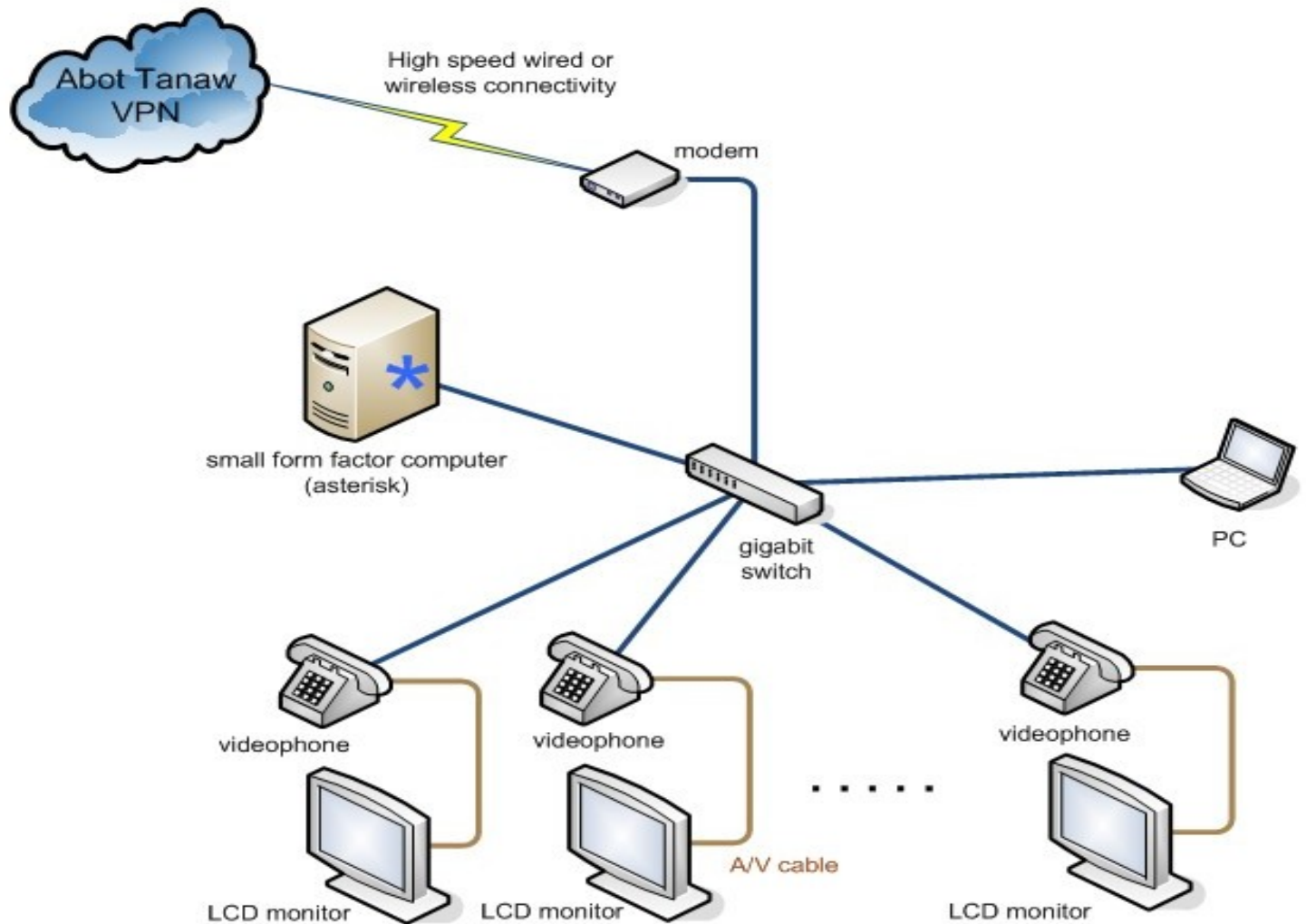
National city / baranggay network

The figure above shows the network diagram for the Abot Tanaw setup. The network consists of several calling stations, or "Service Hubs", located in different countries. The service hubs are placed at strategic places where most OFWs and Filipino families would find convenient to go to. In the Philippines for instance, service hubs are installed in major shopping malls since most Filipinos love going to malls to spend their free time together with their family or loved ones. Each service hub is set up as one private network that contains around 25 videophones with assigned static IP addresses for each videophone. The videophones are set up in phone booths with large TV screens for those who would like a larger video screen. A personal computer (PC) is connected to the network for member registration and online scheduling of video calls. The Asterisk-based Next|IX INF server handles the media streaming and all video calls coming in and out of a service hub. A Cisco router, assigned with a public IP address, connects the private network to the Internet to interact with other service hubs.



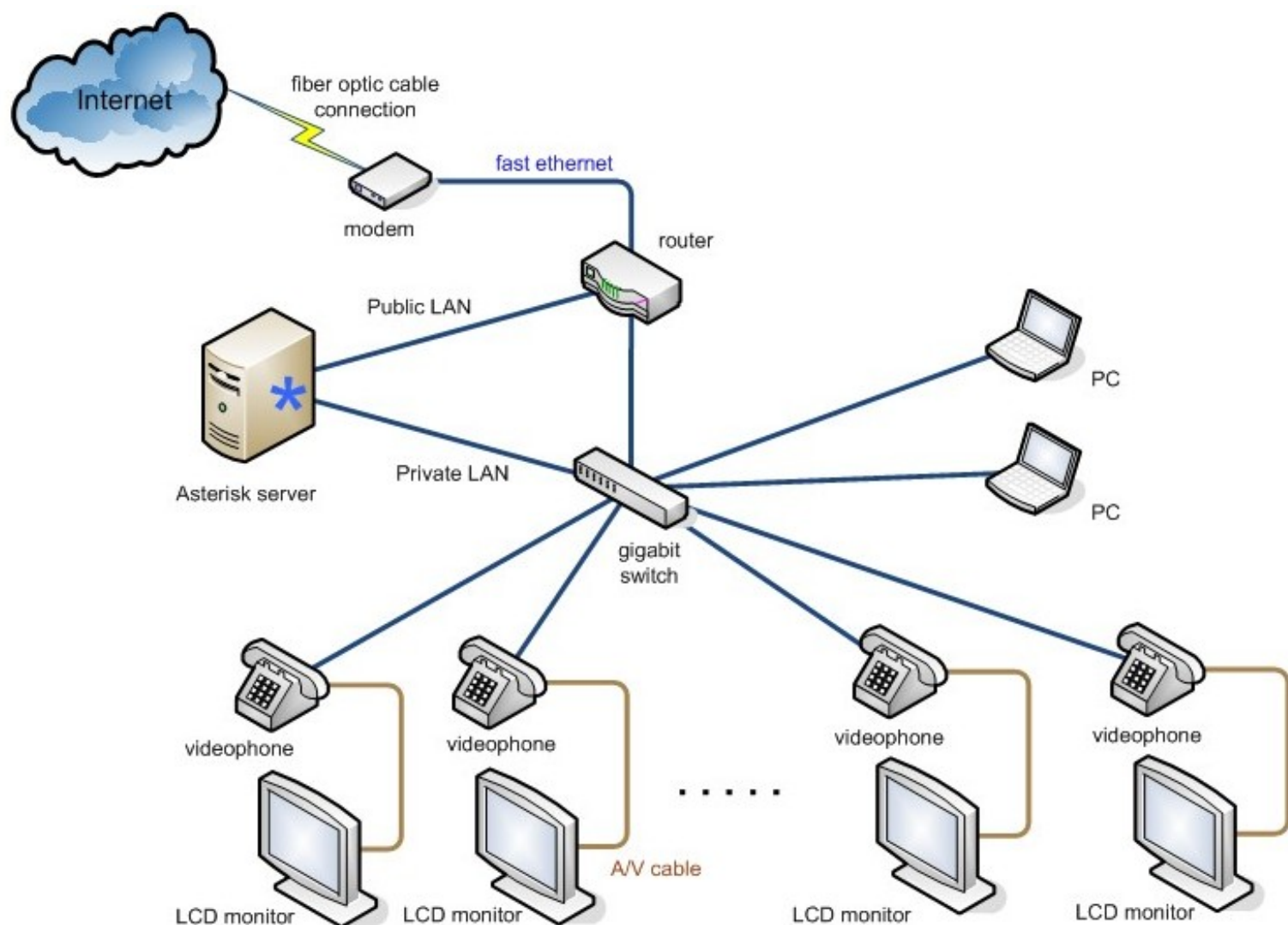
Network Implementation

Abot Tanaw City/Baranggay Configuration



Network Implementation

Abot Tanaw Hub Configuration



How Abot Tanaw Works

Member Profiling and Online Booking System

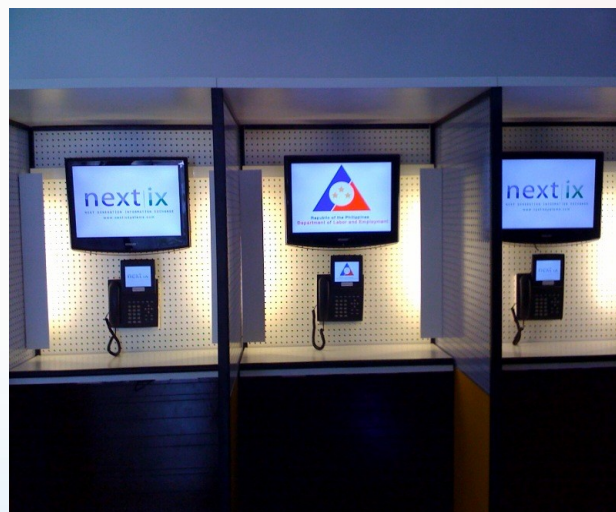


To be able to make video calls using Abot Tanaw, member registration is required. This can be accomplished through the reception desk of a service hub or through their online website. The member ID is also conveniently used as the “phone number” of the member during the video call. The member profiles contain basic personal information and interests, data which can help offer more specialized services for the members in the future. The member profiles for all service hubs are stored in a central member database server, and these profiles are used by the scheduler server for the online booking system.

The online booking system is a way to avoid queues from walk-in clients when all videophone booths of a service hub are full. The scheduler server picks up information from the service hubs and members to determine free timeslots and available videophone booths for a video call session. Members should have a schedule before they are able to use the system, and similar to member registration, scheduling can also be done either online or through the reception desk. Abot Tanaw currently offers 15 minutes of free video calls for their members which are allotted in 15 minute time slots for every hour.

Video Call Process using Asterisk

Each videophone has an assigned Session Initiation Protocol (SIP) extension number which is hidden from its users. For Abot Tanaw phone booths that have scheduled video call sessions, the scheduler server gives the member ID to the Asterisk server, and Asterisk associates the member ID to that particular videophone’s extension number. This removes the need for the user to memorize or dial different extension numbers everytime he uses a different videophone booth or service hub. For the whole Abot Tanaw network, service hubs are divided into trunks. Each Asterisk server in a service hub is a trunk and has a specific range of extension numbers. For the current setup, SIP numbers 1000 and up are assigned to Manila branch, while numbers 2000+ are assigned to Quezon City branch, while 3000+ is assigned for Hongkong. Dialing plans are configured accordingly and forwards any received video call to the specified trunk.



Media Streaming: Source of Revenue



With a worldwide implementation and free video call service, one may wonder how Abot Tanaw would be able to sustain itself. Abot Tanaw gets its revenue from advertisements. When a videophone is idle, it grabs advertisement pictures from a specified IP address and the picture slideshow acts as a screensaver. Another way of showing ads using Abot Tanaw is a short 20-second video advertisement played before a video call. The Next|IX INF server is modified to support on-demand media streaming. The video advertisements are stored inside the Asterisk server in categories and each category is assigned an extension number. Once a member ID is dialed, Asterisk will look into the member profile and will connect to the extensions containing the video advertisement category that are closest to the member's interests. After the caller dialed the member ID of the callee, a video advertisement is first streamed on both the caller and callee videophones from Asterisk, before establishment of the actual video call. After the video is done playing, both parties are then connected using the previous call process to start the video call.





SUMMARY



Abot Tanaw is a global video telephony implementation that connects Overseas Filipino Workers and their families through high quality videoconferencing. The Next|IX INF Asterisk-based server overcomes the shortcomings of the default Asterisk implementation by supporting high-quality H.264 video, optimizing call and codec negotiations and adding media streaming capabilities. The Next|IX INF server also simplifies complicated calling processes so that more people would be able to use and benefit on the many solutions provided by Asterisk .



About NextIX

NextIX specializes in universally available information and communication technology solutions for the consumer, SME, enterprise and government. NextIX constantly aims to drive technology to the next level with robust, scalable & agile systems, creating infinite feature rich applications at the least prices possible. The company's expertise creates a more agile and multi-faceted technology innovations and solutions. All NextIX technologies leverages on the internet to offer communication systems for the internet age.



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