CONNECT

Reaching underserved communities

Cable TV networks in the Philippines are a potentially powerful force that may be harnessed to provide high-speed yet affordable internet connectivity in underserved areas, due to their widespread service coverage and existing installed infrastructure. With the support of the Asi@Connect project, CONNECT (Cable Operators Neutral Network Exchange for Community Transformation) aims to help the local cable TV industry quickly leapfrog and transform in order to provide affordable internet access to users, and offer new and socially-relevant services.

Cable television (CATV) operators in the Philippines have extensive fixed-line coverage, even in some distant and suburban areas where traditional telecommunication companies have poor wireless coverage. However, local CATV operators currently enjoy only a marginal share of the local fixed broadband internet market. By leveraging their existing last-mile infrastructure, these cable networks can be harnessed to provide affordable and high-speed internet connectivity in underserved areas.

However, cable network operators need to overcome several challenges in order to gain a larger share of the local internet market. These include:

1. Transforming their existing infrastructure from one that supports the delivery of (almost exclusively) video content, to one that is able to deliver triple-play services and additional new services that will provide a competitive edge.
2. Interconnecting physically within the industry to achieve better purchasing leverage and economies of scale, therefore attaining a critical mass in order to compete with traditional large telecommunications operators. From a technical perspective, peering between local cable operators will ensure better domestic network performance, more profitable use of expensive transit links, better access and pricing for high-capacity international transit, and attractiveness for content providers to colocate local content caches.
3. Developing and deploying new access infrastructure approaches and business models to expand service coverage far beyond the current geographic reach of legacy wired infrastructure.
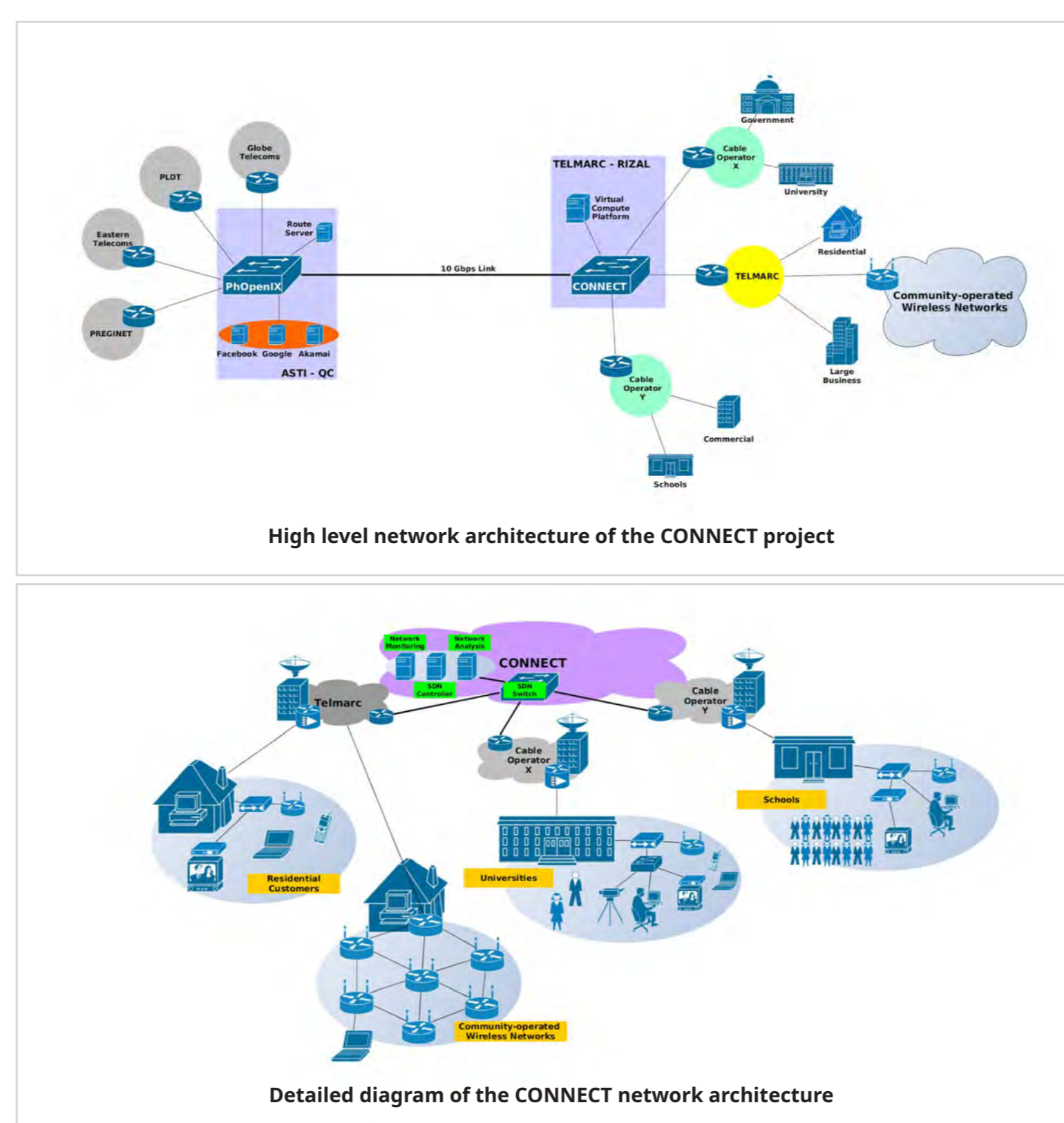
To help achieve these goals, the University of the Philippines Diliman, Advanced Science and Technology Institute, Telmarc Corporation, and the Central Luzon State University proposed CONNECT (Cable Operators Neutral Network Exchange for Community Transformation) in response to the 2nd Call for Proposals process of the Asi@Connect project. With the support of Asi@Connect, CONNECT will employ the following multi-pronged, multi-stakeholder strategy:

Engagement. CONNECT aims to engage and mobilise the following sectors towards these goals:

• The cable industry. The main beneficiary of the technology intervention and capability-building effort is the cable industry. Through our principal industry partner Telmarc Cable, we will engage industry associations such as the Philippine Cable TV Association (PCTA) and the Federation of International Cable TV and Telecommunications Association of the Philippines (FICTAP), as well as individual CATV operators.

• Local R&D agencies and NREN operators. PREGINET, the local National Research and Education Network (NREN), is operated by the Advanced Science and Technology Institute, a partner in this project. PREGINET is not only a network but also a rich resource for expertise and advanced networking technologies and services. Physical interconnection between cable TV operators and PREGINET is likely to uncover opportunities for mutual infrastructure growth, enable the delivery of new services and content to the NREN's clients, and promote resource sharing such as through mutual access to content delivery caches.

• Academia. Both the University of the Philippines Diliman and the Central Luzon State University will provide academic and research expertise, leveraging R&D knowledge in areas such as software-defined networking and community wireless mesh networks. Recent R&D work from both universities in these areas will be scaled for larger pilot deployments.

• Communities and local government units. We plan to engage the actual target market itself so that it becomes empowered to be part of the solution rather than the problem. Working jointly with communities and their respective local government units, we will pilot-deploy sustainable community-driven and community-operated mesh networks to extend access far beyond the reach of existing cable TV operator infrastructures. Building on the experience and successes of similar efforts such as guifi.net in Spain and the smaller local pilot Bayanihanets, we will explore hybrid approaches where community-based and community-driven bottom-up mesh networks are collaboratively built in partnership with commercial providers, NRENs, and the academic community.

High level network architecture of the CONNECT project

Detailed diagram of the CONNECT network architecture

Enhancement. We intend to embark on capability building between and among project participants and the wider public. These will be targeted towards both cable TV operators and future community-based operators.

Exchange. A key technical component of this proposal will be the formation of an internet exchange point (IXP) targeted towards, but not exclusively for, cable TV operators. This will ensure good network performance particularly in the exchange of domestic traffic, and hopefully promote the development and distribution of local content. An IXP will also make it economically feasible and attractive for foreign providers to deploy caches and offer high-capacity transit links. The new industry-operated IXP, called CONNECT, will peer with PHOpenIX, the local carrier-neutral IXP, in order to further exchange traffic with other domestic ISPs and to gain access to CDN caches hosted in the latter exchange.

CONNECT aims to:
• Increase the amount of network traffic exchanged across the PHOpenIX switching fabric.
• Improve the reliability, speed and quality of access of cable operator networks to domestic internet content.
• Improve the reliability, speed and quality of access of cable operator networks to popular internet services such as video streaming and social media content.
• Reduce transit data volume of cable operator networks.
• Increase peering activity among domestic autonomous systems.

The CONNECT - PHOpenIX interconnection will allow the cable industry to directly exchange traffic with PREGINET's partners. This provides a unique opportunity to link users and subscribers from previously underserved areas (who will be serviced by cable TV companies and community-driven access mesh networks) directly with the other end of the spectrum, represented by NREN users, such as higher education and R&D institutions, and government agencies. This enables the bridging of a previously very wide gap between digital haves and have-nots, and as such, may offer unique, new developmental opportunities for the future.

Enablement. To ensure flexible and future-proof infrastructure for cable TV operators, we will use software-defined networking (SDN) technology, both in the proposed cable operator IXP, and throughout partner cable TV network infrastructures. The vision is for the technology to enable the flexible and rapid development and deployment of the next generation of services beyond 'plain' internet access. On the IXP end, SDN will help promote a new class of internet exchanges that support rich information and services for peering participants, making it attractive and practical for new members to join. On the provider side, using SDN will transform how the cable industry delivers video content in the future. Future types of video and content delivery may include community-relevant yet Quality of Service (QoS)-sensitive services such as interactive educational content, rural healthcare, managed Internet of Things (IoT) security, community CCTV, hazard warning and sensor data, for example.

Empowerment. The challenge of providing access infrastructure in geographic areas considered to be commercially non-profitable is difficult to solve using traditional methods and metrics of provider-driven investment. An area considered to be unprofitable by an incumbent telecommunications provider is likely to also be unprofitable to a cable TV provider, even with the provider's potential advantages in terms of existing infrastructure, service presence and relationship with the community. However, other bottom-up community-driven infrastructure developments suggest that this strategy can be used to empower communities in order to further develop access infrastructure. This has already been successfully demonstrated by the 34,000-node guifi.net in Spain, and our local experiences with cooperative community resource sharing in the local Bayanihanets pilot deployment. By employing this strategy -- directly engaging communities and working with their respective local government units -- we aim to create sustainable meshed access infrastructures that can deliver coverage areas that stretch far beyond the existing legacy cable TV infrastructures.

In this component, we will organise and pilot-test CO-OWNs: Community Operated Wireless Networks. We will install a fibre backbone from a Telmarc Cable node, stretching all the way to Barangay Calawis in Rizal Province, a digitally underserved area northeast of Manila. Along the fibre path, communities will be equipped and trained to maintain and operate their own mesh networks. We will also leverage the experience of some of the project partners with the Village Base Station Project, a collaborative research project on community-operated cellular services jointly carried out by the University of the Philippines and the University of California Berkeley. We will look at not only the challenge of technical sustainability but also examine the matter of financial sustainability as well.

CONNECT is supported through the 2nd Call of the Asi@Connect project, and is expected to commence in January 2019.