Virtual Gateway Labs (Virtual Open Access)

Questions and Answers

1. What is Virtual Open Access?
   a. Virtual Open Access separates the network infrastructure from the services.
   b. Based on Virtualization, Software defined networks (SDN) and Software defined infrastructure (SDI) and network function virtualization (NFV) a virtual open access network is a community foundation for the next 50 years.
   c. Virtual Open Access Provides
      i. Internet-like service experience
      ii. Creates bandwidth abundance
      iii. Access network is transparent to services
      iv. Anyone can become a service provider

2. What are the benefits to each participant in the ecosystem?
   a. Consumers benefit by having a wide range of competing service providers where each can create their own customized “bundles” well beyond basic triple play. More services at lower cost.
   b. Service Providers benefit by being able to offer their services over gigabit connections without being constrained by the access provider’s closed offerings. The Virtual Open Access Network eliminates the ‘last 50 miles’ best effort only reality of current over-the-top services.
   c. The Broadband Provider (The Community) benefits by having an open source-based Software-Defined Infrastructure (SDI) that reduces management and operating expenses.

3. What type of services can be offered on a virtual open access network?
   a. Traditional voice, video and internet access services can be offered a la carte or in competing bundles for numerous service providers.
   b. New services including: tele-medicine, smart grid, distance learning, emergency communications, smart homes, transportation, private clouds, the Internet of Things, Smart City can all be offered as well as services we can’t even imagine today.
4. Can’t over-the-top services (OTT) offer the same features and functionality?
   a. On the surface yes they can. However, these services are provided at the IP Layer of the network (Layer 3) through the public internet. Therefore, Quality of Service (QoS) is best effort only and security is only as good as the public Internet, which is horrible.
   b. OTT services, such as Netflix, are limited to the quality of the network in the “last 50 miles”. Content delivery networks (CDNs), such as provided by Akamai, by-pass the public internet backbone and deliver content to major cities. The metro IP network that connects cities and towns to the major city is best effort with the links from each town’s central office to the core city point-of-presence (POP) highly oversubscribed. Current net-neutrality laws prohibit anything else but best effort.

5. Is point-to-point Active Ethernet FTTH required?
   a. No. Virtual open access is transport independent and can be implemented on xPON and FTTx/DSL architectures. However, the goal of virtual open access is to make bandwidth abundant thereby eliminating bandwidth as a constraint. Thus, Active Ethernet is an ideal architecture and supports a dig once strategy.

6. What’s the technical foundation behind virtual Open Access?
   a. SDN and OpenFlow to the premise edge
   b. QinQ, PBB, MPLS
   c. Intelligence at the premise edge
   d. VMs at the Premise edge
   e. SDN, NFV, Virtualization and automation are technologies that are drastically changing the economics of the access business.
   f. IoT, represents a new sources of billions of packets
   g. Smart cities can benefit from a modern easy to manage broadband access network and IoT sensors, smart streetlights, etc.

7. Can an incumbent implement Virtual Open Access?
   a. Yes they can and we think many should take a serious look at this architecture. Incumbents now have the opportunity to re-make themselves. By taking advantage of proven software defined networks as well as virtualization and open source solutions they can build the right network for the next 20 years. If they continue the 5 to 7 year upgrade cycle many ILECs will get left behind and face gigabit community networks competition that will severely limit their options and perhaps put them out of business.
   b. The status quo of bandwidth scarcity and long incremental upgrade cycles will not be tolerated by communities around the country and the globe. Thus, in some cases the
ILEC has the choice to deploy a gigabit infrastructure or face real competition from Municipal Broadband.

8. GoogleFiber?
   a. It's great, they are accelerating gigabit deployments and forcing incumbents to act. But, it's not Open they are merely an over builder with deep pockets, a long term outlook and a cool brand name. So if you're lucky to live in a select neighborhood in a select city GoogleFiber can sell you "UP TO" a gigabit service. GF downplays the "UP TO" part which is inherent in PON architectures.
   b. I've also heard that GF is soon to offer voice services, something they've been loath to do for regulatory avoidance reasons. To me it a proof point that best effort VOIP isn't good enough. Another argument for Layer 3 transparency +L2 tunnels a la FlowOPs.

9. Google Fiber and Huntsville Alabama: Isn't that open access?
   a. No. The PON infrastructure is open to the first company (GF in this case) who leases it. In theory you could have your choice of closed access providers. In which case you have a choice of Triple Play bundles as designed by each closed provider and you can switch every two years. GF is trying to spin this as OPEN. Before Google the industry call this type of transaction "Unbundling".

10. Is broadband infrastructure essential infrastructure in the same way water, electricity, and sewers are essential infrastructure?
    a. I wish there was an easy answer. The access network, or the local loop, varies across the country not from state to state or even town to town but neighborhood to neighborhood. Some areas have a vibrant competitive environment so why mess with success. On the other hand, some have zero competition and poor service options so why do nothing?

11. Does virtual open access just replace one monopoly with another?
    a. Yes. However, in a large part of the country the economics do not support a competitive access market. The municipal broadband network is operated to benefit the community at large. The private ILEC is operated to generate profits and dividends for shareholders.