

Home Voice Gateway: Description and Analysis

by
K. Aswath Rao

1 Introduction

As Broadband deployments increase, there has been an increased interest among consumers to use VoIP technology for their voice communication needs in an attempt at arbitrage. Additionally, the pricing structures aggressively pushed by the cellular service providers encourage many subscribers to use cell phones even when they are at home. In either case, the connectivity is not always guaranteed due to lack of universal deployment or lack of resources. In these cases, the only choice left for the user is to use wireline phones. This suggests that it would be preferable if there is a consumer product that interfaces to the home telephone wiring, interconnects to multiple network interfaces, specifically wireline telephone network, cellular network and Broadband access to IP network and mediates originating voice calls between these three interfaces without much explicit instructions from the user. This document explores this idea further.

Section 2 provides a high level functional description of Home Voice Gateway (HVG) along with call handling procedures. Section 3 discusses different ways HVG can be marketed. Currently, there are many products in the market that have similar set of features and capabilities. Section 4 identifies some of the vendors and compares their functionalities to HVG. Section 5 lists future capabilities that can be incrementally provided to enhance the usefulness of HVG. A mockup that demonstrates the user experience is available directly from the author.

2 Functional Description

2.1 Basic Requirements

1. Provide an FXS interface using the current house wiring infrastructure to traditional phones.
2. Provide an FXO interface to the phone company.
3. Provide an Ethernet interface to connect to a broadband access device (DSL or cable modem) either directly or indirectly through a router.
4. Provide an interface to a built-in cell phone or an adaptor that will accept a popular cell phone.
5. The device may require an external power source for normal operation; in the absence of power, the device should failover and connects the FXS and FXO interfaces.
6. For an outgoing call, select the network interface based on the dialed access code, locally provisioned data or consult an external database using a procedure like ENUM.
7. Provide line side features like Caller ID, Call waiting and three way conference across the three network interfaces.
8. Web based provisioning of the access codes and the local database.
9. Use UPnP procedures to traverse home based NAT device.
10. Simple to install.
11. Priced as a consumer item.

2.2 Registration

On power up, HVG need to register itself with some directory service by establishing a mapping between its wireline PSTN number and the IP address of the broadband access network.

2.3 Call Handling Procedures

For an outgoing call, the user will dial the digits in the traditional manner. HVG will provide a dial tone, when the user lifts the handset; it will collect the digits till an end-of-digits indication (either “#” or timeout) is received. HVG will select the outgoing network interface using the following priority order:

- Access code
- Local database
- Cellular usage database
- ENUM database

The path taken by an incoming call determines the selected interface for that call.

3 Marketing Strategy

HVG can be marketed in one of many ways. Cable MSOs are very much interested to offer voice service to their customers. One of their vexing issues is providing uninterruptible power supply. They must also have additional capabilities imposed by regulatory requirements like E911. But a cable MSO can circumvent these two requirements because HVG always has access to the wireline telephone interface and calls can be directed to that interface on demand.

Under the current architectures used by cable MSOs, deployment of Gateways is a capital-intensive proposition for cable MSOs. During the early phase of deployment, most of the calls made by the cable subscriber will be destined to the PSTN network requiring cable MSOs to deploy Gateways. The number of Gateways will be a function of the physical diameter of their network and may be out of proportion to the amount of offered traffic. Since, HVG can be instructed to direct the traffic to a specific interface on a call-by-call basis, the cable MSOs can strategically deploy the Gateways thereby reducing this initial investment.

HVG can be marketed directly to the consumers eager to take advantage of the arbitrage opportunity between the three service providers. This approach requires good distribution channels at the consumer level. Alternatively, HVG can be marketed as an OEM product to companies that have good access to the consumer market.

Finally, one can provide a reference architecture that uses a good set of components to companies that are in the business of building consumer products. This may be attractive to components vendors.

4 Market Activity

1. <http://www.quintum.com>
Their Tenor is similar in objective, but for PBX application. Features are provided by the PBX and so there is no feature intelligence in the box. They also have a box, A200 for SOHO application; but no indication of line side features that will be integrated across the two interfaces. It does not include wireless interface.
2. http://www.inalp.com/products/smartnode/fs_smartnode.htm
For ISDN lines
3. <http://www.scidyn.com/>
Another Tenor like product targeted for corporate enterprises.
4. http://www.vive.com/voip/termination_.htm
Routes GSM destined calls via dedicated GSM handsets.

5. http://www.avois.com.tw/products/IP_phone/AV-3500.htm
6. <http://www.solwise.co.uk/voiceoverip.htm>
7. http://www.solwise.co.uk/voip_phones.htm
One of the products that is close to the current proposal.
8. <http://www.asus.com.tw/communication/voip/avg600xba.htm>
This also has FXS and FXO lines. But it doesn't have interface selection capability; also it doesn't offer features across the two interfaces.
9. http://www.brain21.com/eng/index.php3?eng_id=10 (AG800)
Has both FXS and FXO ports with failover to PSTN line. But it does not offer feature transparency across the interfaces. It is targeted for large enterprises.
10. <http://www.voipack.com/product1.html>
It has both FXO and FXS ports. Feature descriptions are not readily available.
11. <http://www.inter-fone.com>
This is yet another gateway that has both FXS and FXO ports.
12. http://www.sysbas.com/english/html/eproducts_05.htm
Dialgate-2010 has an FXS and FXO port. But it is not clear what features are supported.
13. <http://www.artech.com.tw/html/gx100e/gx100e-1.htm>
Redirects an outgoing call between the PSTN and GSM interface, based on the dialing plan.

5 Future Capabilities

Given that HVG has computing capabilities, many of the promises anticipated by Computer Telephony Integration (CTI) can be realized for the home application. Some of the interesting features include address book based calling.

6 Conclusion

HVG is technologically viable and it is also reasonable that we can meet the price objective. The main issue would be the marketing of this device to the consumer market place.