

Federal Communications Commission  
Washington, DC

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Dear Chairman and Commissioners,

Thank you for hosting a timely and diverse forum on VoIP. As a telecom network architect and advisor to technology companies and investors, I would like to contribute a few clarifications and comments that may help you in your task ahead.

### **What is the PSTN?**

The PSTN is a circuit-switched transport network, designed in principle for voice services, but also used for fax and internet dial-up services. The PSTN is a global complex structure, resilient and highly reliable, very simple to use, and it has served civilisation very well for over a century.

### **What is Voice over IP?**

It is a voice service transported on a packet network, which may, or may not be, simultaneously used to provide data services, e.g. email. VoIP traffic looks like data packets, but require special handling through the network, specifically in terms of latency (end-to-end delay) and packet loss rate.

VoIP services may take different generic forms:

1. **PC to PC** VoIP service, mostly offered for free by many Messenger services, and transported on the public internet, which is operated collectively by ISPs. There is no number assignment, nor special hardware, but software application, a user ID and a password. Because of its free nature, this service offers no guarantees of quality, and does not interconnect with the PSTN.
2. In the **network backbone**, VoIP offers carriers an opportunity to converge voice and data traffic on one platform achieving operational savings. This is completely transparent to the subscriber who benefits only by potentially lower charges, e.g. long distance traffic.
3. **Enterprise** VoIP is used in corporate private networks, using leased transmission lines between offices, are free from access fees on internal (closed group) traffic, but must pay for PSTN interconnect. Since a private network is operated internally, his choice is usually based on technology costs and service features, rather than service fees.
4. **Subscriber VoIP** service is an opportunity for new entrant to provide public voice services with PSTN interconnect, while circumventing access fees to the local loop carrier. The VoIP subscriber is assigned a PSTN number and uses a VoIP PC application or a specialised hardware. This service offers subscribers many advantages like geographical portability, and enhanced voice features. On the other hand, subscriber VoIP services are recommended for use with broadband but not with dial-up internet access. This service may be free, e.g. Free World Dial-up, or fee based, e.g. Vonage.

Other VoIP implementations are combinations of the above, including PC to PSTN, and Virtual Private Networks, but it is the subscriber VoIP service that is mostly disruptive to the PSTN access network.

### **What is the regulatory distinction between VoIP and wireless cellular telephony?**

Wireless cellular networks are based on an access technology alternative to wireline, and is a means to providing multiple services including voice. In contrast, VoIP is an alternative architecture for delivering voice, whereby the service is logically independent from the location and type of the underlying physical

transmission medium, i.e. the local loop may be a copper pair, a coax cable, an optical fiber, or wireless. VoIP offers new opportunities for enhanced services, and new challenges for service verification and accounting. Regulating VoIP services, does not automatically lead to regulating the data network.

### **What is the likely economic outcome of this market development?**

1. A rapid launch of competing offers, with severe price competition, and a wide spectrum of performance guarantees from best-effort to PSTN-like, with prices to match
2. Increased take up of broadband services, and a widening of the digital divide between the broadband community and the offline/dial-up community
3. PSTN will have fewer subscribers, and fewer switched minutes, leaving the burden of Universal Service to the fewer subscribers, who correlate highly with the under-side of the digital divide.

### **What is the impact of potential FCC regulations?**

1. It is technically feasible for VoIP to support Basic 911 with a self-powered network, and this may well be in the public's best interest. Such an upgrade may easily double the Capex and significantly raise the Opex of the underlying broadband access network, and would likely be reflected in higher ISP Broadband fees.
2. Supporting E911 on fixed wireline telephones may be resolved by a simple and optional subscriber location registration process. For portable telephones, e.g. WiFi IP handsets, a more innovative solution may be found, subject to necessity, c.f. cellular telephones today.
3. Should the FCC impose a USF fee on VoIP, one might observe that:
  - PC-to-PC VoIP cannot be included because of its free and unbilled, best effort, global nature
  - Carrier backbone VoIP is naturally excluded to avoid double fees
  - Enterprise VoIP PSTN interconnect may be subjected to fees, but not internal corporate traffic
  - Imposing USF fees on subscriber VoIP is an obvious way to preserve the USF and bridge the economic impact of a wholesale technology substitution

### **What is the role of the FCC?**

As a regulator, the FCC has the unenviable task of enforcing rules, usually unpopular, and for unobvious, long-term benefits. It is worth pointing out that a free market, encourages innovation, but left unchecked often does not preserve consumer rights *per se*. Witness the clear necessity for regulation in many industries, irrespective of the lack of monopolies. Plentiful examples include: financial services; automobiles as products; medical and pharmaceutical products; and many professions such as legal and medical. Notice also that the financial burden of regulation is charged to businesses, but usually passed on to the consumer in a visible manner.

Fundamentally the regulator is trusted with ensuring total access to basic telephone (voice) service for all Americans, and fostering a competitive environment for service delivery and innovation. Contrary to some comments made at the forum, the FCC should not be concerned with job creation, which belongs to the realm of free markets. Nor should the FCC be unduly influenced by commercial interests, large or small, who's priorities always begin with profits.

I hope you find these comments and opinions helpful.

Sincerely,

Dr Nabil Badr