

## Consumer Voice and Video on the Stupid Network

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Continuing the examination of the opportunities afforded by the rise of the Stupid Network, the all-IP network that has displaced the PSTN;

Are there opportunities in the market for personal communications, the kind of person to person, and person to business communications that were/are dominated by land-line and cell phones?

A key characteristic of the PSTN is the fixed range of the network, bounded by the length of the copper wire between the exchange and the phone.

Cell phone technologies are bounded by the range of the direct-line radio signal between the cell mast and the cell-phone. Masts are linked to provide a much wider network, originally over the PSTN, but now over an IP network. Theoretically this makes the cost of a national call no more than that of an international call – accessing a web-page in one country is no different to accessing a web page in another country.

Compared to these technologies the all-IP network is boundless, any device connected to the IP network can communicate with any other device connected to the IP network, anywhere in the world. The ways in which devices connect to the IP network are also many and varied, including fibre-optic cable to the premises or cabinet, 4G or 5G wireless, and satellite networks.

What this has done is to free the consumer of voice services from the provider of the Internet connection. Already we have the choice of whether we make a phone call using a land-line phone or a cell phone, and in the market for cell-phone connections we normally have a choice of suppliers.

In order to connect to the Internet we have a choice of technologies, fibre, wireless or satellite, but a limited choice of suppliers.

The cost of building and maintaining the infrastructure to support the Internet is large and will tend to confine the number of companies to a small pool of large companies. This does mean that there is a tendency toward monopolies of supply in any one area – particularly with regard to fibre-optic cables in sparsely populated areas. Satellite may be the most cost effective option.

But once connected, the market for communication services is limitless, with all the benefits to consumers that a competitive market provides.

Of the non-SIP services, like Zoom, Teams, Webex – which I view as collaboration tools, there are popular personal communication apps like WhatsApp, and Tik-Tok. A common characteristic of all these applications is that communication is only possible between end-points using the same application.

SIP end-points range from soft-phones on PCs and smart-phones to large PBXs. At present it would seem that the market for stand-alone SIP phones is confined to the office and call-centres.

But there's one group of SIP phones hiding in plain sight – cell phones making calls using VoLTE and VoNR (aka V05G). Cell-phone calls are set up using SIP, but the cell-phone operators locate, validate, charge, and route the calls utilising IMS . Determining location, the URI of the called number, is done using ENUM, but the ENUM service is private. Location of a number owned by another operator, as far as I've been able to determine so far, is facilitated by interconnect agreements between operators.

If a 'telephone number' is used as the unique identifier of a personal end point on an all IP network, then some sort of ENUM function is required to map a number to a SIP URI.

The other bit of necessary information is the IP address of the phone end-point, cell-phone, soft-phone, or desk phone, being called.

This is recorded by a SIP Registrar service, the phone contacts the registrar and the phone IP address is recorded, plus, usually, whether the local phone IP address is hidden behind a NAT service on a gateway or router.

Most households connected to the Internet today will have some sort of router providing an Internet connection for all the IP devices in the property – they all share the same external IP address but have private IP addresses inside of the home LAN. This enables multiple SIP phones on the home LAN to register independently and make calls simultaneously.

The question then is;

*Is a number the best identifier of a SIP call capable device?*

In the days of the PSTN, each circuit was identified by a number at the exchange, and each exchange was identified by a number in the trunk network, and each country was allocated a number.

Why should it be necessary to have to map each allocated number to an IP address in order to connect two SIP end-points.

DNS came about as means to assign a memorable name – e.g. [www.google.com](http://www.google.com), to an IP address. This saves us having to remember all those addresses. But most of us already have a unique address – our email address. A SRV record in DNS zone will enable a request for the SIP URI for [me@service.com](mailto:me@service.com) to be fulfilled just as an email message to [me@service.com](mailto:me@service.com) can be delivered to me.

The difference is that although my address is the same, and can be used by someone wanting to talk to me, or send me an email message, the applications providing the services are different and can be identified.

A change away from a system using a unique number to identify an end-point will not be trivial. We started off asking an operator in an exchange to connect us to a circuit, automated that by direct-dialling using a rotary selector on the phone, and then replaced that with a key-pad.

The Fonznik ([www.fonznik.com](http://www.fonznik.com)), is an early attempt to connect a SIP call to a destination using a spoken instruction. It would appear that we're going back to saying who we'd like to be connected to.

Use of large language models to discern our intent, who we'd like to speak to, or send a message to, allows the use of natural language to communicate with with the system. Imagine saying 'Alexa, call by brother Mike' and having a SIP call initiated to anywhere in the world. Personally I'd rather press a button to initiate the session rather than saying a 'wake-word' like 'Alexa', and press a button to end the session.

Moving control back to the end-point devices, away from central control, will help realise David Isenberg's vision of a Stupid Network (1).

By using DNS SVC records to locate a service means there is no need for an IMS Service Layer.

The problem is how to charge for any service provided.

For 'static' services like SIP Registration with a Registrar Service, a subscription model may be appropriate, the user pays for the facility to be present.

On demand services are probably best charged for by usage.

There may be a market for a Payment Service, like PayPal, to provide a means to accumulate micro-charges and bill the user once a month and pay a collective payment (from all the users) to the service providers.

AWS Marketplace provides a service like this for services hosted on AWS, but it is really business oriented – the user needs an AWS account to subscribe to any service.

Many of us have gmail.com email addresses, and these form an initial market for SIP services, either typing in the SIP address (sip:[me@service.com](mailto:me@service.com)) or using a personal directory to map our personal contacts to to names that we prefer to use in a spoken instruction.

A new market for the provision of Registrar Services could be created where the service provider can offer their services to domain owners in order to make SIP calls to [user@domain](mailto:user@domain) as easy as sending an email to [user@domain](mailto:user@domain).

At the beginning of the article the question was posed ‘Are there opportunities in the market for personal communications, the kind of person to person, and person to business communications that were/are dominated by land-line and cell phones?’

Yes, absolutely – from Registrar Service provision, to ‘cloud’ personal contact lists, to speech-enabled SIP phones. These SIP phones can be soft-phone apps on smart-phones and PC’s, desktop phones, or WebRTC phones added to a web page – *Asterconn* at <https://www.asteroute.com/> (click Read More for details) is an example of a javascript softphone added to a web-page that uses SIP over WSS (secure web sockets).

When a SIP call can be initiated from all sorts of devices, then the opportunity exists to provide the same advanced voice services to callers no matter where they are.

Cell-phone calls may go the way of the PSTN, along with telephone numbers, but 4G and 5G connection services are still needed to provide a mobile connection to the Internet.

1. Isenberg, David – Computer Telephony, August 1997, pg 16-26. :

<http://www.isen.com/stupid.html> ,

<https://www.hyperorg.com/misc/stupidnet.html>

IP – Internet Protocol

SIP – Session Initiation Protocol

URI – Universal Resource Identifier

NAT - Network Address Translation

LAN - Local Area Network

PSTN – Public Switched Telephone Network

DNS – Domain Name System

ENUM - E164 Number Mapping (an E164 number looks like +44123456789)

IMS - Internet Multimedia Sub-system

VoLTE – Voice over LTE (4G cell technology)

VoNR – Voice over New Radio (5g cell technology)

WebRTC - Web Real-Time Communication (used by products like Teams, Skype, Slack)

WSS - Secure WebSockets (allow for real-time, bidirectional communication – typically browser to server)