

# All-IP, All-Mobile Business Communication

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The transition to All-IP is happening here and now. Because it provides solid business values, the trend is accelerating and unstoppable. Get ready...



**Contents**

Introduction: Three Trends in Business  
Communications .....3

Trends 2016.....4

All-IP .....4

All-Mobile .....5

Everything as a Service .....5

From here to there .....6

Conclusions .....7

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## Introduction: Three Trends in Business Communications

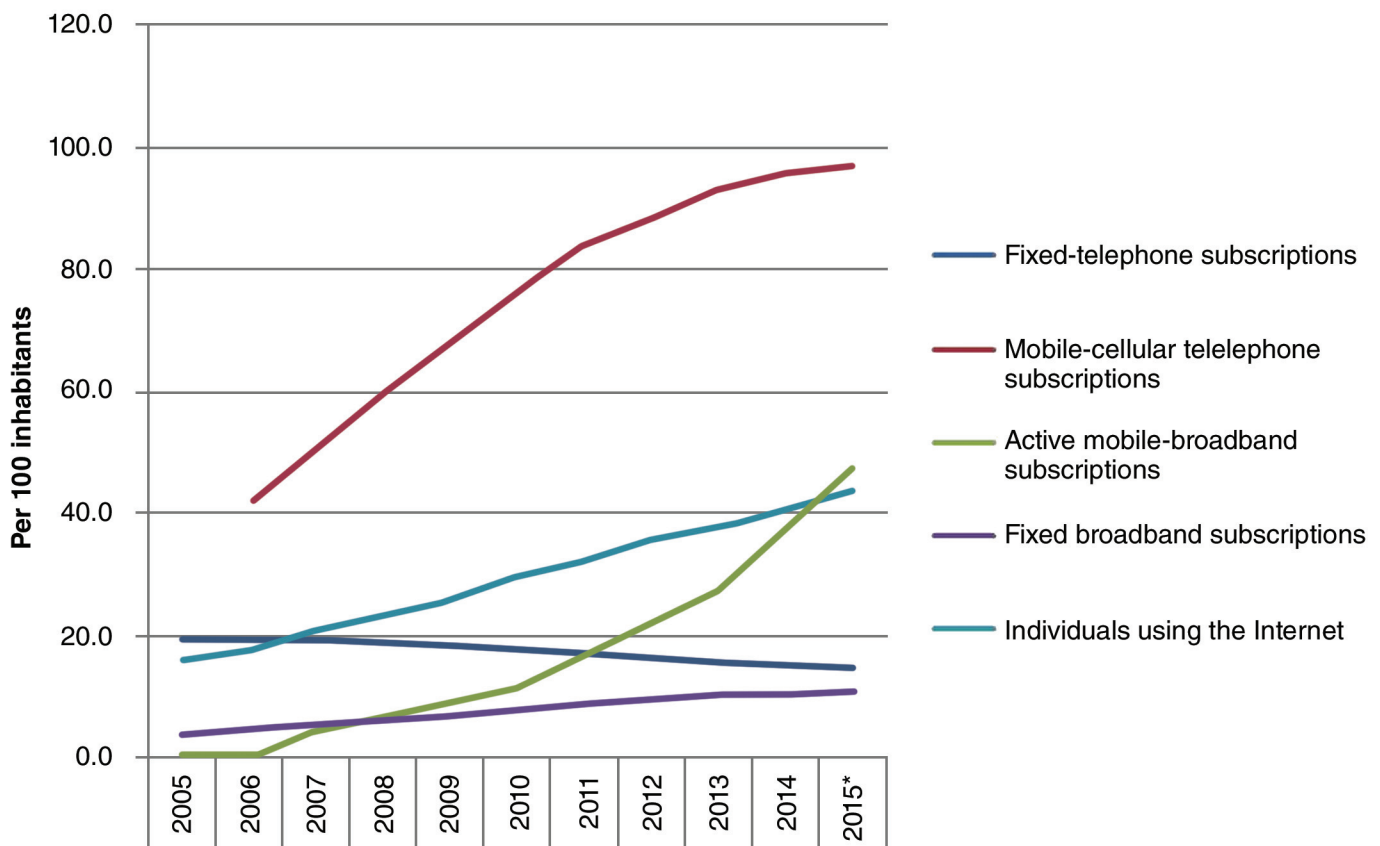
In the year 2000, the world had just survived the Y2K bug which threatened to bring computerized civilization to a grinding halt. The big buzzword in telecommunications at the time was “convergence”.

Convergence promised to bring all network traffic, be it telephony or data communications, onto a single network infrastructure, resulting in lower infrastructure cost, more bandwidth and better service. Which network technology would fulfill that promise was less than clear however. Contenders were ATM (still), Frame Relay, even ISDN—and, coming up fast from behind: IP—the Internet Protocol.

Ten years later, this race has been decided with IP as the clear winner leaving every other networking technology behind in the legacy dust. With the

Internet available in such a ubiquitous manner, touching so many aspects of our daily lives from education to work to health and leisure, the first trend in business communication technologies becomes evident: **All-IP**.

Looking back at this race attention is drawn inevitably to another track which runs in parallel and actually presents a spectacle of a very different scale, the advent and growth of mobile communication. The speed at which mobile phones and networks (.2G, 3G, 4G...) have penetrated the global market is mind boggling. To the point where today in the developed countries mobile cellular telephone subscriptions reach 120% of the population (I believe an exclamation mark is appropriate at this point, so here it is)! With this backdrop in mind, the second trend in business communication technologies is clear: **All-Mobile**.



Note: \* Estimate

Global Usage of Network technologies (Source ITU)

And the third trend? Computer technologies are relatively young, having only existed since, let's say, the seventies. Yet during that short time span, some would say system architectures have been breathing in and out—from centralized to decentralized, from master-slave to peer-to-peer, from concentrated to distributed—in roughly 5 to 10-year cycles.

Do you remember mainframe computers, client-server, and application service providers—ASPs? Hosting and the cloud? Infrastructure as a service (IaaS)? Software as a service (SaaS)? Platform as a service (PaaS)?

With communication technologies evolving into (IP-enabled) software applications, the PBX or video-conferencing system can now follow the same cycle. Which leads us (considering that the IT world is currently breathing in) to the next trend: **Everything-as-a-Service**.

## Trends 2016

So here we are with three trends which can be expected to keep us busy for the next years:

- All-IP
- All-Mobile
- Everything-as-a-Service

What does this mean for equipment vendors, network integrators and service providers? How can we realize the benefits promised by these trends and how can we avoid pitfalls along the way?

## All-IP

Behind the short words, All IP, lies a huge transformation of the global telecommunications infrastructure. Most major telecom service providers including the former national, monopolistic operators have announced the shut-down of their TDM based (analog and ISDN) telephone networks with deadlines ranging from 2017 to 2020. We are talking here

about hundreds of thousands of Local Exchanges (buildings full of 30-year-old switching technology) connecting a little over one billion fixed-line telephony subscribers. Many small and medium operators, competitive carriers and over-the-top (OTT) providers have realized this transition already and are running Voice over IP (VoIP) in their networks. This experience will be crucial to successfully scale-up to mainstream and bring these billion subscribers onto IP networks.

For the individual business going All-IP—as well as the market in general—this implies some new expectations on IP connectivity:

- **Bandwidth**—Each phone call ads roughly 100 kbps of network traffic, each video session 500—4000 kbps depending on quality. "All-IP" therefore means also "more IP". The evolution of broadband access technologies supports this with VDSL (VDSL, VDSL2, Vectoring, etc.), Fibre (FTTx, PON, ...), Cable (DOCSIS 1.X, 2.0, 3.0) and also wireless technologies (WiFi, 3G, LTE, 5G, ...).
- **Reliability**—With all communication channels running over IP the reliability of the IP connection becomes more critical. The market has been spoiled by 99.999% availability of the old TDM network. If your phone lines start running over a regular Internet connection with 99.8% availability, you may expect some grumpy users (0.199% actually does make a big difference, namely 21 minutes of service disruption per week on average). IP Fall-back, multi-homing, bundling or load-balancing technologies will be in demand to make those less-than-happy users smile again.
- **Quality-of-Service**—The Internet in general—and the Internet connection of a business in particular—is still usually best-effort. Meaning it works sometimes faster, sometimes slower (different users and applications compete for the same bandwidth), and any particular packet may get through

or be silently discarded. While this is good enough for browsing the Web or sending E-mail, the consequences for real-time services such as voice, video or fax are felt by many users. Fluctuating voice quality and unreliable fax transmission are a regular cause for frustration. Quality of Service (QoS) is needed and the technologies to provide it have been around for decades.

Traffic-labeling standards such as ToS, DiffServ, VLAN etc. allow the network to tag packets for different service classes. Traffic management technologies like priority scheduling, weighted fair queuing or traffic shaping enable the network to handle IP packages in different queues for faster delivery, higher bandwidth or low-priority best-effort service. The real challenge lies in actually applying and managing both aspects (classification and traffic management) consistently and diligently to improve the customer experience.

## All-Mobile

The explosive growth of smartphone and tablet computer use in the consumer space has generated a huge pressure on business IT administrators. Supporting these cool gadgets for professional use has caused many IT staff to throw their hands up in the air and cry “bloody BYOD!”.

So workers, especially in small and medium companies, did “bring their own device” to work and now business communication vendors are catching up with the release of ever-new apps to bring the features of IP-PBXs and Unified Communication (UC) platforms to Apple iOS, Google Android and Microsoft (Mobile) Windows.

The goal is to make any smartphone or tablet a full-featured and fully integrated extension (terminal) of the corporate communications network.

The promise of slipping the equivalent of a full-featured enterprise desktop phone and conferencing station in

my pocket is appealing. Yet it raises the question: Do I really want to be reachable anywhere and anytime? Workforce adoption of All-Mobile presents significant challenges for the business communication infrastructure:

- **Diversity**—Mobile networks can be very diverse. The technologies employed can vary from one street corner to another, from country to country, or hotel to the airport (Free WiFi, LTE, 3G, etc.). The network quality challenges that All-IP has to face are multiplied in an All-Mobile or nomadic environment. Some technologies that have been almost forgotten in ever faster fixed-line IP networks may come to the rescue. Bandwidth optimization, voice compression and header compression for instance. Techniques that previously supported 3 or 4 voice calls over a 64 kbps leased line or satellite connection can now help network operators reach a 3G terminal with poor coverage.
- **Connectivity**—Even basic IP connectivity can become a challenge with the mobile networks being administrated in various modes: private or public addressing, behind large-scale NATs, or simple firewalls at some WiFi Hotspot. VPN tunnels and NAT-traversal features can overcome these barriers.
- **Security**—Mobile devices can represent a security risk to the business, potentially exposing critical data on unknown networks and with little control or enforcement of company security policies. Mobile device-management solutions combine encryption, storage segmentation and accessrights management to counter these threats.

## Everything as a Service

The promises of All-IP and All-Mobile are apparent. We have seen the cool demos, seamless integration of different communication and collaboration tools



from mail to chat to voice and video and desktop sharing. Working anywhere anytime with access to all information. Start the meeting standing in the Starbucks queue, continue on the road to the office and finish at your desk without a hiccup (yeah right).

OK, we also know that to make it all work like the demo takes quite a bit of effort, money, and know-how. So maybe it will be easier to leave this to the pros and get the whole solution as a service. Well, in many cases it probably will be, but is your case one of them? To figure that out, you might ask yourself the following questions:

- How critical are communications to your business success?
- How standardized are your communication needs?
- Can you afford to build and maintain your own UC system?
- Do you trust a service provider to control and manage all of your communication needs?
- How secure are your internal communications going through a hosted solution?
- What happens if your Internet connection goes down?

Your answers may lead to one of several conclusions:

- **No problem**—UC as a service is the right choice for me. Fast to deploy, manageable in cost and trouble-free in maintenance.
- **No way**—I want to keep *my* systems under *my* control and have clearly defined demarcation points and SLAs for each connection to the outside world.
- **In between**—Most likely you'll find yourself somewhere between the two extremes. Meaning you're ready to get some tools as a service, while controlling others on your own infrastructure. Or, you may want to enhance some hosted services with

survivability and fallback options and secure your connection to the service provider with encryption.

## From here to there

Ok, by now we have a pretty good idea where we want to end up: an IP-based, very-mobile UC solution with a mix of hosted and on-premises elements. The next question is “how to get there?”. Since very few start from the ideal green field, the answer is quite different depending on your starting point. In other words, companies—like technologies—have a legacy that needs to be considered when drawing the roadmap to All-IP.

Nevertheless we can attempt to arrange the multitude of individual scenarios into some categories:

- **Trunk-first**—If cost is a primary consideration, a company will likely want to extend the life of its PBX infrastructure on one side and benefit from attractive flat-fee SIP-Trunk services on the other. In such a case it makes sense to IP-enable a PBX with a media gateway and connect it to a SIP provider. Interestingly enough an external gateway is often more cost-effective in such cases than upgrading the PBX with integrated IP hardware and licenses. Such an external gateway also provides more flexibility with respect to IP network integration, security requirements and interoperability.

The devil may be in the interop details, however. While the TDM interfaces are well standardized, the behavior and supported functionality on the SIP side can vary from provider to provider. Consider things like Advice of Charge, push-back of call transfers to the network or restricted number presentation (CLIR). certifications, recommendations, and configuration templates between providers and gateway vendors help to

pave the way and establish which features will be supported in what way.

- **Enterprise-first**—In this category, the primary focus is on user-experience and features, that is, integrating different communication channels (chat, mail, voice, etc) and seamlessly integrating phones (hard or soft) with other apps (PC, tablet or smartphone). The actual monthly cost of communications is a minor issue, so the company may prefer to keep using the rock-solid trunk lines as long as they are still around. Here again a media gateway is called for to connect the IP-based, in-house infrastructure with the TDM trunks. An additional benefit in this scenario is the possibility to migrate users batch-by-batch from the old TDM PBX to the new IP UC system while maintaining a common TDM trunk to the outside world.
- **One-Step**—Finally, we may define the *one-step* category of companies that take the All-IP leap in one go. With the right preparation, this can make for a fast-path upgrade with the complete set of benefits from both a user and cost perspective. Of course it also involves some risks. While the functionality and operation of this final All-IP solution are understood better and better, the threats and vulnerabilities of this network scenario are still emerging. Security and fraud-protection must concern both the subscriber and the provider of All-IP services. In this context, an interesting question is “where does one network end and another begin?” This demarcation point defines the limits of control, responsibility and liability between provider and subscriber. More and more integrators are opting to install an enterprise session border controller (E-SBC) on the customer premises to clearly answer that question.

On a side note, it is interesting to see that legislation is also starting to address this question. In the European Union, regulation is under way that should eventually ban the so called “Routerzwang”. This German expression describes a practice followed by

many operators and service providers to impose the type and model of customer premises equipment (CPE) that must be used together with a given service. Such a mandatory router limits the subscriber’s freedom of choice while providing the operator with some level of control and insight into the customers’ private network. Not a situation that many companies like to contemplate.

## Conclusions

“So” the interested reader will say—and I have to assume you are interested if you made it this far—“We’ve seen some trends and some options. Now, are there any conclusions you can provide, or is this one of those articles that leaves you with more questions than answers?”

“Well”, I say, “some”. In the 17 years I have been at Patton Electronics and involved with Internet telephony I have learned that trends can be pretty obvious, but the speed and impact of these trends can be much harder to predict. I’ll give it a shot nevertheless:

- The All-IP transition is here and now, unstoppable and accelerating. Get ready.
- At the same time, the legacy will follow us for many years to come. Twenty years down the road, we’ll probably still be transmitting 100-year old signaling tones over technologies that have not been invented yet. Do not underestimate the legacy know-how required to do so.
- The more burdens you pack on IP, the more mission-critical IP becomes. Don’t opt for the fast-and-cheap options. Quality will matter more and more. And quality—especially when it comes to real-time software—is no small feat. Consider total cost of ownership including maintenance, support and upgrades for the anticipated lifetime of a network (and then some years on top).
- Carefully consider where and how much *staying in control* matters to you. Evaluate and select services and products, then build your



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