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The Challenge of Future Communications

José-Luis Núñez-Díaz and Óscar-Miguel Solá

The globalization of Internet access and Web 2.0 services has led to profound changes in the nature and context of communications. Traditionally, communication meant to transmit a message to a certain person in a concrete moment in time, and so it was one-to-one and occasional. With the success of social networks, communications have become pervasive; people are communicating all the time, feeling connected, expressing themselves, sharing their lifestyle. The model is now asynchronous and one-to-many. These emerging needs are today primarily being met by Internet players who are leading innovation in communications better than old operators. These new players arise offering to the users very simple, appealing and focused services that satisfy some of their communication needs much better than old operators do. But not only new ways of communication come up. Most of these new communication services are even free, changing the traditional business models and causing the global communication scenario to change. However, traditional operators still handle most of the synchronous voice communications with landline and mobile services that satisfy other more intimate user needs. With all this information, the challenge for communications in the future is to find the user needs behind all the different services use cases and build a new communication environment based on simplicity, socialization, security and privacy, to take the traditional services to the next stage.

Keywords: Communications, Identity, Immersive Services, Innovation, Mobility, RCS, Sharing, Social Networks, Ubiquity, User-Centric, 3i.

1 Introduction

This article will first introduce the current communications scenario, then try to address the main characteristics of the different types of communications to try to understand user needs**.** Then it will discuss identities and relationships, and finally it will try to introduce the technology context for future communications by using current solutions and standards.

2 The Current Global Communication Scenarios

The communications scenario has radically changed during the last decade. Ten years ago, communications mainly included telephony. Since it was invented in 1876 the telephone has evolved along with the technology throughout the years, but although some innovations have been added to it, the basis of communications remained unaffected and a few basic services (mainly voice & messaging) around the phone and telecommunication operators have driven progress. However, developments in the last few years have been enough to change the industry and create the age of hyper-communication. Nowadays we talk about the ITC Revolution, computing and communication have radically transformed society and a lot of innovative services have emerged quickly in our day-by-day lives.

Telephone services became very popular in the second half of the twentieth century and there was at least one in every house in the occidental world. Communication needs were solved by a landline phone shared within a family. Since then the telecommunication industry has been driven an evolution towards personal communications, first with wireless phones attached to the same landline phone number, then with the mobile revolution introducing and developing the personal device (the mobile phone) and enriching it with new easy, direct and ubiquitous services.

At the same time the Internet was born and became popular as a repository of a huge amount of information which was accessible by hyperlink from universities and corpora-

Authors

José-Luis Núñez-Díaz is currently in charge of innovation activities in the area of End User Services at Telefónica I+D, trying to take the communication experience delivered to the users to the next stage. Last year, he led the launch of the Social Communication Labs, a innovative concept on the Web where the customers themselves can collaborate in co-creation and evaluation processes of disruptive concepts, making the most of the mixture of traditional communications services (like voice or messaging) and the social media paradigms (like virality and lifestyle spreading). Prior to this challenge, since joining Telefónica R&D in 1994, he has held several positions related to emerging mobile technologies, focusing on messaging, interactive services and how Web 2.0 technologies could be applied to the telco world. He received his MSc degree in Telecommunications Engineering and also has a degree in Business Administration and Management. <jln@tid.es>.

Óscar-Miguel Solá is a Technology Specialist in Social Communications in the area of End Users Services at Telefonica I+D. He is currently leading the Movistar Contacta initiative that allows social network users to establish mobile communications as voice calls and text messaging by using their social identities and keeping the phone number private. He has also collaborated in the definition of new products and pilot services within the Social Communications Labs, a Telefonica initiative for the generation of services based on social networks and personal communications. He also worked as the main coordinator of the Corporate IMS Services Labs and as Technical Lead in the development of Intelligent Network Services as Ring Back Tones. <oscars@tid.es>.

tions and some mechanism to share it (e-mail, FTP, IRC, etc.). From then on, alternative forms of communications have been emerging from the Internet. First it was e-mail as an alternative to the traditional postal and fax service. Then instant messaging services and chatrooms became available, providing new channels of synchronous communications between users, defining a new type of addressing system with which to contact people via the Internet. After that, with the broadband access network and the explosion of multimedia, Internet players started to offer voice and video call services free of charge and emerging products quickly became common communication tools. Nowadays, most people in the developed world have an address on the Internet and the possibility to use a wide variety of rich communication services beyond voice calls. And so, everyone can find a mean of communications or a set of them that really fits their needs.

The problem that faced the Internet approach to personal communications is that it would only reach to other users connected to the Internet and, in spite of the explosion of Internet access, users are not always connected. The first option is to provide permanent access to the Internet for mobile devices, but both the battery life and the quality of service experience problems with actual mobile technologies acts against really widespread adoption. This has led to other initiatives to connect VoIP services with legacy telephony networks like SkypeOut or Jajah.

While traditional telco operators remain attached to voice communications while supporting mobile and broadband network access, VoIP agents tried to expand into the mobile market and new players from the Internet world started to lead innovation in communications. New players have arisen offering to users very simple, appealing and focused services that satisfy some of their communication needs much better than old operators do. Besides this, most of these new communication services have been built over new business models where services may be free for the final users as third-parties pay in return for higher exposure, publicity, promotions, etc.

In the other hand, traditional voice services (including both landline and mobile services) are still addressing more intimate user needs carrying the most part of the voice traffic. These services are still related to closer privacy, quick answers and decisions and greater reliability.

3 Main Characteristics of Current Communications Process

In the last few years of hyper-communication, people have profoundly changed the way they want to communicate. In the new paradigms, users don't want to simply transmit a message or say something to someone anymore. They want to share anything all the time, feel themselves to be always connected and close to their peers, tell their feelings to all of them at the same time. They want to share their lifestyles and express their feelings, and they want do all these things at any moment, at any place, in a mobile environment. This way, communications become personal and social at the same time. Three main key points address this new environment:

- Everybody needs to be connected all the time,
- one may communicate from any geographical location,
- everyone can contact anyone wherever they are located.

To sum up, while the old model meant a kind of one-to-one and occasional communications, the new communications model means pervasiveness, being asynchronous and one-to-many.

Users have changed the way they interact, communicate, collaborate, and relate with each other. Taking a look at the concepts of these new services, some common characteristics may be detected, and most of them remind us of the Internet approach:

- **Put users at center stage**: the essence of the Internet "Long Tail" paradigm where providers value users' contributions, satisfy their needs, allow them download and upload contents (UGC) and even services (better to have many small and tailored services used by few users than a few heavy and generic services used by a lot of customers).
- **Everything can be sent and shared**: beyond to send things (message, notes, pictures) people want to share them. It's useless to send the same picture or story to a lot of your contacts by e-mail. Users don't send the same picture to a big list of contacts by e-mail, as they can share it to all of them (and any new friend they make). In some cases, some people find that sharing is not enough, and they expose contents to everyone. In a near future, beyond contents and thoughts, it may be possible a new model to share services, relationships, devices, or, why not, even the car, the apartment, the shopping, …
- **Mobility, ubiquity and Always-on**: mobile handsets are the only device that can generally be found less than one metre from users and they allow them to be connected at any moment and at any place. In addition to this, users often have many connected devices around them that can improve their communication experience by extending their phone capabilities, so people can be connected in the best conditions.

Taking a look at the different devices with all these in mind, it can be observed that every electronic device is a potential communication endpoint, both generating and consuming information. Personal computers are the principal entry point to the Internet and, with it, to the new communications scenario. Game consoles are integrating voice and text services to allow a full immersive social experience, playing with friends or even total strangers. Media players (audio, video or even e-book readers) are beginning to incorporate shared functions and are able to download sharable content. And many more devices are getting connected to the Internet, like the television, the freezer, the house. But, above all, the mobile phone is the center of real personal multimedia and multi-purpose communications. So, one of the challenges of future communications is to turn any connected device into a communication device, i.e. into a phone.

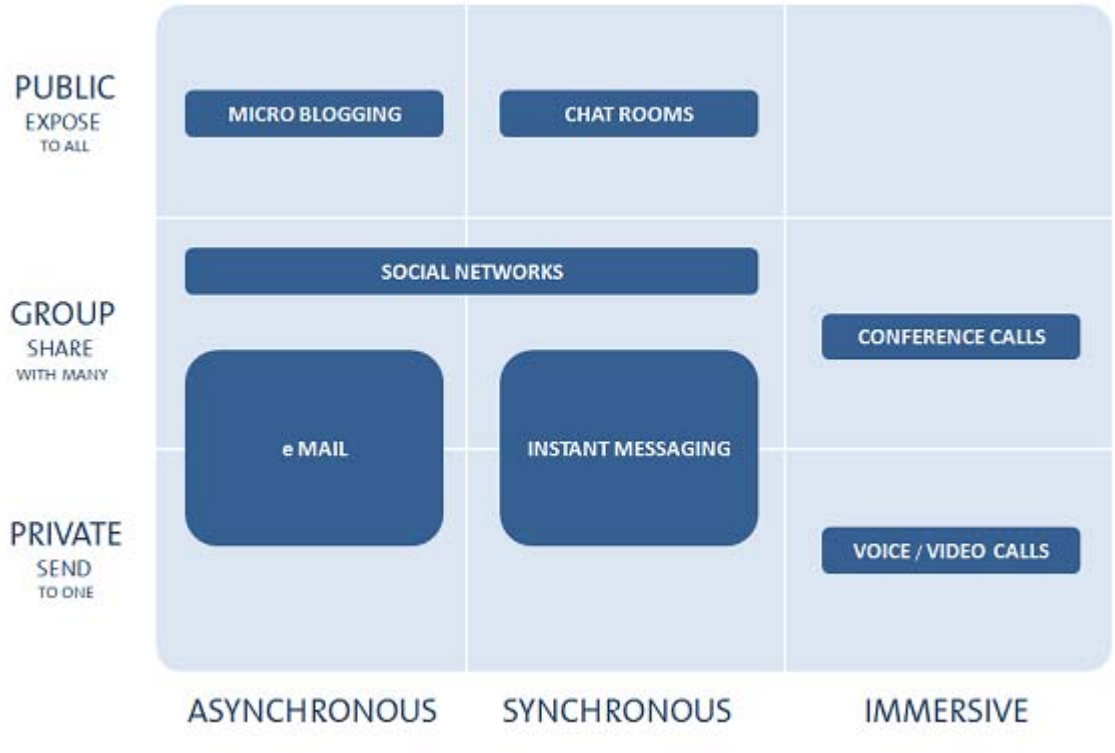

Figure 1: A Communications Classification.

4 In Search of Communication Needs

In this heterogeneous scenario it is important to understand real user needs and motivations behind the different communication services. With this in mind, traditional services can be reshaped and new and innovative ideas may be developed in order to create a new bundle of services.

Observing the evolution of communication previously described it may be seen that a progression from the traditional private and intimate methods like phone calls or e-mails to a more public approach with social networking and twitter-like services is occurring. These emergent services are generally asynchronous, pervasive and less immersive, because they make it possible to have many varied forms of communication at the same time. However, although some people are stating that the age of privacy is over, people still need to use more private and intimate ways of communicating thoughts, lives and meanings. Given these two dimensions, we can build a table like the one depicted in Figure 1, where a map of the different currently available services can be seen.

On one hand, **asynchronous services** go from the more private approach of traditional e-mail to social networking that allow a very quick way to share things with a group of friends. Asynchronous services mean that users don't expect an instant answer to their messages, and the expected elapsed time between message dispatch and reply varies greatly between the different services (from hours to days). It is still interesting to differentiate between social networking sites and micro blogging (twitter-like) services, because the latter are designed to expose things to everyone who wants to follow you and the former defines communications in the context of a friendship relationship. The different nature of this relationships make social networking sites a very powerful communication tool for everyday anecdotes and news.

In **synchronous services** users establish connections with other users, send messages and receive instant answers, but are also able to handle many conversations at the same time because the expected answer response time is still wide (ranging from seconds to minutes). This type of service is commonly in the form of instant messaging suites (like Microsoft or Yahoo Messenger) and has not experienced a relevant evolution in the last couple of years. Social Networking sites have integrated this kind of solution to provide instant communication tools but without enriching them.

Finally, **immersive services** are understood as those in which users establish immersive connections with other users, communicating through voice, video or multimedia. In this type of connection it is very difficult to handle more than one conversation at the same time because the expected answer response time is only a few seconds, and the silences (understood as absence of transmitting information) are commonly avoided. Real time infrastructures are especially important to support these services and, in this regard, telco operators still have the best user experience of immersive services in comparison with Internet players, due to the greater reliability of mobile voice channels versus VoIP technologies.

Figure 2: Traditional Communication Identities.

With this differentiation between communication services in mind and directing the focus on their end users, a high level profiling of them can be done. On a first approach, three different categories may be seen:

- **Occasional phone users.** They are generally far from technology and only use immersive services, may have mobile phones, but only appreciate the mobility, using them just to make calls and seldom to send text messages.
- **Intensive mobile phone users.** These are generally strong social persons who prefer live meetings and intimate communications like text messaging and voice calls, rather than social networking sites or micro-blogging. Although these users mainly value the mobility of the device, they may also have top smartphones using a wide variety of applications to get information or play, but seldom use them for communication purposes.
- **Trendsetters and innovators.** They intensively use email services, social networking sites, instant messaging and chat. They still do use immersive communications but only for intimate, private conversations or to take quick decisions based on quick answers. If possible, they have smartphones to check email, update their social status, text their friends and even play games, and phone calls are just other utility.

With all this in consideration, one of the challenges of future communications players is not only to fill all the holes depicted in Figure 1 and position themselves on a wide area of the map, but also to build unique and differential communication experiences that will provide all the capabilities to all the types of users, improving the efficiency of communications.

5 Identities and Relationships

Taking a look at communication services, it should be differentiated:

- The **address** that tells the network where to route the messages or calls in order to establish a communication.
- The **identity** that both endpoints use to identify the originator and destination of the communication.

In traditional telco communications like phone calls or the popular short message service, the identity and the address are almost the same thing. The originator uses its local device information (contact list) in order to obtain the address (phone number) required to reach the destination (identified by a name). Then the only information that travels the network and serves to route the communication is the address. After that, in the end user device it is translated, if assigned, to a name in the local contact list that serves as identity. If there is no association between a local contact entry (with a name) and the address, the same address is used as identifier. Then it may be realized that users define how they want to identify the people who contact them, because this identification is done in their terminals and with an assignation process defined by them, the contact list or address book. This way, users are aware of both the address (where to contact) and the name (which they had written) of their contacts (see Figure 2).

On the other hand, in social networks identity is clearly separated from the address. While this is typically an e-mail or even a mobile phone number (for instant notifications), identity is a much more enriched concept, including:

- Not just a name, but a global profile where users build their image and how they are seen by the rest of the world (pictures, thoughts, personal and work information…).
- The current self, who is the current status, mood, place, etc.
- The set of relationships (one is defined by one's set of friends) and the history of those relationships.

Besides this enrichment, another even more important thing to notice is that the association between both address and identity is done on the server and the social networking platform is responsible for addressing and contacting the user. This means that users are not aware of addresses and they only see social identities and a mechanism or process to contact or communicate with those identities, and so the social networking platform controls the communication process, the permissions and embeds communication in the context of a relationship. With this **it** is relevant to notice that users do not choose how to see or identify the people who contact them, but how they want to be seen by them (see Figure 3).

Social networking sites put communications in the context of a relationship, which means that they allow differ-

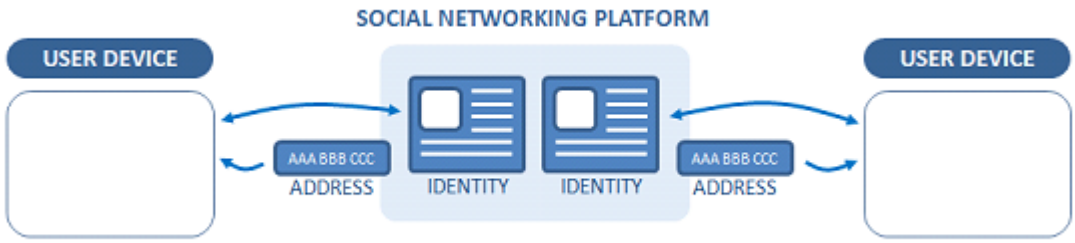

Figure 3: Social Identities.

ent communication methods depending on the state of a relationship, while giving a conversational approach to messaging, as all the messages may come from other previous messages and this history can be seen. However, they only define one level or type of relationships: friendship. For a global communication scenario, this limitation can simplify and flatten the possibilities of a complete communication suite. At this point, it is important to differentiate between the different roles that users may take on in their real lives and how they relate with others: couples, friends, colleagues, workers, tutors, teachers, apprentices, clients, providers, …

Gathering together all these different points, another challenge of the future communication player is to establish communications between enriched identities, within a social context and a relationship, taking into account that different relationships should receive different treatments.

6 Leveraging the Current Technology

Having a look at technology, there are a lot of services and standards (both from the telco industry and provided by the ISPs) that currently enable users to enjoy these kinds of real-communication services, including the social dimension, several media support, interactivity, etc. It can be worthy to review some initiatives now gaining momentum across the industry.

As an example, we can point to the GSMA Rich Communication Suite (RCS) Initiative. Initially, RCS was a collaborative attempt to commercially deploy IMS-based interoperable services that provide enriched communication in the short term. Even though, some years later, RCS is not available yet as a commercial service, some mobile operators have launched pre-commercial and limited trials and show a strong commitment to pushing ahead with RCS development.

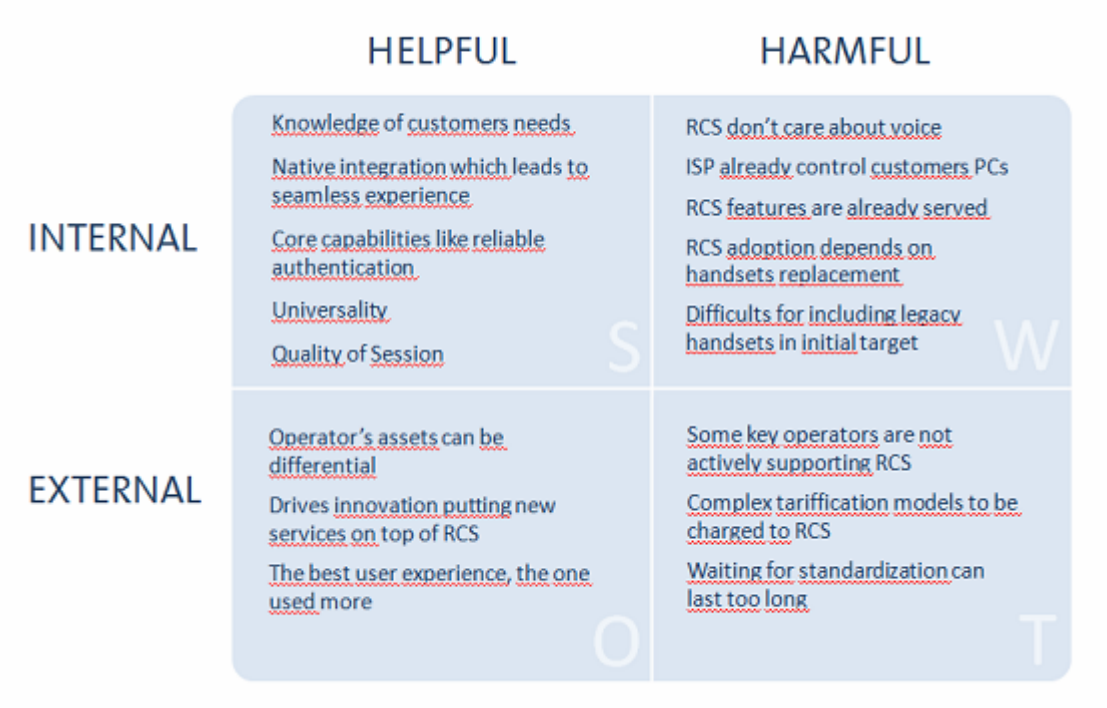

Figure 4: SWOT Analysis of RCS Environment.

Regarding the scope, RCS defines a set of features around a presence-enabled address book, mixing media and content for enriching ongoing calls and a unified vision of messaging services including IM, SMS and MMS. This features are supposed to be convergent covering both mobile and broadband access and fitting the mobile customer's lifestyle.

From this perspective, RCS aims to renew the communication services evolving from the current mobile operators' offering to a totally convergent architecture (IMS based) keeping the phonebook as the key driver to manage communications and the users' all digital life in the most compelling way. RCS is not a new standard, but delivers implementation guidelines based on profiling of existing standards and specifications to build a completely new and integral communication experience (see Figure 4).

Other services massively adopted both in the Internet and the telco-environments for delivering communications are also covering most of current customers' needs for real communications. The problem under these services is mainly complexity. RCS can seamlessly handle people identities and their contacts data and privileges for being published and spread all around the net. However, people are now used to keep their identities and private data fragmented and partially published across several services, each one even hosted by different providers with very different usages. Is it possible to really simplify these tasks to users and let them control their data, relationships and privacy?

Following the RCS rationale where supporters are focusing on simplicity (all my contacts and stuff in my mobile phone synced with and available in the cloud) and interoperability (every user can contact with any other user regardless of devices, networks and technology), we can extend it and set as one of the challenges of future communications environment not replying the old silo-based model, where every service was operated and provided by individual players for their customers and users had to register with many services, platforms and solutions in order to satisfy all their needs. The new model also means that users can seamlessly manage their privacy spheres (meaning both their stuff and their social graph and relationships) and communicate with other people regardless of the provider with whom they have a contract, the device and services they are using or the network and technology they are accessing from.

7 Conclusions for the Near Future

In the context of future communications both telco operators and Internet players will play a significant role. The definition of successful future communications will come from those who will know how to solve the real communication needs behind all the different services, and thus it is still uncertain how events will unfold. However some key points may be given as a first approach to the challenges of future communications.

In a world where every device has communication capabilities, multiplicity is going to be more important than convergence. This multiplicity should be understood as multiple numbers, devices, identities and even multiple service providers for the same user but in different contexts.

However, in this scenario of multiplicity the user is still unique, and so all those numbers, devices, identities and providers converge into a unique profile for a given context. And this profile should be the one that identifies users in their communications, taking into account the varied nature of relationships, and giving back the identities to the users not calling numbers anymore.

In the world of hyper-communication, efficiency will play an important role. This efficiency must be understood as building the best communication experience (simply and perfectly oriented) to transfer a message from an originator to a set of destinations using all the available capabilities of both traditional and innovative services.

It will be important to rethink new sustainable business models, where telco operators will try not to be just data pipes, and Internet players will try to generate new and increasing revenues. In this context collaboration would be better than competing, new win-win models will arise to deliver communication services which remain focussed on the user.

And at last, but not least, if will be interesting to see what will happen after social networks noise and digital fatigue, developing advanced and semantic filters and aggregators to present the users the relevant information and news. It'll be the time to see if all the players understand how to help the users to communicate and simplify them the processes. Or perhaps it'll be the time to wait for the next revolutionary invention which might arise, as Google did, to really deliver the definitive communication system.

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