

## Interview with Vint Cerf

Hello, my name is Lon Safko, co-author of *The Social Media Bible*, published by John Wiley & Sons, the largest book ever written on the subject of Social Media. And today we are here with, believe it or not, Vint Cerf, the Father of the Internet. Need I say more! Wow! And we'll be speaking today about Social Media and its effects on the internet. So let's get started!

**LS:** Vint, please tell our listeners a little bit about your background and that project that you worked on a few years ago that some people might have heard about.

**VC:** Well, first of all labeling me the "Father of the Internet" is not fair to an awful lot of people, especially to Bob Kahn, because Bob started the program when he was in the Defense Department in 1972; and then he came to me when I was at Stanford in early '73 and said, "You know, I have this problem. How do I hook all these different nets together?"

So the two of us did the basic internet design, and it started the design of the TCP/IP protocols. But there are many, many people, both before and after that stage, that have contributed to make the net what it is today.

So, I'm just happy that I participated in it, because it has been a lot of fun.

**LS:** (Laughter) a lot of fun! That's to say the least! It was probably the most important technology that changed the world, and you participated in it, so for that, I give you kudos. That's pretty exciting!

In Social Media, that's what this is all about, and with your background since the conception of the internet what do you see the effect of Social Media, trusted networks, user-generated content, two-way communication, how do you see that affecting and how they interact.

**VC:** It certainly has been something of a surprise to me that the users of the internet, the consumers of information, have now become the producers of information on the network. It's very wide-spread. It shows up in a number of different forms. It shows up as blogs, it shows up as video uploads in YouTube and other similar services. It shows up at social game sites. Things like *World-of-Work Map* or *Second Life*. It's showing up as people with their own web pages, email, and distribution lists, and the like.

Some of those things have been around for a while. Email, of course, was invented in 1971, so it's an old media in some sense but still very heavily used as are distribution lists. There's chat and there are other kinds of more "real" time things, including video now.

So all of these different ways of interacting have been very rapidly absorbed by the public. Mobiles, which only recently have come on the scene now account for some 3 billion users, not on the internet but in the mobile world. But the internet interfaces to many of the mobiles and so people are beginning to do texting in the mobile world, they are doing instant messaging; they are doing email exchanges, their searching the web from their mobiles.

What I'm seeing right now is a wide range of choices that people have in maintaining relationships and in interacting with people one-on-one, and in groups. I think this is likely to persist. Certainly, the sharing of

information in the net has been dramatic. In the scientific world, equally so. Where scientist begin to build common databases that they can make reference to, like the Human Genome database or astronomical information, or the geophysical information, we are finding that scientific results occur faster because people have reference to virtually everything that is know about some particular phenomenon because it's been codified in these shared databases.

So now we're seeing an increasing amount of collaborative work in the online environment and something which Google, of course, is intensely interested in.

**LS:** And that leads to the next question. How do you feel about it? Do you see that social media has made a positive contribution to the internet?

**VC:** Well, I have mixed feelings, to be honest with you. And the reason for this is some of the interactive modes strike me as being a waste of time.

**LS:** (Laughter).

**VC:** This may be a generational problem, not anything more fundamental than that. Another problem, though, is that in these mediums it's possible to be abusive, and I am very concerned about the side-effect of cyber-bullying and things of that sort. Others have expressed a discomfort with the fact that anything and everything can be expressed on the internet, including, you know, negative information, whether it's accurate or not, it sometimes has an impact.

So we have a, let's say, a potential for both positive and constructive and also rather negative kinds of interactions in this online environment; and I think we're still trying to discipline ourselves in how to treat these different media in a way that protects us from some of the abusive behaviors.

I am thinking not merely of the social media, but more generally speaking; things like viruses and worms and things that are *Keyloggers* that are looking for user names and passwords, or identifiers of account numbers and things of that kind.

Those are all fairly pernicious abuses of this online medium, and I think we are still trying to learn how to cope with it socially and legally, as well as from the law enforcement point of view.

**LS:** One of the things in the research for *The Social Media Bible* book I came across; it was kind of a revelation to me, is that in one way or another we've been censored in all of our media. I mean, going back all the way to the Guttenberg Press, there's either been some government agency or the sponsor of whatever was being produced. And for the first time the internet is not governed by the FCC. It's not governed by any government agency.

Do you see that, maybe, happening at sometime?

**VC:** Well, first of all, I think you made a miss-statement. The FCC believes that it is responsible for all communications in the United States. It doesn't mean that it's responsible for communications outside the United States, but it has chosen to treat "Internet" as a Title I Information Service.

There are some side-effects of that, which I think are not relevant to this discussion, that they're of concern to me; having a lot to do with "Common Carriage" and things like that; but the FCC has chosen to forebear to regulate, except in cases it considers to be anti-competitive practices. And you'll note that there was a recent decision by the FCC with regards to Comcast and its attempt to manage network use in the presence of BitTorrent and other kinds of peer-to-peer file sharing applications.

The FCC censured the Comcast Company for the way in which it undertook to do that management. There are, of course, other places in the world that are even more actively trying to control access to and use of the internet. You're going to find that everywhere. The internet is global in scope. It operates in virtually every country in varying degrees and countries have different views of what people should or shouldn't be able to do using this medium.

One of the biggest challenges, I think, is that no matter what position you take with regard to usage, you have the problem that if your position is different from some other countries' view, there is nothing that you can do to enforce your view, and vice versa.

And so then you get into this question of, "Gee, under my rules my citizen was attacked by a person in another country and I'm looking for some kind of compensation."

You will not be able to deal with those problems unless there are more common agreements about what is or is not acceptable behavior on the internet. And since the social views vary from one country to another, I think it is going to be hard for us to come to global agreements; but I think we will come to some agreements commonly.

An example, I think is, as far as I know every country in the world rejects child pornography as an unacceptable form of behavior, whether it's on the internet or otherwise.

So, maybe there are other things that we can agree are commonly unacceptable and, therefore, should be either prevented or punished if they are detected. It's going to take a lot of international work to make that a reality.

**LS:** That's a really good point that you're bringing up again. I think in the U.S. we are somewhat U.S.-centric in our views of the internet and that's exactly right, every country has its own social mores. For China, for example, and its ban on some of the internet access and Google, that's absolutely true. And then you do have international fraud, such as the bankers contacting us out of North Africa. And especially the Asian countries, too, as well as Russia, are now getting to be a problem.

**VC:** That's all correct. And, by the way, I would like to say something about China. It is more interesting when you talk to people on the streets, so to speak, you discover that some number of them actually appreciate the censorship. They like it, they believe they are being protected; now whether that's true or not is independent of how they feel about it, or how they, at least, say they feel about it. So we shouldn't make the assumption that the First Amendment notion, which is powerful in our Constitution, is necessarily universally accepted as preferable.

There are cultures where, in fact, the citizens want this kind of control.

**LS:** That's a really good point.

**VC:** Not everyone in China feels that way and, of course, I do not mean to suggest that to you, but it's surprising to find that not everyone thinks like an American, either.

**LS:** Yes, that's really true. I mean in Social Media is has, kind of, a social perspective of "power to the people", freedom from censorship, and of course, as Will Rogers once said, "Thank God we don't get a hold of the government that we pay for."

**VC:** (Laughter)

**LS:** And I had a conversation...an interview with Kevin Marks from Google's *OpenSocial*. And I thought *OpenSocial* was really fascinating because it touches on what we're talking about here...where they are trying to set up a standard for all communication, all information-exchange between social networking sites and other types of sites. But the cool thing is is that they're actually doing it on a global basis and even though there's companies like *LinkedIn* and *MySpace*, *Spacebook* (which are perceived competitors), they have all gotten together as well as Europe, South America, and China, to come together in a commonality to create these standards. And I thought that that was pretty cool. Even, of course, Communist countries that were actually, for the first time, having this commonality, pulling people together. And it is the internet!

**VC:** Well, you know this reminds me of an interesting phenomenon that happened in the last 1980's. I had asked permission from the U.S. Federal Government to connect MCI, which is a commercial email service, up to the internet. And they reluctantly allowed me to do that. The reluctance came from the concern that we would be carrying, or using, government-sponsored backbones to carry commercial email traffic.

After I put the MCM mail system up on the internet, immediately the other email service providers said, "Well, you know, the MCI people shouldn't have an exclusive privilege. And so *CompuServe* came up and *OnTime* came up and some of the other commercial servers also came up on the net.

And the side-effects of this was that they could suddenly interchange email with each other through the internet, which before they could not do. So it's this standardization that creates the possibility of interoperability. And this is why our *OpenSocial*, I think, is an important effort because it creates interoperability among those areas in Social Networks.

I think it will be very attractive for the users of those networks to be able to interact, regardless of which the Social Networks systems you happen to be registered in. You know, we may see some interesting consequences of that interconnection as people begin to adopt it. There will be interactions that we might not have anticipated that are enabled by that standard.

**LS:** True. One of the things that's exciting (at least to me as I do the research over the last couple of years on Social Media) is I am finding that really what sparked Social Media and this interaction was a convergence of all of the different electronics in a digital format. Digital telephone communications, digital music, digital photographs, the computer, of course, is digital and it seems that that is what sparked it overall.

What's your opinion? Do you think that all of this technology coming together is a good thing? Do you see some positives coming out of this?

**VC:** Well I'm of course, perhaps understandably, excited and feel positive about a lot of these new developments. The internet was designed to be fairly insensitive to specific media, so it does not know if it is carrying a digital image or voice or video or some other digitized object. You know if it is part of a program or a piece of webpage. It just does not know, and that's very deliberate. It was intended to be a general-purpose transport mechanism, and the consequences of that have been, as you say...every device that produces digital output potentially can be interfaced to the internet and this output transfers around and delivers to other places. I think that we are going to see a very significant increase in the number of devices that are able to connect to and interact with other devices on the internet.

There had been some discussion about the earlier fazes of internet being "internet for everyone" and now it is becoming "internet for everything"! And I really do believe that. I think sensor networks, appliances, things at home, in the office, in the automobile and that you carry around will all be "internet enabled" and this allows us to manage them better. These devices can report their status to us, they can accept, command and control from third parties. You can imagine entertainment systems being managed over the internet by third-party entertainment managers; you simply "click" here if you want this movie or that song, and it takes care of the details of getting it to the CD player in the car or the hard disc that replaced the CD player, or your *iPod* or some other DVR or what have you. All of these are possible once these devices become part of the internet.

And, of course, mobiles are contributing to that because as they become more and more prevalent with internet capabilities, they too, will become remote- controllers for many, many devices.

**LS:** And that's a really good point. One of the things I heard the other day is that in some of the new cars, when it is actually time to change the oil, the car will send you a text message.

**VC:** Well, I'm not surprised. I have an intramentation system, a censor system at my house. It is actually running *IPv6*, which is the new advanced internet protocol which is scheduled to slowly replace *IPv4*, which is what most people are running today. But this system gathers humidity and temperature from sensors scattered around the house, especially the one in the wine cellar (Laughter). And it reports on a daily basis what its status is and I can get, you know, a little chart showing what the variations in temperature and humidity have been over the course of a month, or six months, or a year.

**LS:** Wow.

**VC:** And when things break, I get email saying, "The (following) sensor is not working. We have not heard from it for the last two days. Please change the battery, or do something."

So I expect that we are going to see more and more environments like that where the appliances that are around us are part of the network and are capable of telling us what their condition is and accepting advice from us about what to do.

**LS:** Yes, I love that! In the mid-80's I built the first computer to save a human life, blah blah blah...and worked with the physically disabled and I actually pioneered some of the work on environmental control and *Smart House*, *Smart Home*. And this has given us the whole "*Smart Home*" thing a whole different spin.

A couple of weeks ago I did a blog on a little device that you can buy now to put into your houseplants; and if the houseplant gets dry it sends you a text message. It actually Tweets you to tell you that it is dry! And if you do not water it, it keeps annoying you; and if you overwater it, it complains!

**VC:** Hey, where do I get some of those? My wife is a huge fan of houseplants. Is this something that's a product?

**LS:** Yes, actually it is two products that are put together. It is a little electronic board that costs about \$48 and then there is a typical digital moisture sensor. I'll send you the article and a link to the webpage.

**VC:** I would appreciate that! There are two companies I have dealt with in the past with sensory networks like this, called "RTrack" and the other one is called "Costo" and it did not occur to me until you just mentioned it. A dryness sensor would be a perfect...and I'm taking notes here...I mean this is a really good idea!

**LS:** Well, just go to [www.lonsafko.com](http://www.lonsafko.com), click on blogs and the article is right in there. That's a little self-promotion.

**VC:** That's great! What else would you like to talk about?

**LS:** Well, real quick...you mentioned the *IPv6* and some people have been talking about a total rewrite of the internet because of the packet design and the speed of transmission. Do you think we are going to see that some time soon?

**VC:** Well, let me see. Let's distinguish *IPv6* from what's called "clean sheet" efforts to what a re-designed internet would look like.

*IPv6* was standardized about 1996 and it has been a very slow process to get people to implement it in parallel with the *v4*. But we now are sure that we are going to run out of *IPv4* address space. You need to [19:51.3] space somewhere in the 2010-11 timeframe at the current rate of assignment of these internet addresses. Google has already started implementation of *IPv6*, together with *IPv4*. If you go to [www.ipv6.google.com](http://www.ipv6.google.com) you will actually see our *IPv6* search site with a logo that is animated...which is one way of letting you know that you are on a *v6* service instead of *v4*.

It's going to take a lot of time to proliferate the *IPv6* protocols everywhere; but these are not a major departure architecturally from *IPv4*. The things you've been hearing about with regard to redesign of the internet are really research programs asking a question, "Now that we've been on the internet for over 30 years in one form or another, what have we learned and what would we do differently? Would we design it all over again?"

I know there are a number of things I would certainly choose to do differently; mostly having to do with security and authenticity, but also dealing with broadcast media in addition to *Point-to-Point* connections, and several other kinds of aspects of the network's design.

So, along with others, I'm participating in that exercise to say, "What would it look like if we started over?" Whether or not we get to start over is really an open question. One could make the argument that there is such a huge investment in the internet today that one could not imagine starting over again. And yet, we could have

said that same thing about the telephone network in 1973. When Bob Kahn and I started to design the internet....

**LS:** And television has gone digital....

**VC:** ....yeah, the same is true. So it is not impossible to imagine a “something new” that is not the internet, it is something else arising; and perhaps eventually, if not supplanting it, at least augmenting it, which is what happened with the telephone world today. I mean the telephone network is still there and the internet is there, although increasingly people are using the internet to carry all forms of media, including traditional telephony. And it very well may be that over time the traditional telephone networks simply gives way to broadband internet access.

This possibility of a complete redesign and something new that isn’t the internet but is a successor is not out of the question in my view. But it might, also, take a fair amount of time to have any direct impact on the world’s population.

**LS:** And more than likely, it would be transparent to the users.

**VC:** Well, I don’t know! That’s a very good question. I think that, certainly, the internet has not been transparent, nor has *Voice Over IP* been transparent to the users. You are very conscious of the difference between an ordinary telephone call and what you typically do to deal with *Voice Over IP*. Although I guess it’s fair to say that if you take your PBX, your private automated branch exchange, and turn it into a *Voice Over IP* box, the phone still looks the same; it’s just that your voice gets packetized. You just didn’t know that.

So, yes and no. Transparency is possible but I think it won’t always be guaranteed.

**LS:** Okay. And just to conclude here, is there anything else that you would like to tell our listeners about what you’re working on, about social media? And most importantly, you are considered a futurist. Where do you think we are going with this? What do you think it’s going to be in 10 years-20 years?

**VC:** There are two things that are probably worth mentioning. On the Social Media side, I’m persuaded that people are going to increasingly use this internet base and all the various Social Media applications on it, as a way of maintaining friendships that they’ve established. In some cases they will encounter new friends. I suspect some of the gaming environments have a way to do that and I guess they are social. I don’t want to quite call them “dating” services, but there are services for people to discover each other, let’s put it that way, on the net. And I hear stories about people meeting and eventually getting married through this medium.

So I think we are going to see more evolution of the social networking environment. We’re certainly going to see increased ability to interact in richer and richer ways. Today we have video, we have audio, and we have 3D like environments rendered for us, like *SecondLife*. Eventually I suspect that tactic interfaces, touch interfaces, will be possible. Also 3D presentations where two or three, or some number of parties, can be inside a 3D environment that’s not just presented in a 2D way on a screen.

Sort of like *Star Trek Holodeck*. However I don’t think we are any more close to the elaborateness of that idea. But I have seen some very impressive 3D, just by technology in the academic world that ultimately I think will become commercially available.

The other thing that is happening that I'm quite interested in is the extension of the internet to operate across the solar system. The purpose here is to support manned and robotic exploration. And new standard protocols are required to overcome some of the deficiencies of trying to communicate in deep space; whether it is very, very, long delays like hours of round-trip times, or disrupted communications because of so much emulsion.

So, I've been working with the Jet Propulsion Laboratory and with NASA on the design of an inter-planetary extension of the internet...

**LS:** Wow!

**VC:** ...and that's now rapidly maturing. We'll be doing deep space testing next month, in October, and then we will be on the International Space Station next year.

**LS:** Wow! Wow!

**VC:** And if all goes well, these protocols will become standardized internationally and will be used in new space missions so that all the various explorers of space will have spacecraft that are able to interwork if they choose to take advantage of that.

**LS:** How amazing!! It is not just global now, you are actually talking intergalactic ally.

**VC:** Well, we're not intergalactic, this is strictly interplanetary; and I am sure to distinguish between the two. Distances between galaxies are really (and even between stars) a problem. I'm starting to think about an interstellar extension here, but the round-trip times are going to be years, at best. The speed of light, so that doesn't make for very lively conversation!

**LS:** (Laughter) that is absolutely fascinating!!! I know our listeners, as much as myself, would like to learn more about that. Is there anything that is being published at all on the web? Does NASA have anything?

**VC:** Absolutely. If you go for the technical side of it, if you go to [www.dtnrg.org](http://www.dtnrg.org) (Delay Tolerant Networking Research Group) you can find more about the technical details of the program. As we get these deep space tests done, we will probably also report the results at the Interplanetary Special Interests Group, [www.ipncig.org](http://www.ipncig.org). That site needs to be updated and hasn't been for a while. Those are two places to go to find out more.

**LS:** That's really exciting! I would really like to thank you, Vint, for being here today. Thank you so very much for sharing that.

**VC:** Not at all, it's a pleasure to chat and I certainly hope that our paths will cross again in the future.

**LS:** I'm looking forward to that. Again, thank you.

This has been Lon Safko, the co-author of The Social Media Bible. Be sure to check out the other valuable social media tactics, tools and strategies that can be found in The Social Media Bible book, as well as our companion website. [www.thesocialmediabible.com](http://www.thesocialmediabible.com).

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For more information on me, Lon Safko, please visit my website at [www.lonsafko.com](http://www.lonsafko.com).

And Vint, again, from the bottom of my heart, thank you for taking this time today.

**VC:** You are very welcome.

**LS:** Bye for now. Take care.