



Chapter
11

e-Frontiers

*If you do not actively
participate in creating the
future you want, you have no
right to complain about the
future you get!*

■ *Rajeev Nanda*

What does the e-future look like? Is it scary, utopia or what? Will we all lose our privacy and will be tagged and tracked 24 hours a day? In some cases, the readers may be interested to know which technologies or companies to invest in: I wish somebody could say for certain. The approach I am going to take is similar to any other fortuneteller—make enough predictions that even if only some of them come true, I can stake a claim by just focussing on the ones that happen to be true! Jokes aside, it is not that difficult to predict which way the Internet is heading and how it will impact our lives. The fundamentals are already there and all we need to focus on is which trends are likely to survive and where we would draw the line, in terms of intrusion of privacy or being connected.

In the near term, peer-to-peer technology is going to *explode* and will be touted by everyone as being *the killer* technology for Internet after e-mail. Again, everyone will be in the awe phase for this technology as they grasp the true power behind it and will very soon move into the second phase of fear and frustration. This will happen as soon as everyone realizes that now, their PC's hard disk is completely susceptible to cyber attacks and the industry realizes that they have lost

complete control over intellectual property. Media will report cases of privacy loss and how the consumers can 'protect' themselves and all this while people around the globe will be merrily exchanging digitized information!

Irrespective of what happens in the near term, peer-to-peer will evolve to become *one* of the killer applications for the Internet and may even make e-mail obsolete. Looking back from the future, current e-commerce models and applications will look like school projects and the e-universe will become completely transparent. Let's peek into the future and see what net may be cast. For avoiding brain explosion and damage, I will just focus on Internet technologies and not divert into biotechnology and other advancements that will complement the Internet and bring in really mind-boggling changes.

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It's 6 a.m. and the radio next to your bed is giving you a wake-up call. It's not an ordinary radio from today's standards, it has a broadband connection to the Internet and can tune into millions of stations around the world. The sound that is waking you up today is not a music station or a buzzer but the sound of your brother, thousands of miles away, as you had requested him to wake you up so that you can together call your parents on their anniversary. While you are in the process of waking up, the house wakes up too, as lights of your bedroom and bathroom are automatically turned up. While you are brushing your teeth and freshening up, you are also having conversation with your brother *via the radio*.

As you step into your living room, the radio hands over control to the video panel in your living room and automatically switches it on, without any break your conversation. Now you can see your brother on the screen and you place a call to your parents, who accept the call by switching on their TV. After the greetings, you get into other conversations and notice that there's a party going on in your parent's house. You can see your cousins and other relatives in the background and they stop by to exchange hellos and find out how you are doing. Your parents inform you that they are planning to visit you during the New Year. You invite your brother to come over so that you can plan a family re-union and also mention that you'll let your sister know about it. She could not attend the call because of the local time in her place would be past mid-night. You end the call by tentatively confirming the plans and sign-off.

Meanwhile, many things have happened in the background so far. Your house has automatically switched from night-security to perimeter security. Your security service provider has been notified accordingly, which operates around the globe and switches the watch from one-time zone to another so that someone is always watching your home while it is in high-security modes. When you were making plans with your family, your calendar, along with your brother and parents', got updated to show a tentative plan. A message was sent to your sister with a summary of the call and a preview of video clips along with the plan on her calendar. A bid was sent out to various airlines for the scheduled dates and tentative reservations were made on your family members' behalf.

You pick up your newspaper, which has been published *only* for you. The front-page shows your name and address and the entire layout of the paper is as you had personalized

with your 'Information Service Provider'. Even the news stories are on the subject and region of the world you are interested in. The stories are in continuation because you have specified in your personalized settings that you do not like flipping pages between the news stories. The front-page is divided into various sections and gives you a dashboard view of today's paper with sections like the 'Latest News', 'Follow-Up News', 'Today's Summary', 'Events and Reminders' and 'Family News' among others. The front-page only contains summaries with page numbers where details of that section can be found. The 'latest news' section contains all the new news items from around the world on topics of your interest, e.g. political news from US, Japan, UK; archaeology from Egypt, entertainment from Hollywood and Bombay; semiconductor news from China and Taiwan, etc. The 'Follow-Up' news section contains the updates on news that you have tagged to be followed, e.g. the semiconductor manufacturing industry news item from three days ago that mentioned some labour crisis in China. Today's summary provides an update on what is planned for discussion in the congress today in the countries that you follow. The 'Events and Reminders' show you your today's appointments and reminders on upcoming events that you should act upon, e.g. a week ago this section reminded you of your parents' anniversary and today it has a reminder from your sister to make sure you call your parents. The 'Family News' section shows photographs from your parents' anniversary party in-progress halfway around the globe and shows the summarized list of guests. Another section may contain financial news that shows how *your* portfolio is doing and other financial data.

You pour yourself coffee (oh! Did I forget to mention that the coffee pot started the brewing when it got a message from

your alarm-clock/radio that you are awake) and sit down with the newspaper. The 'newspaper' you are holding is not made of paper but of a paper-thin LCD panel that has a touch and feel of the paper. A paperboy does not deliver the newspaper to your house, rather, you buy the 'hardware' from any shop and then subscribe to an Information Service provider. Or it is provided, for free, by your Information Service provider and is automatically kept up-to-date using a wireless web, so no matter when you read it, you get the latest news. It's now about 6:45 a.m. and your family is now waking up. Your spouse and kids come into the living room and call up your parents to wish them a happy anniversary. The party is almost over and you can see your aunt helping to clean-up in the background. You chime in for a couple of minutes and then proceed towards your *home office*.

In the background, your 'home office' has been informed that you are now awake and may step into your office any time soon. The 'office' has started collecting and synchronizing your meeting schedule and information related to meetings or discussions. The messages and information have been sorted out and categorized based on projects, just the way you had specified. Your cell-phone, which also is your PDA, has been synchronized and reminders have been set.

The panel on the wall shows your updated calendar for today and messages for you. Because you had set filters to block work-related messages while 'at home', these messages were delivered to your 'office'. The first meeting you have is with your customers in Japan, and that will include your team from India and the US for discussions. There are no alerts for the meeting so you assume everything is as planned and the data you have is the most current. You initiate the meeting by

inviting your teams and have a brief discussion on the topics that you want to cover with the customers and then invite the customers into the meeting.

Even though you are dressed in your pyjamas and have not yet showered, the image on the screen is your 'official' persona. This persona is automatically activated as soon as you enter the 'office' and represents you in meetings. The persona keeps the lips and gestures in sync based on what you are saying and automatically filters background noises, view and any questionable words that you happen to say. The other thing to notice is that even though you are speaking in the language of your choice, the customers are hearing everything in their local language and so are your teams. In effect, the customers are hearing and speaking Japanese, the team in US is hearing and responding in English and the team in India is using Hindi for conversation. The real-time translation services and 'persona' services come to you courtesy of your corporate IT services.

When the meeting is over, a summary of the meeting notes is sent to the relevant people and the actions required are automatically sent to everyone's task scheduler, while a complete log of the meeting is archived in the corporate network. The next meeting you have is a face-to-face meeting at the office, so you go back into the house to get ready and see that your family is on the table having breakfast and are ready to leave. After some casual conversation, you step into the bathroom to shower and get ready for the trip to office. While you are having breakfast, the panel on the wall informs you that your boss wants to talk to you and automatically routes the call from the office to the living room and gives you a 5 seconds' delay to prepare for the call. Your boss had already seen the summary of the meeting and had couple of questions for clarification.

As you stepped out of the home office, the office was set in 'away' mode and your phone accepted incoming calls and informed the caller that you were away. While you were in the shower, your family left the house and the house switched to 'secure' mode. It switched back to perimeter secure mode when you stepped out of the bathroom.

You pick up your cell-phone and leave for office. When you close the door behind you, the house automatically switches to 'full-security' mode. You open the car door, and start driving towards the office and switch on the radio for some music.

As soon as you touch your car door's handle, you are authenticated by the 'security provider' to unlock the door. Your home office phone screens and routes calls to your car, which will automatically 'pause' the radio if you choose to accept it. The house has now switched back to high-security mode and the security provider is notified.

Your car radio does not just tune to independent broadcasters on the AM and FM bands, but also has an Internet connection for streaming feeds of your liking. Your 'Content Provider' takes voice commands to play you the music you want or any other event that you would like to listen to. You can also request an update to the news stories that you read in the morning or an update on your stock portfolio. The content provider knows your collection and will automatically play new music from the artists you have in collection or similar in *genre*. If you like a song being played, you can request the content provider to add it to your collection, again using voice commands. You can also request the content provider to send the song to your sister as she enjoys similar music. Of course, the sampling will be free of charge and she can buy it for her collection if she likes it.

When you reach your office you head to the meeting room and your phone automatically switches to meeting mode. The callers will be informed that you are in meeting and the filters will only allow emergency calls to go through. As the phone also has your calendar, the caller (only if authorized) can choose to listen to your schedule for today and know what time you'll be available.

As you go through the day, everything around you shifts and changes based on what you are doing, where you are and what you may be doing next. The various service providers that you have signed up with, will anticipate your needs at every step and will work seamlessly, transparently, to provide you with products and other services that may interest you.

When you reach back home the door automatically gets unlocked because the house 'recognizes' you and there is no need of carrying any keys. You notice that the family is already gathered around the TV in the living room and you also join them. They have been watching the 'family channel' where your parents' anniversary party is being replayed. During the show you are being offered to buy the rights to this broadcast and are being reminded that it will only be available for free for the next one week. After watching the party, you switch to the 'news channel' and the reporter starts updating you on the news stories you have been following.

After dinner, you all go back to the TV and switch to the family channel to find out who, from your family and friends, is available. Your daughter invites your cousin to a game of chess and while you are in the game, other family members join in to watch your game from all around the world. As bedtime draws near, you bid goodnight to everyone and switch off the TV.

Later, when everyone goes to bed, the house switches back to high-security mode and the lights are automatically shut-off with appropriate night lighting left on.

All These Providers

Currently, you subscribe to or pay for many different service providers, e.g. newspapers and magazines for information, banks and other financial institutes for financial services, cable services for entertainment, etc. The onus is on you to sort out the items of interest and ignore the rest by flipping pages. Even though you bought a car a few months ago and are not planning to buy another for at least a couple of years, you receive pages after pages of classified advertisements. On the other hand, you are thinking of buying some new furniture, but you don't find much advertisements or names of businesses that deal in the type of furniture you want. Primarily, the businesses advertise based on statistics and generalizations. If the statistics show that people tend to buy or replace furniture during Christmas holidays, that's when you will see the advertisements for furniture and good discounts too. This, in fact, becomes a self-fulfilling prophecy because people tend to put off buying something to a period when they know they will get good prices and good selection.

With the Internet and supporting technologies like personalization, the services and products can be fine-tuned to *your* needs and requirements. If some provider in your neighbourhood does not do it, then someone else, maybe halfway across the world, will do it. Over time, specialized service providers will emerge to meet your needs and fulfill your needs by procuring things you need from around the world. In fact, not just material things but even services like

security, information, entertainment etc. will be provided that is fully personalized for you.

Information Providers

Do you read the entire newspaper every day? Do you read all the articles in all of the magazines you subscribe? What about books? If you consider the amount of information being thrown at us every day, it is astounding how we can keep up. On the other hand, the human mind has a built-in feature of sorting things that are automatically sorted, compressed and stored appropriately. But there is a limit to how much information can be absorbed by our brains without impacting other functions. As one of my friends once said: “*let me depress you further*—this information overload is going to increase manyfolds in the coming years!”

With the increase in information and its sources, the quality and reliability of any information will be questioned, as faking a news item will not require any special skills or communication channels, just a good web design tool and posting to a website or news group will do. This, in turn, will put more pressure on reputed information providers like CNN, ABC News, CNBC, BBC, WSJ etc. to validate a news or report before ‘accepting’ it for publication. Similar to product brands, information brands will need to be developed stronger and will vie for your business in a more granular way than what is done today.

Today, many personalized portals like myYahoo! provide limited capabilities to aggregate information from multiple sources into one view, but still lack the full capability of

delivering the same news in a printed form or a more portable format that can be folded, kept in the pocket or read in places that are 30,000 feet above the ground. The information providers of tomorrow will let us subscribe to information in a more targeted way, e.g. you should be able to get the editorials from *Wall Street Journal*, *New York Times*, world news on politics from the *BBC*, financial news from *Bloombergs* and *WSJ*, stock updates from *CNBC* and regional news from *CNN*. To top it all, we will be able to get the information every day in paper, electronic and any other form we choose. The capability to tag any news item for follow-up, save for collection or buy rights for distribution and duplication will be included and seamlessly integrated with your 'storage provider'. The current limitation of channel selection based on the partnerships of the information aggregator will be done away with, and information or content syndication will be completely de-linked from information or content distribution.

Content syndication will also become granular and independent. This will enable services like allowing your mother or any other family member to provide you with daily news from your hometown, no matter where on earth it belongs! Imagine reading or listening to news from *your* friends and family about what is happening in their neck of the woods along with their 'expert commentary', that you may have missed earlier. If you are a software developer in Silicon Valley and your family is back in India, currently the only options you have are telephone or e-mail (provided your family has a PC and net access) to keep in touch. What if your friend could affiliate with your Information provider to keep you in touch with what all is happening in that part of the world. He can 'interview' your father or 'political-savvy' uncle to comment

on the latest developments and send them to you, as they happen!

The same concept can be extended to any information or content syndication, the main task of the Information aggregator would be to authenticate and filter the information based on your preferences. Another interesting fact to notice is that the aggregators and providers may be spread around the world and will not be limited to any specific geography.

Security Providers

What are our options in regard to security? For home security, we can rely on the police, a security agency that will wire our houses for intrusion alarm system and also provide monitoring services, or hire a security guard. For personal security, we can again rely on the police, hire a security guard or carry some type of deterrent like pepper spray or a cell-phone that can be used for calling help if needed. The geographic regions and agencies that operate within that region, limit the choices for all these services.

What if you could ask your mom or brother or sister to keep an eye on your home while you are away? What if you had a choice of getting all your security needs taken care of by an agency that operates half-way around the globe? These choices will explode in the future as second or third generation of Internet technologies get developed. Using webcams and biometrics authentication, in combination with broadband wireless connections, you can be protected from anywhere around the world and the 'security watch' can shift from time-zone to time-zone to make sure live people are present to

handle any emergency. Suddenly, the neighbourhood watch programs will take a totally new dimension! Even if you don't want to hire an agency for security, you will be able to subscribe to a free-for-all service on the web, where you can ask you mom to 'keep an eye' on your house while you are on vacation—no matter that she lives thousands of miles away.

Using similar technologies, your car can be smart enough to know when to shout for help and how to reach you if someone is trying to steal it or tow it away. The scream for help may not be audible, as it can be a message sent to your cell-phone and another to the nearest police station along with a snapshot of the person trying to break-in.

With a combination of GPS (Global Positioning System) and wireless web, you will soon have a function in your cell-phone which will actually become a misnomer, as it will be a lot more than just a cell-phone, where you can switch to 'track-me' or 'high-security' mode. Switching to this mode will automatically alert your family member(s) and security provider that you want to be kept track of. This type of feature will come in handy when you go out for a hike into the woods and now seem to have lost your way. Consider a wireless tracking device that can alert you if it goes out of a specific range! Many parents would *love* to give this device to their teenagers before they go on a date.

This type of capability to provide security to yourself, your family, your assets and possessions will become easier and cheaper as the Internet becomes more widely available with robust wireless and encryption technologies.

Entertainment Providers

Similar to information and content, entertainment is today produced for mass consumption. It becomes your responsibility to track the program listing and timing and you better be there in person to enjoy the program. Time-shifting is possible using VCRs and with new gadgets like TiVo, but they still require you to set up a schedule and make sure you have the cassette in place before you can record. For movies and other programs that are available on video, they can be rented if your neighbourhood store carries them.

What if you had a selection of not just what program to watch but also when and how? The choices are not in hundreds but in millions? What if you could arrange the *sequence* of programs the way to want to watch them and categorize in channels that make sense to you? Similar to the concept I talk about under *information providers*, the concept of *entertainment providers* will emerge. This will enable you to subscribe to only one (if you wish to) provider and get all your entertainment through them. The provider will let you specify what topics interest you or, specifically, what content you wish to view from which syndication? So you may choose to see local news from *Fox*, world news from *BBC*, science news from *Discovery*, and put it all in a channel that you name 'World News'. Even movies and other TV shows can be categorized into various segments and you can select what to watch and when. You may even get to specify the actors or actresses you like and any new movie or event that includes them will automatically be added to your 'to be viewed' list.

As with the print media, even in entertainment space, content syndication will become independent and de-coupled from

the media agencies of today. With the Internet, you should be able to listen to the music collection of your brother, watch vacation movies of your sister and any party events at your parents' or other family members or friends. When someone gets married in your extended family and you are not able to make it, just ask him or her to broadcast the ceremony on your 'Family and Friends' channel!

All your entertainment needs come to you in one box and through one provider that let's you personalize the entire domain as per your liking. Things like audio or video on demand will become as freely available as e-mail is today. Your choice of content and entertainment will follow you no matter where you go, the same way your e-mail etc. follow you today no matter if you sign on to your ISP in the US or in India.

Other Providers

You are on vacation and are constantly shooting video using your digital camcorder and rather than the images being stored on a media inside the camera, the video is being transferred directly to your storage provider. Obviously, this is possible because of the wireless mega-bandwidth that is provided to you by your ISP. Your 'Family Network Services Provider' gets an alert that you are uploading your vacation video and one person is assigned to the project. She or he initiates a project for editing the footage and also selects and marks the frames that will be converted to prints. At the end of your vacation, the regional offices of your FNS provider are informed, that cut a DVD of the vacation package, print the frames and deliver it to your family members around the world. The same DVD or raw footage will be available to your family and friends on *their* 'Family and Friends' channel, which they can view for

free for a limited time and can choose to buy the rights to video for keeping in their collection.

Education, as we know today, will cease to exist. Worldwide universities and schools will become, you guessed it, 'Education Providers'! Elementary and middle schooling may not change to a large extent, as they would still serve as the foundation of higher education. High school onwards, you will be able to choose and subscribe to courses taught by any school around the world. So, you may get your (compressed) MBA from Harvard Business School or Berkley University and technology courses from MIT or whatever you choose. All of this will be delivered to the place of your choice rather than you travelling to far-off places to get the education. Other than changing the structure and delivery mechanism of education, even the course's length and content will change more frequently to meet industry requirements. Corporations will subscribe to these compressed courses to keep their employees up-to-date with changes in technology and industry.

Around the house, we already talked about the security, but what about 'home gallery provider'. What the heck is HGP, you may ask? Well, today we go to various shops, museums and buy prints or paintings that are framed and put up on the wall. We also enlarge our family pictures or assemble them as a collage and put them on a wall. The kids grow up, the seasons change but our 'home gallery' remains the same for many years because of the effort involved to replace the pictures. Once the plasma and LCD panels become cheap and similar new technologies are developed, we will just hang these 'panels' on the wall and our HG provider will provide the (digital) paintings, pictures and even videos that are streamed live over

the net. The panels will have built in wireless net connection using technologies like bluetooth making these panels 'live'. The paintings will automatically change with seasons, of course within your list of preferences, and may even show photographs of your kids, grandkids or any other family members or sibling that are fed directly by appropriate sources. You may have a panel that is designated 'sunsets' that continuously shows sunsets from around the world that is streamed over the Internet. Another panel may be tagged as 'grandkids' that will automatically update as soon as new photographs are clicked and are supplied to your storage provider.

My, Mine and Me

When everything you do or you want to get done resides in one or the other database, what happens to privacy? I would compare the privacy issues of today to the type of issues that are raised whenever a new technology or service is introduced. Would you want to live without a TV or refrigerator or telephone today? When cordless telephone was introduced, there were security and privacy concerns raised by many because you could tune to an FM frequency and listen to all cordless phone conversations of your neighbour. Soon, everyone realized that no one has the time to 'listen in' to your conversations and even if they did, the convenience factor of a cordless phone outweighs the loss in conversation privacy. But soon after that, companies added a 'secure' feature to their cordless phones to encrypt your conversation between the handset and the base, which mooted all issues. Similar issues were raised by many public well-wishers when credit-cards were introduced, because now the business could track your purchase habits, patterns and sell the data to other companies or use to

push products to you. Again, the public voted with their wallets because the convenience of carrying the plastic outweighed the loss in privacy.

Whenever I hear or read about issues related to loss of privacy because of the Internet, I am reminded of the song by Sting, '*Nothing bout me*' from his album *Ten Summoner's Tales*. As the environment changes, people adapt and as people adapt, the environment is forced to change again. The same issues and choices lie ahead for you and you can choose not to participate and be content with the results you get or participate partially and reap some benefits or charge full thrust ahead and get the full benefits of new technologies. The human mind is very capable of filtering out noise and with the increased number of brands and advertising, you will gain an amazing capability to ignore what does not interest you. Remember that the ultimate decision will still lie with you and unless you are stupid enough to authorize a merchant for automatic deduction from your checking account, you will still control where your money gets spent.

Ultimately, it will be *an individual choice* and decision to weigh the benefit of everything revolving around you and your preferences or the value of your information. I hope you would find a nice balance somewhere between the two extremes.

PC and the Privacy

So far, the examples I have used seem to position that in a net centric future, we will have to forgo our intimate details in order to enjoy any of the conveniences brought by the connected world! That is not true as the good old PC will come to our rescue. In fact, PC will not be a PC anymore, it will be

morphed into a more intelligent device that will be hidden in a basement or attic or wherever you wish to put it. The PC will become your gatekeeper and will provide a unique identification to many or all of the service providers that will be de-coupled from your actual identity. Intelligent e-commerce and personalization software will manage and filter information with minimal information being sent back to the providers.

Even though Intel faced a lot of flak when it introduced the processor serial number, I think a feature like that can provide the consumers the ultimate privacy and security. Consider, for example, that when you subscribe to all these various service providers you identify yourself with just the serial number and nothing more. So, all your information and content is provided to your PC and it is then distributed to various panels, gadgets or appliances around the house by wireless technology. Yes, it would require some of your time to setup all your preferences and personalization rules at the PC, but that would be a one-time task and if you value your privacy enough, it will be worth it. As more and more powerful PCs arrive, voice recognition and speech synthesis will bring more natural interaction between man and machine along with realistic game playing in a collaborative environment. Over time, Internet will become more of a distribution channel and PC the consolidator of all the information.

Depending upon your comfort with privacy issues you will be able to set filters and personalization at the source itself or at the PC. In the near future you will see both sides of the fence arguing about benefits and risks of making once choice over the other.

As the World Shrinks

The possibilities are astounding and limited only by one's imagination. Once everything becomes digital, we can shape it, bend it, morph it the way we want it. We can reproduce it multiple times without any loss in the quality of information and exchange it with family, friends and strangers around the world. The Internet has shrunk down the world to a manageable size. It has brought people together and made things possible that were unimaginable just a few years ago.

A close friend of mine got married and moved to a different part of the world. One day, I thought of locating my friend and it took me less than 10 minutes to get in touch with someone who gave me the e-mail address and the phone number of the friend I was looking for! Could this have been possible without the Internet? May be, but I would bet the time taken and the cost would have been prohibitive factors. With the Internet, however, my total cost of the entire transaction was ZERO! I tried locating other friends and colleagues who worked with me in HCL, India, and within a matter of one day, I was able to not only connect but also exchange e-mails with my friends. The punchline is that all of them had been residing within the 5-mile radius of my home and office for the last couple of years and I had never run into them even though we frequented the same malls and stores.

As the Internet grows in size, capacity and its reach, the world will become a small place indeed!

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