

Computer and Communications Future

Introduction

Change in Computers and Communications is happening at a breakneck pace. It is bewildering and overwhelming to follow and make a sense of that change because so many things are happening at the same time. It is easy to give up and be reactive about the change. But, there is a way to make a sense out of it and be proactive.

The key to understanding the change is to look for and find patterns. These patterns can be formulated into trends that predict the change over next two to ten years. Knowing the trends allow us to be proactive.

This book presents these trends in categories. These trends are a culmination of my research in Computers and Communications over last five years.

The Main Concept

The concept, "Cheap information always chases out expensive information" is the main concept behind many trends that follow. It is from the book "Futurewealth" by Francis McInerney and Sean White.

The Categories

- 1) Hardware
- 2) User Interface
- 3) Internet
- 4) Media
- 5) Wireless
- 6) Printing
- 7) Digital Camera
- 8) Software

I have taken the "Trend Report" outline discussed in the book "How to Write" by Jill Meyer and Herbert Meyer to discuss the rules.

1) Hardware

What the trend is

Plain phones will go away in favor of the phones that connect through Internet.

What is the approximate time frame

USA - 2010, India - 2020

Why the trend is taking place

Internet has been very successful. It has made any kind of data transfer, including phone conversations, very cheap. The traditional phone network was built for phone conversations only, Thus it can not have the economics of scale that Internet has.

How the trend is happening

Special hardware that allows one to connect a phone instrument to broadband Internet is now available. These hardware providers enjoy economics of scale of the Internet. They pass on their savings to their customers in form of unlimited long distance.

Where the trend is going

The trend is going towards more and more unlimited calling (A company called Lingo offers unlimited calling from USA to Western Europe). Long term, The trend is moving to unlimited calling from anywhere on earth to anywhere on earth for a subscription fee. This delay is because bandwidth is still costly in many developing countries.

What do I think of it all

A role reversal is happening. Initially plain Phone service brought Internet through modems. Now, broadband will bring phone service through its wired or wireless connection.

What the trend is

Special purpose electronic appliances (TV, Radio, Audio Players, Audio-Video Players, PDA, Simple Phones, Cameras) will give way to general purpose electronic appliances. (Computer, Mobile)

What is the approximate time frame

USA - 2010, India - 2020

Why the trend is taking place

With software, general purpose appliances can do many things more efficiently and cheaply than special purpose electronic appliances. As an example it is cheaper to convert a PC to a digital TV than buying a digital TV. (A company called ATI sells such a card).

How the trend is happening

PCs are becoming media centers. Mobiles play audio and have cameras.

Where the trend is going

The trend is going towards two general purpose devices, PC and Mobiles.

What do I think of it all

PCs and Mobiles will play all media.

What the trend is

Sometimes, analog special purpose electronic appliances give way to digital special purpose electronic appliances rather than general purpose. These special purpose appliances enjoy a short period of success. After that period, they eventually give way to general purpose appliances.

What is the approximate time frame

USA - 2012, India - 2020

Why the trend is taking place

People want digital electronic appliances but they still want to cling to their old habits till they adapt to the new way of general purpose electronic appliances.

How the trend is happening

Analog mobile -> Digital mobile

Analog camera -> Digital camera -> Mobile with internal camera

Portable cassette player -> Portable audio player -> Mobile with internal audio player

Analog video camera -> Digital video camera -> Mobile with internal video camera

Radio/TV -> Digital Radio/TV -> PC/Mobile internal tuner

Plastic records -> CD -> PC downloaded audio

VHS -> DVD -> PC downloaded video

Phone -> Broadband Phone -> PC internal phone

The tuner is giving way to Internet based Radio/TV in time.

Where the trend is going

The trend is definitely towards general purpose electronic appliances. One should not be fooled by short period success of special purpose electronic appliances.

What do I think of it all

This is a very tricky part of the trend and difficult to uncover and predict.

What the trend is

PCs will be in all of homes. Rich homes will have PCs and/or Game Consoles and high definition displays in every room.

What is the approximate time frame

USA - 2012 (95%), India - 2020 (50%)

Why the trend is taking place

Postal mail has given way to Email. Web access for shopping and getting information about products is catching on. PC also has become a powerful entertainment appliance.

How the trend is happening

More and more low income households are buying PCs.

Where the trend is going

More rich homes in USA have more than one PC. Rich homes in developing countries are buying PCs. Maximum PC buying growth will be in China, India and Asia because of their huge middle class.

What do I think of it all

Somebody has said that computers are extensions to our brain. Information is becoming cheaper by the day.

What the trend is

All adults and children above five will carry Origamis (developed countries)/mobiles (developing countries).

What is the approximate time frame

USA - 2012 (95%), India - 2020 (50%)

Why the trend is taking place

Being in touch with anyone from anywhere is a convenience people will like to have. Low cost Origami/mobiles are enabling this trend.

How the trend is happening

Many people are buying mobiles; even in poor countries. Some people are depending only on mobiles. They are giving away their land lines.

Where the trend is going

Star-Trek like universal communication is not that far fetched.

What do I think of it all

People with more needs in photography may carry a high resolution digital camera.

The equation is; one home one PC and one person one Origami/mobile.

There will be more Origamis/mobiles than PCs. But PCs will survive. PCs and Origamis/Mobiles will work together. Origamis/Mobiles will not have as much power and capacity as PCs.

Cheap PCs are not an answer for developing countries. Because they will not be that cheap. Developing countries will get their computer needs through wireless and mobiles.

What the trend is

All mobiles will have hard disks.

What is the approximate time frame

USA - 2012 (95%), India - 2020 (50%)

Why the trend is taking place

When there is a need to store more information, hard disk comes into picture. This is because it stores more and costs less.

How the trend is happening

Audio players have hit 60 billion bytes. Samsung has already introduced a mobile with hard disk. What will fill these hard disks? Music, Podcasts, Audio Books and (sometime later) videos of all forms.

Where the trend is going

There are two trends. More capacity. Less size.

What do I think of it all

All PCs do have hard disks. Would that have been a plausible prediction in 1980? This prediction has gone slower than I expected. This may be because of the power requirement of the hard disk. Yes, Samsung and Microsoft have a right idea with hybrid (disks with flash cache) hard disk which caches the data and spins the disk down when not wanted. Yes, this is very important for micro hard disks.

The ideal is to synchronize the document folder in PCs with mobiles.

What the trend is

x86 and ARM will be the only two Instruction Set Architectures.

What is the approximate time frame

USA, India - 2010

Why the trend is taking place

Hardware and software momentum builds around a popular Instruction Set Architecture and it becomes such a powerful force that even the companies that gave birth to those architectures can not replace it.

How the trend is happening

PCs are x86. Most mobiles are ARM. On the server side x86 is replacing other architectures.

Where the trend is going

Full standardization.

What I do think of it all

This is my personal view. But I think it is better to be warned and paranoid early.

What the trend is

Long term, ARM will be the only Instruction Set Architecture.

What is the approximate time frame

USA, India – 2015

Why the trend is taking place

Hardware and software momentum builds around a popular Instruction Set Architecture and it becomes such a powerful force that even the companies that gave birth to those architectures can not replace it. In absence of differential pricing (Eastern Economic Edition in books) for x86 architecture, ARM will gain advantage in developing countries through mobile based computers and the ecosystem built around ARM will finally will be bigger and overtake x86 based ecosystem.

How the trend is happening

Most mobiles are ARM.

Where the trend is going

Full standardization. In most developing countries mobile numbers have surpassed PC numbers. In time, mobile revenue will surpass PC revenue.

What I do think of it all

This is my personal view. But I think it is better to be warned and paranoid early. Differential pricing is not only desirable for developing countries but also makes good business sense for Intel and AMD. I have changed the years on previous and this on purpose. I feel that I may be right on the dot (usual caveats apply). Again, I think it is better to be warned and paranoid early.

What the trend is

(x86) The width of data that computers process will increase from 32 bits now to 64 bits.

What is the approximate time frame

Full Switchover - USA - 2008, India - 2011

Processor Switchover - USA - 2006, India - 2008

Why the trend is taking place

64 bit computers give more performance and can use more memory.

How the trend is happening

AMD has gone full 64-bit Opteron and Athlon 64 and other chips. Intel has Xeon 64 and Pentium 64.

Where the trend is going

Memory may remain to 64 bits. With time, data width may go to 128 bits or even to 256 bits. This has already happened with graphics processors.

What do I think of it all

More performance can come by increasing data width rather than just pushing speed.

What the trend is

All desktop PCs will be media PCs and will go in homes.

What is the approximate time frame

USA - 2012, India - 2015

Why the trend is taking place

There is not a single reason behind this trend. Desktop+LCD costs almost near to Notebooks. Hence, enterprises will not buy desktops. So most of the desktops will move to homes.

How the trend is happening

Media PCs are selling in increasing numbers. One of the major functions of PCs at home is entertainment.

Where the trend is going

Bigger displays, bigger hard disks and more memory

What do I think of it all

PCs should be classified into categories that show its use, There are two categories, entertainment and productivity.

Comfort with all aspects of Cable is a major bottleneck in adaption of media PCs.

What the trend is

All productivity PCs will be Notebooks and eventually Origamis.

What is the approximate time frame

USA - 2010, India - 2015

Why the trend is taking place

There is not a single reason behind this trend. Desktop plus flat panel costs almost near to Notebooks. Hence, businesses will not buy desktops. Even the most sticky of office workers moves around in the office. Wireless networks in businesses offer greater flexibility with notebooks. The importance attached to higher speed available in desktops is also falling.

How the trend is happening

Notebooks sales are bigger and bigger percentage of PC sales to businesses and work at home people.

Where the trend is going

An all notebook office.

What do I think of it all

Notebooks will take time to catch up in developing countries. This is because price is important than any other factor in developing countries.

A significant number of homes will have at least two PCs.

One media desktop and one productivity Origami thus computer population thus will surpass 100%.

What the trend is

All notebooks will be Origamis.

What is the approximate time frame

USA - 2012, India - 2020

Why the trend is taking place

Handwriting is a more natural way to input. It allows text input (keyboard), pointing (mouse) and drawing (currently difficult).

How the trend is happening

Origamis are selling in increasing numbers. Some forward looking businesses and schools have standardized on them.

Where the trend is going

Origamis will replace paper books and documents.

What do I think of it all

The move will be very slow and very gradual.

Origami is a natural notebook for Asian countries. For many Asian languages keyboard is unnatural and/or tedious.

Origami in Education: In the US, between 2010-2020 (Give or take a few years) Origamis will go from all Post-Graduate -> Graduate -> Higher Secondary -> Secondary -> Primary students. Only tiny tots will not have a Origami.

When that generation reaches adulthood, paper will become irrelevant. These Origamis will use 4G and/or WiMax mobile. As for kids, kids really love Paint on Windows XP. Just think what Ink Art will do to them on Origamis.

Why is it not happening now? Because eBooks have not reached a critical mass. Origami and eBooks form a symbiotic relationship (virtuous circle) that will help them both.

What the trend is

All Origamis will have a scanner wand (wired or wireless) to scan paper and a camera built in for scanning white boards, billboards and the like.

What is the approximate time frame

USA, India - 2010

Why the trend is taking place

Origami is an eventual paper and a white board replacer (OneNote shared sessions) but in the meantime it needs these for input.

How the trend is happening

People who want to replace paper are asking for these.

Where the trend is going

To eventual replacement of paper and white boards.

What do I think of it all

I got inspiration for this trend from the "Paperless Challenge" experiment by Eric Mack and Tracy Hooten.

What the trend is

All Origamis will have a noise canceling microphone system.

What is the approximate time frame

USA, India - 2012

Why the trend is taking place

Speech is a more natural way to input than keyboard, more so for non-English speaking market.

How the trend is happening

Speech input has been there for quite some time, for Chinese it has been demonstrated that it is faster than a keyboard. The same may be true for Indian languages.

Where the trend is going

Handwriting recognition and speech input are the new wave input methods. They both are complementary and will coexist.

What do I think of it all

New processors with their computing prowess and low power requirements are transforming computing and making it very easy to use.

2) User Interface

What the trend is

Black and white displays will give way to color displays.

What is the approximate time frame

USA - 2008, India - 2012

Why the trend is taking place

Ease of use. Color is easier on eyes. It increases the effective resolution.

How the trend is happening

For computer monitors it has already happened. For mobiles it is happening.

Where the trend is going

Number of colors available have gone from 256 colors to 65 thousand colors now. it will soon go to 16 million colors.

What do I think of it all

Obvious.

What the trend is

Computer displays will have more and more dots row wise and column wise. (up to a limit)

What is the approximate time frame

(1024x768) USA - 2006, India - 2008

Why the trend is taking place

Ease of use. People want more dots on the display to work with. Applications are becoming more complex and demand more real estate on the screen.

How the trend is happening

We have moved from 640 dots row wise and 480 dots column wise to 800 dots row wise and 600 dots column wise. The second move to 1024 dots row wise and 768 dots column wise is also happening.

Where the trend is going

Even higher number of dots (Eye limit has not been reached yet)

What do I think of it all

This is a need as we want to see more on display screens.

What the trend is

For desktops, we are moving to larger screen sizes. (up to a limit)

What is the approximate time frame

(17 inch) USA - 2006, India - 2008

Why the trend is taking place.

Ease of use. People want more screen space to work with. We also need bigger screens for more dot.

How the trend is happening

Initially 14 inch monitors were standard. Then 15 inch. Now 17 inch monitors are standard.

Where the trend is going

Even bigger monitors (eye limit has not been reached yet)

What do I think of it all

The limit will be determined by eye, price and how easy they are to manufacture.

What the trend is

All mice will have scroll wheels.

What is the approximate time frame

USA - 2006, India - 2008

Why the trend is taking place

Ease of use. It is so easy to use scroll wheel rather than scroll bars.

How the trend is happening

Almost all new mice have scroll wheels.

Where the trend is going

Support for horizontal scrolling also.

What do I think of it all

I want to use horizontal scroll wheel mouse to find out how convenient it is.

What the trend is

All mice will be optical.

What is the approximate time frame

USA - 2006, India - 2008

Why the trend is taking place

Ease of use. They are also more reliable. No need to remove and clean the ball. No need of mouse pad. They are also lighter in weight.

How the trend is happening

Almost all new premium mice are optical.

Where the trend is going

Any surface (laser).

What do I think of it all

An analogy, it is just like going from a mechanical watch to a quartz watch.

What the trend is

(longer term than above) Almost all mice will be laser optical.

What is the approximate time frame

USA - 2010, India - 2015

Why the trend is taking place

All the advantages of optical mice plus more. PCs now have become 'put them anywhere' machines. So the mice should be "work on any surface". Light Emitting Diode optical mice do not work on transparent surfaces.

How the trend is happening

Logitech has introduced one. Microsoft may follow.

Where the trend is going

They are the highest in ease of use. They work anywhere.

What do I think of it all

As an analogy, it is just like going from a quartz watch to an atomic clock watch.

What the trend is

For desktops, thin displays will replace TV like monitors.

What is the approximate time frame

USA - 2006, India - 2008

Why the trend is taking place

Ease of use. TV like monitors are bulky.

How the trend is happening

Move towards thin displays is happening at a steady pace.

Where the trend is going

More flexibility in displays.

What do I think of it all

This was long overdue.

What the trend is

For desktops, all thin displays will rotate to vertical mode.

What is the approximate time frame

USA - 2008, India - 2010

Why the trend is taking place

Ease of use. Vertical mode is needed to see a full page in an application like Word. TV like monitor bulk prevented rotation.

How the trend is happening

More and more thin display manufacturers are offering this option.

Where the trend is going

Auto switch to proper mode in software.

What do I think of it all

Vertical mode is useful for reading eBooks, eDocuments and eNewspapers.

What the trend is

When processing power is not adequate, less intuitive but workable approaches can be devised, will be adapted and may remain in mainstream for a long time. But once the processing power catches up, the movement to more intuitive approaches will be swift.

What is the appropriate time frame

Depends on the approach.

Why the trend is taking place

Processing power increases and that allows more intuitive approaches to come to focus.

How the trend is happening

Reverse polish notation calculators (HP 35 and others) came, were adapted but disappeared when infix (normal with parentheses) calculators came. Graphical User Interface replaced Command Line Interface. Graffiti on Palm came, succeeded, but is on the way to give way to normal handwriting.

Where the trend is going

Keyboards -> Handwriting

Reverse Polish -> XML

PostScript -> XAML

What do I think of it all

There may be many examples of this phenomenon.

What the trend is

Speech recognition will find its killer application in mobiles for localized languages. (Initially China and India).

What is the approximate time frame

China:- 2011, India:- 2013.

Why the trend is taking place

PCs are too expensive and English centric for most of India and China population. Initially these mobiles will have speech input and screen output. Later it will also have speech output. Keyboards, number pad localized input and SMS are too English centric for most of India and China population.

How the trend is happening

Mobiles are taking computing momentum away from PCs. Microsoft has demonstrated that speech input in Chinese is faster than keyboard input. In India, Keyboard input for localized languages is difficult.

Where the trend is going

PCs for Home and more sophisticated users; but mobiles for all because of price and localized language. (Initially India and China)

What do I think of it all

To all hardware and software makers (Especially Microsoft), MOBILES ARE TAKING COMPUTING MOMENTUM AWAY FROM PCs. YOU HAVE TO BE IN MOBILE SPACE.

Handwriting recognition will have a place specially in Origamis, but as screens get smaller and smaller its role declines gradually.

What the trend is

All productivity desktops and docking stations will have three monitors

What is the approximate time frame

USA 2015 India 2020

Why the trend is taking place

Email on the first monitor, Work application on the center monitor and Web or other reading material on the third monitor makes a lot of sense. This combination will lead to a very high level of productivity. People who have Outlook as work application may work with two monitors

How the trend is happening

Forward looking executives are putting in and working with this three monitor setup

Where the trend is going

Better Operating System support for multiple monitors (after Vista)

What do I think of it all

It seems a little far-fetched but will happen. One of the reasons multiple monitors were not happening was CRTs (just think of bulk of three CRTs) but with the new, light flat panel monitors this is now possible.

3) Internet

What the trend is

Internet will reach all homes and all mobiles.

What is the approximate time frame

USA - 2010 (95%), India - 2020 (50%)

Why the trend is taking place

Communication (Email, Instant Messaging), Information (Web, Internet Media) and Entertainment (Internet Media) will make this happen. These will become so important that people remaining due to poverty and lack of interest also will finally get Internet.

How the trend is happening

In the USA, getting Internet is increasing at a steadily.

Where the trend is going

In the USA, having broadband will reach 100%. Video (all forms) and Game Consoles are drivers for broadband.

What do I think of it all

Internet will become like electricity or water.

What the trend is

Internet browsers will translate almost all world's languages to the user's native language while accessing the web. Initially the translations will be of draft quality.

What is the approximate time frame

USA - 2010, India - 2015 (draft quality)

Why the trend is taking place

Globalization is leading to lot of commerce that will be enabled by Internet browser.

How the trend is happening

AltaVista search engine is already translating world's major languages present on the web.

Where the trend is going

Web Translation -> Speech Translation (very long term)

What do I think of it all

On the web, initially, high quality translation is not a big requirement. Most of the time a user wants to have an idea of what is on a page.

What the trend is

In addition to standard times, Internet time will come into being

What is the approximate time frame

World – 2020?

Why the trend is taking place

There is a need for a single time to say when events on Internet happen (News, Webcasts) which is not GMT. Current time presentation is confusing for a lot of people and daylight saving times just add to confusion

How the trend is happening

In the Internet bubble era there was a start to this by dividing a day into 1000 units. And the time was same globally. At least one mobile phone supported this time. Bubble era concepts were right but just too much ahead of their time.

What do I think of it all

Do not underestimate the power of Internet. I am so confused by so many news and webcast times Both types of time will co-exist. One day Windows will display both times.

4) Media

What do I mean by media? Following are the media with increasing need of processor power, bandwidth and memory (both RAM and Hard Disk)

Email

World Wide Web, Newspapers and Magazines

Still Pictures

Audio and Radio

Video, TV and Films

Virtual Reality

What the trend is

Analog media will give way to digital media.

What is the approximate time frame

USA - 2010, India - 2015

Why the trend is taking place

Because digital media is more convenient and cheaper to work with, manage and transfer. Also it usually offers better quality.

How the trend is happening

In mobiles, digital mobiles have replaced analog mobiles. In audio, first generation (CD) has happened and second generation (MP3) is happening now. In video, first generation is happening (DV).

Where the trend is going

Towards personal and digital virtual reality.

What do I think of it all

Digital media is a nice gift from us to ourselves from Information Revolution. PhotoSynth is one example of what digital media can do for us. As more and more media gets digitized, more and more new approaches and application will come forth.

What the trend is

Mechanical media like CDs and DVDs will give way to downloaded media.

What is the approximate time frame

USA - 2015, India - 2020

Why the trend is taking place

Downloading is more convenient and cheaper than transporting mechanical media.

How the trend is happening

Downloading songs have been very successful. Legal downloads are also increasing.

Where the trend is going

CDs will go away. Even DVDs will go away.

What do I think of it all

Will surely happen.

Sub Trend

There is a definite time and perception lag between the adaption of first media trend (Analog) and the second media trend (Mechanical),

One of the consequence of this phenomenon is the emergence of high density portable DIGITAL storage, the flash memory media card. It is the digital version of the cassette or film. In fact, I have seen them being used as 'digital film'. Shoot till it gets filled up, store it and use another for new shoots. The person being unaware or not wanting that the photos can be loaded on the computer and the card can be erased and reused.

All this while it was obvious to me and it still is that all mobiles (in a general sense; cameras, PDAs etc included) will have hard disks. But I was perplexed by it not happening soon enough and instead flash memory media card happening. Flash memory media card is happening because of the four technologies that are needed for the second trend, only one is there in its full force.

I am talking about Wired Personal Area Network (USB 2, FireWire), Wireless PAN (Wireless USB), Wired Broadband (Still happening) and Wireless Broadband (Still happening),

Portable media cards are a stop gap. When the above technologies happen, they will go away (but very slowly). The reason for them going away is the above technologies and cost and storage density. Personal Area Networking and Broadband and perpendicular recording on hard disks will see to that. Just remember, floppies on PCs came first and they gave way to hard disks. And CDs are giving way to hard disks.

Some things may be predicted by this sub trend. It may happen that we get libraries of eBooks on Flash Memory media cards along with the downloads.

Hard Disks in mobiles 2007 (Most Optimistic) – 2009 (Most Pessimistic). (No Coincidence with Internet Media, These are the dates I am most comfortable with. I have thought through both independently)

What the trend is

Internet media ('Conversational' media'.) will replace broadcast media.

What is the approximate time frame

USA – 2007 (Most Optimistic, YouTube and MySpace) – 2009 (Most Pessimistic), India – 2008 (Most Optimistic) – 2012 (Most Pessimistic). These are the dates I am most comfortable with. Intuition :- watch this Christmas, something significant for this space will happen, I do not know what but something significant for this space (people sending video Christmas greetings?).

Why the trend is taking place

The problem with broadcast media is limited choice and inferior quality.

How the trend is happening

Traditional radio stations are putting their content on Internet. Companies like Microsoft, Yahoo and AOL have introduced or are introducing blog, podcast and videocast solutions.

Where the trend is going

Listening and seeing what you want, wherever you want.

What do I think of it all

I was inspired by the quote "Markets are conversations' from the book "The Cluetrain Manifesto" by Christopher Locke, Rick Levine, Doc Searls and David Weinberger. I have not read the book.

Blogs, podcasts and videocasts and their improvements are digital, are not mechanical media and are 'conversational'. In time (after a long time) they will replace printed media, radio and TV. It may sound ridiculous now but it will happen. I did not remember consciously that I have written this and again arrived at same conclusion while talking to a relative about blogs. Blogs are somewhat there but are hampered by search technology for blogs needing time to grow mature.

Remember, these things will not happen overnight. Change takes time. I was perplexed by slow uptake of Satellite and Internet radio until I realized that a much deeper revolution is going on. There are or will be issues with music and advertisements in podcasts and videocasts and these need to be resolved before they start to take hold.

DJs will generate music podcasts that we will consume during commuting. Some people may like talk podcasts rather than music podcasts. Where will we get traffic and weather information while commuting? From Internet, of course. These will come from Wireless Wimax Mobile or 3G or 3.5G.

What will be broadcast? Live Sports, Live News and Live Politics. TV Serials and infotainment will not be broadcast. Broadcast's bane is the schedule, its content is fine. They have to change the delivery mechanism of the content. One the success of Video iPod is the ability to see these shows at a convenient time and place.

Broadcasters should wholeheartedly move to HD. Due to Internet delivery (streaming and download) and media PCs the broadcast standards like NTSC, PAL and SECAM will lose meaning (it also does not help that they are analog standards). The competition will be between codecs for 720p and 1080i (some 1080p). For what is broadcast (live stuff) 720p and 1080i (some 1080p) will be the only world wide broadcast standard and the Internet media will drive the broadcast standard in non-US countries including India. Yes, it will require broadband but broadband is already happening and broadband will also happen in non-US countries like India. If 4G wireless (Wimax mobile) delivers broadband for mobiles then Origamis will also do 720p and 1080i (some 1080p). One advantage of HD (16:9 aspect ratio) is that it can cover faces of two people talking at normal talking distance. For 4:3 aspect ratio it will be required to show more than just faces i.e. also neck and shoulder. I think this may be one of the reasons (among many) that movies have moved to CinemaScope (16:9 aspect ratio).

I think that HD will require DSL speeds and hence is achievable (correct me if I am wrong). Today, in India, I work with 256k and listen to Internet radio. There is no talk about multicasting Internet radio as bandwidth has moved much beyond that. Same way we will move beyond Internet video in bandwidth. Multicasting will be used for live stuff like Superbowl.

What the trend is

Wired and Wireless Internet will be the ultimate and the only medium.

What is the approximate time frame

Based on media, USA - 2015, India - 2020

Why the trend is taking place

Internet is the cheapest medium.

How the trend is happening

Word and photos have moved to Internet. Audio is in the process of going to Internet.

Where the trend is going

Video and Virtual Reality will follow.

What do I think of it all

Internet is a main medium of all mediums. It will be a central store for all media and it will also deliver all media.

What the trend is

Both downloaded (short term) and Internet media (long term) will succeed.

What is the approximate time frame

(50% of all media) USA - 2008, India - 2012

Why the trend is taking place

Mobiles should be able to play music even when not connected to Internet.

How the trend is happening

Audio and video mobile players are selling.

Where the trend is going

Subscribing per month like magazines.

What do I think of it all

A mobile should work even when not connected to Internet.

What the trend is

All mobiles will be audio book compatible.

What is the approximate time frame

USA - 2010, India - 2015

Why the trend is taking place

Mobiles are becoming media machines.

How the trend is happening

Some mobiles are already compatible.

Where the trend is going

Proper automatic reading. (very long term)

What do I think of it all

Audio books are strong and significant competition to eBooks. Audio is next best in comprehension to video. With AudibleListener, audio books have finally become affordable. As there is manual effort involved (reading properly), audio books will always be at a premium to books and eBooks. Though, with market expansion some lowering of prices of both AudibleListener and single audio books is anticipated. The main problem with eBooks and audio books is selection.

What the trend is

Very very long term, all media will converge to Synchronized Multimedia where the distinctions between different media (Book, Movie, TV and many others) just go away and there will be only one form of media (Synchronized Multimedia).

What is the approximate time frame

USA - ?, India - ?

Why the trend is taking place

Synchronized Multimedia is the best way to present and interact with any information. You can choose whatever presentation form (text, audio etc) you want and also choose your device. It will render in best possible form for that device.

How the trend is happening

Synchronized multimedia has taken a back seat as the burst of the bubble has led to less of futuristic use.

Where the trend is going

Synchronized Multimedia will happen as authors (creators) start to want best possible presentation of their information.

What do I think of it all

RealPlayer has a form of Synchronized Multimedia. And initial use of that by CMPNet (if I am not mistaken) has led me to the realization of the power of it. Future Synchronized multimedia will span multiple monitors (virtual reality) and surround sound or maybe even losono.

This comes back to another point. What that was done in five years of the bubble may come back to us in a changed, expanded and wise business planned form.

5) Wireless

What the trend is

All PCs and mobiles will support all existing wireless technologies maybe through software defined radios.

What is the approximate time frame

USA - 2010, India - 2015

Why the trend is taking place

Wireless access (home and work) and mobility are increasingly becoming important.

How the trend is happening

Wireless is happening in both homes and companies in USA.

Where the trend is going

There is a breakup of Wireless markets into four broad segments but with a lot of overlap.

What do I think of it all

According to me Wireless market will break up into four broad segments.

Personal Area Network (PAN) : UWB
Home/Local Area Network (HAN/LAN) : Wi-Fi
Metropolitan Area Network : WiMax Mobile
Wide Area Network : 3G, 3G+
(EV-DO (Revision 0, Revision A, Revision B); EDGE, HSDPA)

I think that in the quest for speed and mobility, mobility wins out once a comfortable speed is achieved. People want to do things in cars, buses, trains and planes.

6) Printing

What the trend is

Portable computers, mobiles and wireless will decrease the need of printing.

What is the time frame

USA -2010, India - 2015

Why the trend is taking place

There is not a single reason for this. To a great extent mobiles, Origamis and to some extent Notebooks decrease need for printing. Printing will decline because using paper and ink are costly for showing something (as they can not be used again) than a mobile or a PC.

How the trend is happening

There are more and more people using Notebooks, Origamis and mobiles.

Where the trend is going

Ultimate going away of paper and printing.

What do I think of it all

A computer in hand is more powerful than a paper document in hand. There can be so many new ideas that come up when our paper based thinking changes.

The focus will shift from text printing to graphics printing to no printing.

What the trend is

In future scanning will be used mainly for converting old books, drawings and photos to their computer versions.

What is the approximate time frame

USA - 2012, India - 2016

Why the trend is taking place

New media is available in computer format. But what about the old media? It is just like converting a CD.

How the trend is happening

People are putting their old photos in computers and on line.

Where the trend is going

Very very long term, scanning will be obsolete.

What do I think of all this

There is a lot of human history to be scanned.

7) Digital Camera

What the trend is

All homes will either have a mobile with a camera or a digital camera.

What is the approximate time frame

(95%) USA - 2012, India - 2020

Why the trend is taking place

People want to remember the moments in their lives by photo shooting their life and other things. Costly films and processing charges had prevented this. With digital cameras people can go all out and shoot more.

How the trend is happening

Camera mobiles and Digital cameras are selling at a steady pace.

Where the trend is going

More photo shooting and then choosing a few good shots.

What do I think of all this

Digital cameras and mobiles with camera will bring photography in reach of everyone.

8) Software

What the trend is

Managed Software will replace Unmanaged Software except for low level system work.

What is the approximate time frame

(95%) USA - ?, India - ?

Why the trend is taking place

It is the next step in developing software. Binary code -> Assembler, Assembler -> Higher Level Language and Higher Level Language -> Managed Higher Level Language. At each step there is a reduction in UNIMPORTANT COMPLEXITY.

How the trend is happening

.Net and Java are gaining in software development.

Where the trend is going

Better frameworks and IDEs. Visual programming (Visual Studio Class Designer, UML).

What do I think of all this

All new languages will be managed as programmers will require that the frameworks deal with UNIMPORTANT COMPLEXITY.

What the trend is

Every successful database technology eventually moves to file system.

What is the approximate time frame

USA - ?, India - ?

Why the trend is taking place

A successful database technology initially lives life as a standalone technology. As the technology matures, it gets incorporated in file system. IMS Database technology -> Hierarchical file system. Relational database technology -> WinFS.

How the trend is happening

WinFS is relational file system.

Where the trend is going

If the Object database technology succeeds we may see an object file system after that.

What do I think of all this

It was interesting to see developers wanting SQL like interface to WinFS. Windows shortcuts are from Network database technology

What the trend is

In this age of the Internet, software has a mixed (online/offline) future. Not SaaS and not offline.

What is the approximate time frame

USA - 2010, India - ?

Why the trend is taking place

Users want responsiveness and security (does not need Internet to work) of offline software and collaboration and ubiquity of online software.

How the trend is happening

SaaS is increasing but its increase in complexity points to advantages of a mixed approach (Salesforce.com).

Where the trend is going

SaaS will have an offline component. Offline applications will become mixed.

What do I think of all this

Users do not want dogma; they want solutions to their problems. A mixed approach solves their problem in the best way possible. Prior to Exchange 2007 email storage was totally server based, now email is also cached on the client.

