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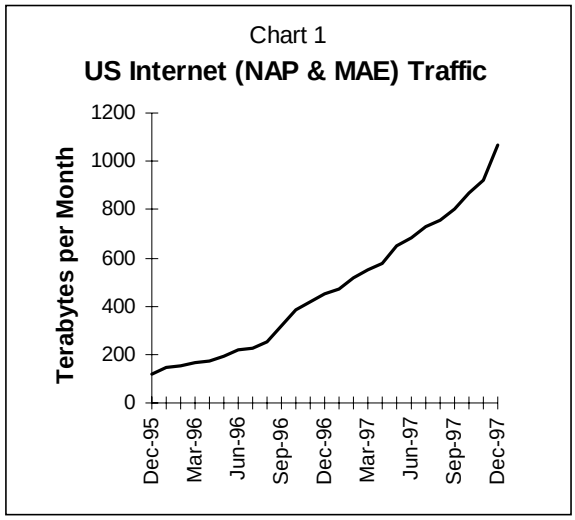
THE SPAN OF LIFE PARADIGM

Flooding over the 28.8 transom in my house, I have been getting virtual kilobits of mail and more about the bandwidth explosion. It's here folks. You thought **Worldcom** (WCOM) and **Qwest** (QWST) were the luminiferous ether? You thought Al Gore was the last word in light? Welcome **Williams** (WMB) Oil and Gas back to the fray with promises of lumens galore down some seven thousand miles of newly available pipelines, along with the folks at **Kiewit** (KIWT) who previously brought you MFS (sold to Worldcom for $14 billion). Flush with cash, former MFS CEO James Q. Crowe now is launching **Level 3** with plans to run IP traffic over three billion dollars worth of new fiber technology. Enhanced by new wavelength division muxing technology from **Nortel** (NT), **Lucent** (LU), **Ciena** (CIEN), and others, running scores of colors down each fiber thread, the total of new capacity in prospect over the next three years mounts into the petabytes *per second* (compared to today's total Internet traffic of perhaps four petabytes *per month*).

The customer is sovereign and he knows what he wants. It is not your product—it is time.

Some spoilsports believe that bandwidth abundance will be bad for networking companies. Think again. Just as transistors costing millionths of cents spurred electronics into the world's largest industry, so asymptotically free communications will make telecom the world's largest industry of early the next century. In every era, companies exploiting the factor of production that is plummeting in price gain market share against all other companies and define the age. Pushing down the price of communications, the new fiber barons will tap the explosive elasticities of bandwidth in an era in which Internet traffic grows 100 fold every 1000 days.

Chart 1



You think the routers and switches won't handle it? Ray Stata of **Analog Devices** (ADI) writes that he has launched a company called **Nexabit** that is rendering all previous routers obsolete: a secret new layer three switching scheme that can handle 16 OC-192s (that's 10 gigabits per second apiece) at once right out of the box and run at a wire speed of 320 gigabits per second.

Amdahl's Law has always held that system speed is governed by the speed of the slowest components. Amdahl's Law now migrates all the way down to the slowest component of all, Gene Amdahl himself. With a transponder speed limit of some 55 bits per second and an effective lifespan of four score years and ten, the human becomes the bottleneck.

Once again abundance begets scarcity. As free economies relieve the perennial pressure of material shortage and diurnal tedium, the ingrate heirs of this bounty look up at last and contemplate impatiently the looming tyranny of biological clocks, the lifespan limit.

In business terms, lifespan translates most sharply as the *customer's time*. The customer is sovereign and he knows what he wants. It is not your product–it is time.

Time's winged chariot, of course, has been noted previously. Been there, Donne that. But as the prime

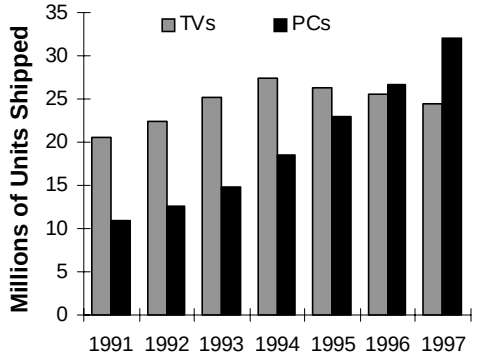
The telecosm, gives to every customer an ability to survey the marketplace and make optimal purchases.

fact and canonical scarcity of business life, it is absolutely new. Down the long millennia of material scarcity, the customer's time was what economists call an externality, like air or water. It was an economic asset so readily available that it escaped economic accounting. In the old economy and all too often surviving in the new, a key rule of commerce thus became: *waste the customer's time*. This was not an accident or a mistake. It was so close to the heart of business marketing strategy that people long took it for granted, like slavery in a pre-capitalist era, and hardly even noticed.

Of course, we waste your time. Make you drive to the bank, grocer, bookstore, post office, hospital, telephone company, realtor, broker, library, software vendor, city hall, school. Make you line up in a queue. Fill out forms in triplicate. Make you clip coupons from newspapers, lick them devotedly until your tongue droops with honeyed glue, pasting them in scrapbooks, one by one, to qualify for discounts. Lure you into the state lottery and make you hang on the TV awaiting the results. Make you perform an endless series of complex and unnatural acts with a congeries of slack and smarmy pettifoggers in sales, insurance, finance, and government in order to purchase a car. Drag you from the tub to answer a telemarketing cold call from someone who mispronounces your name and thinks you want to buy municipal bonds right now or purchase a special discount long distance card from Tabitha's Hair Salon and Telecom company.

Chart 2

US PCs Surge Ahead of TVs



Sources: Dataquest, IDC, CEMA

Besieged by companies treating your time as their externality, even the telephone becomes a hit or miss medium that half the time does not deliver the wanted party and half the time inflicts an unwanted intruder. Telephone tag, phone mail jail, dropped connections, telemarketing invasions were "feature interactions" in the advanced intelligent network.

The supreme time waster, though, awaited you at home. Many people still have trouble understanding how egregious a time consumer, how obsolete a business model, how atavistic an advertising vehicle, and how retarded a technology is TV. You sit down on a couch in front of a screen, to watch degrading and titillating lowest common denominator schlock, scheduled for you in some netherworld between Madison Avenue, the FCC, and Hollywood, offering a sordid stream of sleazy banalities, Uzi sheets, bloody bedrooms, and offal eyebrows, some preening as "news" and some leering as entertainment, for as much as seven hours a day, week in, week out, consuming perhaps two thirds of all your disposable time, year after year, all in order to grab your eyeballs for a few minutes of artfully crafted advertising images that you don't want to see, of products that you will never buy. Is it a breast? Is it a thigh? No, it is the fender of a BMW! No, it's a beer bottle. TV ads that are as irrelevant to you, ninety percent of the time, as the worst telemarketing spiel. Crucial in this scheme is self-serving smarm on the critical free public services–chiefly government flack and Saturday morning molestation of your children's minds–being rendered a necessary part of the programming as the industry seeks to enhance its status as a lugubrious form of political charity.

And you took it in stride, because wasting your time was the essence of business. Your time was the air and atmosphere that businesses breathed. You still take it in stride, all too often. You spend two hours installing programs on your personal computer and then a half an hour waiting on the phone for technical support because the program still issues enigmatic error messages, until on reaching the number at last, you enter a maze of service options that seek to make you waste still more time solving the problem yourself by poring through a large body of usually irrelevant material, often on the Web. Finally you make your way to the voice of a young man on the other end of the line, who cannot hide his disdain or doesn't really try, asking whether you have mailed in your customer registration card, and what, among the array of gnomic digits imprinted on the documentation is your customer's number? Finally, at least a third of the time, if he deigns to address your problem, he tells you it originates with some other vendor.

I do not even want to tell you what happened when you called your phone company for installation of an broadband link to the Internet. Or rehearse all the costly and endlessly time consuming indignities–adding up to as much as a billion hours annually–inflicted on US citizens in the name of collecting taxes nearly as inefficiently and intrusively as possible. The fact is that the entire economy is riddled with time wasting routines and regimes that squander much of the time of the average customer. Suffice it to say that the concept of the customer's lifespan as a crucially scarce resource, indeed the most precious resource of the information economy, has not penetrated to many of the major business and governmental institutions in the U.S., let alone overseas.

The message of the telecosm is that this era is over, as dead as slavery in 1865. These lingering attitudes in established business and government

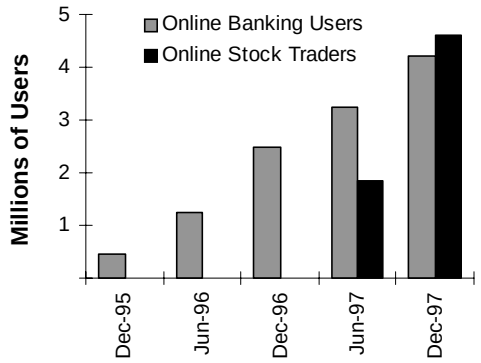
offer the largest opportunities for new companies and strategies in the information age.

Just as air and water entered the accounts and consciousness of the public when the abundance of goods and wastes overflowed into them, now time has become the most precious resource as material abundance floods into the customer's life. The customer who is well fed, sheltered, and capable of purchasing most of the material boons of life, the customer who grasps the possibilities of the new technologies of the speed of light, is no longer going to put up with standing in unnecessary lines, filling out gratuitous forms, telling telemarketers whether he has had a nice day, and waiting for bureaucrats to get around to his case, relating to a previous misinterpretation of the data. In an age of affluence, lifespans become the residual scarcity against which the value of policies, companies and commodities are measured. The question becomes, are you a lifespan extender or a lifespam vendor?

The first portent of the change was an increase in concern for health. As a reflection of the new economic limit, the share of national resources devoted to healthcare is rising in all industrial countries. Though confused by issues of medical insurance, this shift is a positive signal of the new priorities of affluence. Unless artificially suppressed by government, creating time-wasting monopolies, health care companies will remain prime winners in the new era. Huge opportunities lie open for healthcare providers that develop ways to deliver services at a lower cost in the customers time. **Healtheon** is an aggressive play in this field, attacking the endless pettifoggery in healthcare delivery. George Scheele's biotech firm, **AlphaGene**, is launching a revolution in producing full-length genes with automated techniques. Such companies cannot change the ultimate fact of the customer's span of life as an inexorable scarcity. But they can use the new technologies of computers and communications to extend the effective span of life by increasing efficiency in the use of time.

Chart 3

Online Banking and Investing



Sources: Netbanker, Find/SVP

The microcosm chiefly distributed power within companies and facilitated the formation of new companies. The telecosm, on the other hand, chiefly distributes power out of companies to the customers. It gives to every customer an ability to survey the marketplace and make optimal purchases–a power over the market that in the previous age eluded even the most sophisticated procurement offices of large companies.

In empowering customers, the Internet now casts a shadow over the entire established information economy. Just as the lightspeed limit opens large opportunities for companies supplying new network computers and topologies, so the lifespan limit opens large opportunities for companies that focus on saving the customer's time.

That is what the Internet is about and why it is an unstoppable force that will reach into every nook and crevice of the old economy and transform it. On January 28, **Egghead** (EGGS) began its transformation, announcing the closing of all 80 of its brick and mortar retail software stores and the company's rebirth as Egghead.com now focusing exclusively on Internet sales. The Internet saves the customer's time. That is its power and its raison d'etre. But because the customer's time is an externality, not measured in any of the productivity data of either government or business, many experts will miss the profound impact of the technology. They will not have a clue about what's going on until it is already almost over.

Watch the customer of the new era. He awakes in the morning to the music of his teleputer playing his favorite matinade. On the screen across the room is the news he needs, perhaps from **Pointcast** or **CNet** (CNWK). One of his stocks has lost three points. He clicks and a full report emerges. It is written in a font with resolution as good as paper. He doesn't have time to read so he clicks on audio. While he shaves, a voice–generated by text-to-speech software from **Lernout and Hauspie** (LHSPF), or **Dragon Systems**– intones the report on the news affecting the stock. He clicks and the report is transferred to his broker with an inquiry about appropriate action. Or perhaps he invokes **Schwab** (SCH) to buy more, average up on the shares. These actions entail no phone tag or search time. They happen almost spontaneously as he goes through his morning routine.

Meanwhile his wife checks her screen for the local weather and school reports to find out if the snowstorm during the night has caused cancellation of school for the older teenager who still travels for her education. The younger two children are being taught at home through a teleputer program that links them to courses across the country that are suitable for their age and aptitudes.

Then the son enters the room with serious stomach pains. He is referred to the diagnostic sensor linked to the PC–perhaps resembling the set top version debuted at Winter CES by **uniView Technologies** (UVEW), formerly Curtis Mathes, together with **Home Health Link**. He breathes into the tube (or supplies urine to it) and by a rapid reference to a massive database of health correlations his

The Internet saves time. But because the customer's time is an externality, many experts will miss the profound impact of the technology.

Chart 4

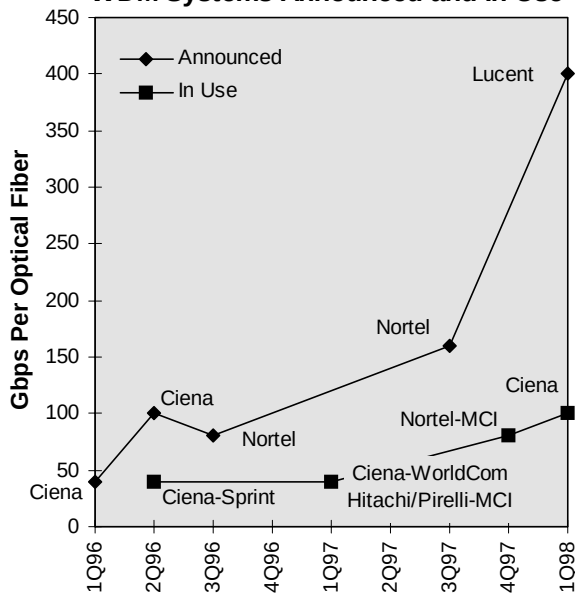
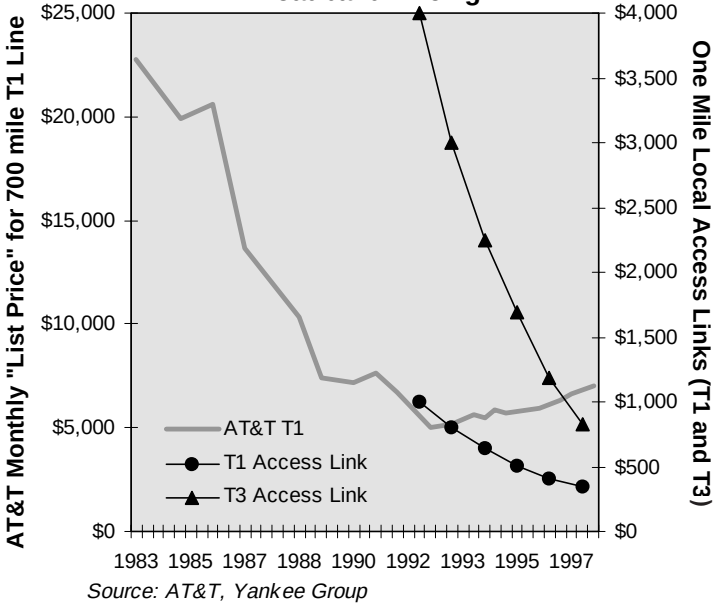


Chart 5



Source: AT&T, Yankee Group

Lucent's January 28, 1998 announcement of a planned wavelength division multiplexing (WDM) system offering a capacity of 3.2 Terabits per second down 8 fibers, set a high bar for commercial WDM systems (Chart 4). Each fiber could carry up to 400 Gigabits per second, 2.5 times the capacity of Nortel's 160 Gbps system expected to be operational in mid 1998. Nortel notes their own lab work on a 320 Gbps system and questions whether Lucent can achieve the promised end of year deployment. This month, Ciena claims to be shipping their 100 Gbps system, thereby reclaiming the lead in capacity of currently shipping systems from Nortel (80 Gbps). But, despite the shipping of Ciena's new system, first announced in June 1996, Ciena will not acknowledge any new development work or product plans which would keep them in the race alongside the likes of Nortel and Lucent. Ciena's early ascendancy in WDM seems to have plateaued with the departure of David Huber and therefore, we have removed them from the Telecosm Technology Table.

Chart 5 shows the list pricing for an AT&T T1 (1.544 Mbps) connection linking two cities approximately 700 mile apart (e.g. New York and Chicago). The falling price seen during the 80's, as fiber networks first expanded, was arrested in the 90's, as the demand for long distance links countered the traditional price declines. Exploding WDM fiber capacity and competition from new players such as Qwest and Level 3 will see prices plunge. The advent of virtual private networks over the public Internet also changes the equation. Corporations' can now link distant sites through two local Internet connections forgoing dedicated long distance links. Prices for local exchange carrier (LEC) T1 and T3 (44.736 Mbps) access links have seen normal declines throughout the period of AT&T pricing stagnation (Chart 5), but are now facing increased downward pressure from competing cable modems and the LEC's own DSL (digital subscriber line) services.

*The explosion of Internet use during 1997 has brought considerable change to the T1 market. Along with an upsurge in usage there has been a shift in type of use. The percentage of T1s used exclusively for data has surpassed voice-only use (***Chart 6***). Also, as data becomes increasingly important, smaller companies, which did not previously need the voice capacity possible with a T1, are increasing their T1 use (***Chart 7***).*

The Universal ADSL Working Group was announced January 26, 1998, combining the efforts of nearly every company active in copper wire DSL technologies with the telecom, computer and software companies necessary to jumpstart ADSL access. Just days later, US West announced a planned expansion of their DSL service offering to 5.5 million customer lines in 40 cities by June 1998. Universal standards, economies of scale, producer competition and legions of consumer subscribers offer the promise of plunging ADSL prices. But, cable Internet access providers can take heart that US West pricing begins at $60/month for a 256 kbps Internet connection versus cable modem access in the range of $40-$50/ month for multi-megabit speeds.

North American cable modem Internet access providers ended the year with over 100,000 subscribers (Chart 8). While @Home led the pack with 50,000 subscribers, Time Warner and US West close behind with a combined 46,000 subscribers after their announcement that they are combining their respective Roadrunner and MediaOne services. CompUSA and other retailers are beginning to stock cable modems in markets with service, and plans for the next generation of digital set top cable boxes universally call for Internet access, boding well for cable's continued competitive advantage.

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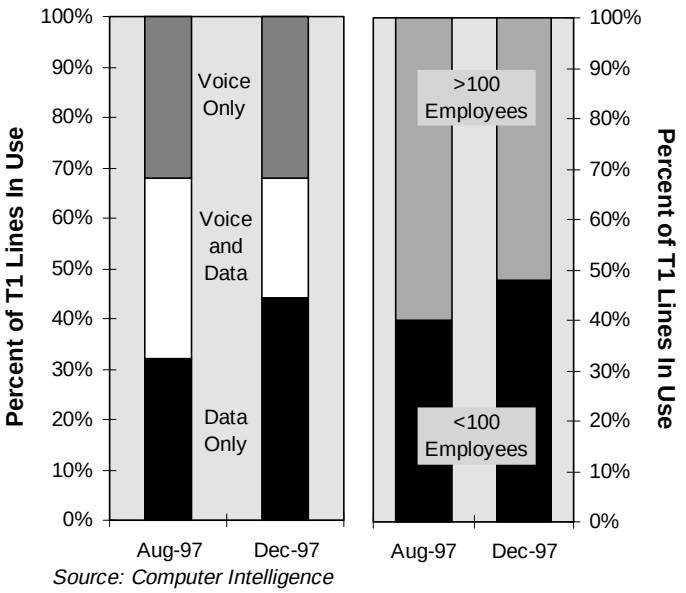
Chart 6 Chart 7



Source: Computer Intelligence

Chart 8

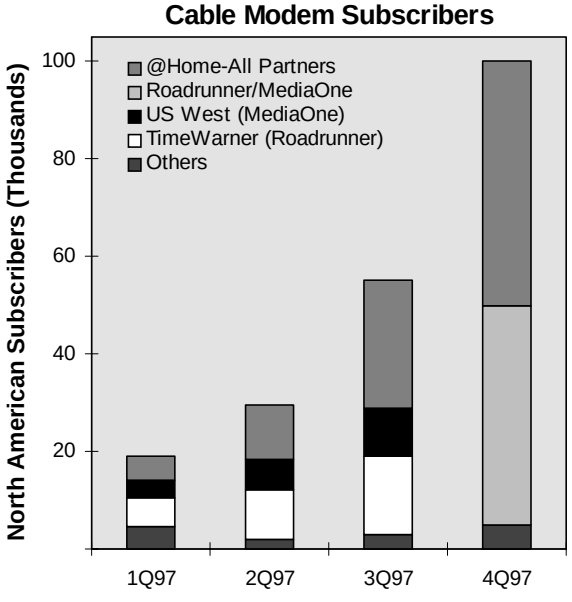
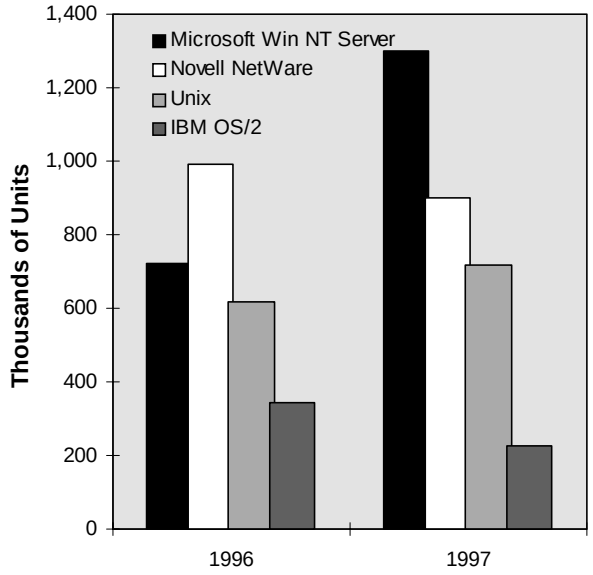
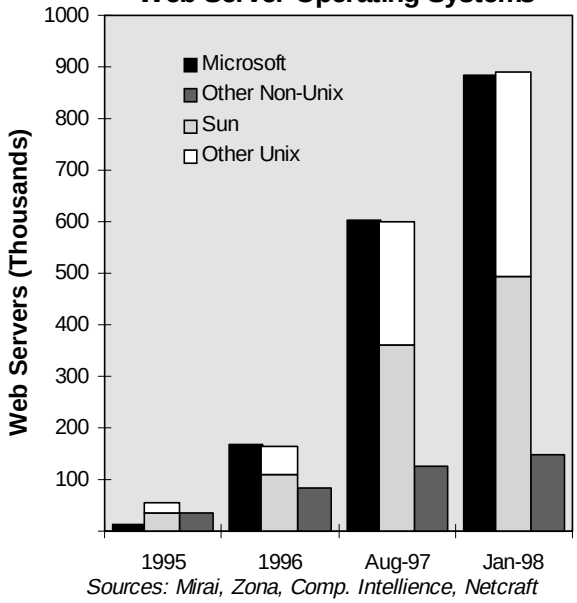


Chart 9



Source: IDC

Chart 10



Sources: Mirai, Zona, Comp. Intelligence, Netcraft

As Compaq sets its sights on the the high reaches of enterprise computing with its purchase of DEC, Digital announced that 4Q97 "Windows NT revenue, driven primarily by Intel-based servers, was up 94% compared to 5% growth of Alpha-based Unix servers." This reflected the phenomenal 80% worldwide growth of NT server unit shipments. While Novell's NetWare and IBM's OS/2 were hard hit, Unix servers, led by Sun Microsystems, managed 15.8% unit growth (Chart 9). Unix strength versus NT continues to be evident in Internet servers, according to data from Computer Intelligence which shows Unix maintaining a 44% share to NT's 48%, with Sun accounting for 55% of the Unix market (Chart 10). Based on figures from the Netcraft web server survey, which attempts to count every web server on the public Internet, the number of web servers increased some 183% from Jan-97 to Jan-98, making Internet servers the fastest growing server market. Looking at the revenues of the worldwide server market Microsoft's domination of unit market share is somewhat muted by its strategy of low cost and high volume. Although high-end systems, costing $1,000,000 or more saw declining revenue, mid-range systems, costing $100,000 to $999,999, and entry level servers under $100,000 both saw growth. The PC Server category of Intel based machines costing less than $25,000 (averaging just $6,000) saw the fastest revenue growth (selling some 1.75 million units of which some 1.3 million ran Windows NT Server) but accounted for just 18% of total server revenues (Chart 11). A combined Compaq-Digital will dominate the PC server category, adding DEC's 5% share to Compaq's 35%, towering over HP's and IBM's respective 12% and 11% shares. In the workstation market, the NT vs. Unix competition is heating up with the introduction of new low-cost Unix workstations by Sun. Sun's move comes just in time, as IDC reports that though Sun remains the 1997 Unix workstation leader, shipping 2.64 times more units than 2nd place HP, HP's combined Unix and NT workstation sales will surpass Sun, and combining Compaq and Digital Unix and NT volumes would push Sun down to third place in workstation unit volume–even as Sun retains the number one spot measured in revenues. Unix's huge installed base and strength in Internet markets, along with Sun's moves to lower Unix pricing and their successful entry into the high-end server market with theUltra Enterprise 10000 series, mean Unix, increasingly dominated by Sun, and Windows NT will co-exist into the future.

*"Java has clearly pulled ahead to become the web application development environment of choice," according to the Business Research Group. Their survey of 300 network managers across six industries found, the percent of corporations developing Java based applications in 1997 increased to 50%, up from 42% in 1996. Java surpassed both Visual Basic at 29% and C++ at 43%. Among small corporations with less than 100 people Java use increased to 58%. While Sun and Unix have been holding off NT's inroads into the web server realm, Sun has also battled Microsoft in the market for Web Development tools. The position of Sun's JavaSoft division as the originator of Java development gave it early parity with Microsoft's offerings. But, Sun's civil suit against Microsoft's Java implementation spelled out a developer's options as either going with Microsoft's "Java" or Sun's 100% Pure Java, and the choice seems to have resolved in Microsoft's favor (***Chart 12***). Java's momentum continues with: the release of a new suite of Java-based enterprise applications by Extensity; the sweeping Java licensing deal with Motorola; support for Java's point-of-sale protocol by JC Penny, Sears, Home Depot, IBM, NCR and Datafit; Groupe Bull joining Schlumberger and Gemplus with a Java smartcard; Rockwell's JEM1 Java processor capable of directly executing Java; and Intel's increasing investments in Java for their platform. Even Netscape's decision to rely on Sun and other's for Java VM development, can been seen as a positive step both for Netscape in reducing development costs and for Java in reducing incompatible implementations of the Java technology.*

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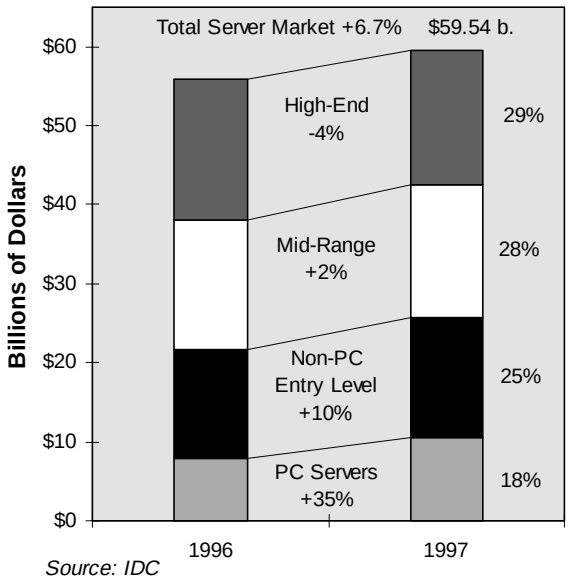
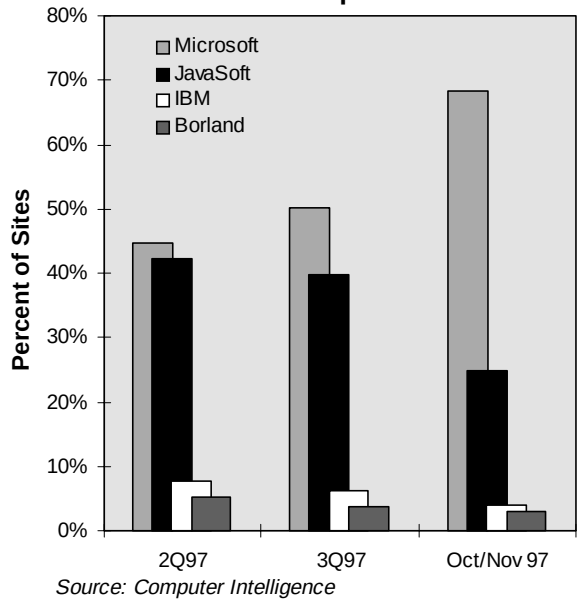
Chart 11



Source: IDC

Chart 12



Source: Computer Intelligence

Since human beings through history have thrived through work, most people use the liberated time to perform more valuable economic activity.

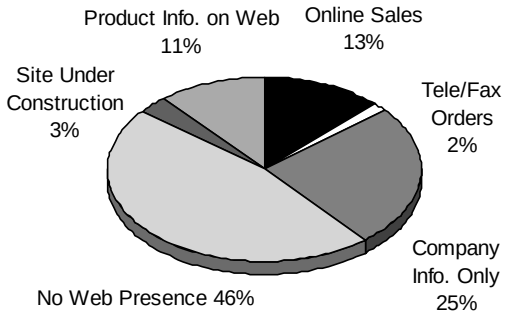
condition is appraised and the results dispatched to a doctor. Within minutes, the doctor responds with an assurance that the illness is not grave and prescribes an appropriate medicine for the boy. The doctor is paid on the spot through the web, perhaps using **Wave Systems** (WAVX) metering and payments technology integrated into the microprocessor.

The man sees that his college track team won a close meet the night before. He clicks on a highlight video which shows the close final quarter of the mile relay race; a reasonable payment is deducted from his account. Professional sports events will still make their claims, and the man may well spend time with his favorite teams. But these events may decline in relative significance, compared to amateur games and competitions. Shunning the WBA, for example, his daughter prefers to watch her sister perform in a college cross country ski race. She moves to a recording of this event and takes in a few minutes as she eats breakfast. Then she is off to school with a printout of corrected calculus problems she had submitted two days before.

Meanwhile, by nine AM, the wife has done all the shopping for the day, using **Peapod** (PPOD) and other systems. **Anderson Consulting** reports that 200 thousand people today shop online for household goods and services. In twenty minutes, they also buy a new car, using **Auto-By-Tel Corporation**. By a long distance teleconference, they visited her elderly parents in Hawaii and took a walk with them on the beach (the petabyte era will bring three- dimensional video parties). Through a teleputer, they had read all the news that they wanted–with **RealNetworks** (RNWK) streaming audio and videos included where appropriate–and are ready to begin their work in the next room. In an hour in the morning, they have accomplished tasks that would have taken most of the day under the previous regime when span of life was still an externality.

Chart 13

Retailers on the Web



Source: Computer Sciences Corporation

As a result, they have more time to leave the house and socialize during the day. Unclogged with lifespam, their lives open up. They may logon to www.**PreviewTravel**.com (PTVL) to book a vacation, but their reservation is as likely to be a business trip. Many pundits will express alarm that people do more work than ever. This is a "problem" that the Internet will not solve. Since human beings through history have thrived through work, most people use the liberated time to perform more valuable economic activity. Using the Web, they will be able to work far more efficiently, collaborating with the best experts anywhere and serving markets around the globe. "Cottage" industries will burgeon and many of them will become important corporations.

In the evening, the family may decide to watch a film together. Choosing from hundreds of thousands of possibilities, sorted and ranked by content and appraised by trusted reviewers, they find a new work that affirms their religious or cultural views. A few clicks on the teleputer and it is immediately served up on the World Wide Web, again courtesy of RealNetworks. Video will be nearly as diverse and as rich in cultural content as book culture is today, with millions of titles available at your fingertips at **Amazon** (AMZN) or **Barnes & Noble** (BKS) or hundreds of more specialized affiliates.

In all this activity, advertising is just as important as ever. After all, there must be ways of publicizing new products in an ever more innovative economy. But you will not look at any ads that you do not want to see. Advertisers will not be able to seduce you into watching their ads, let alone buying their products. In the new economy, this change for advertisers and marketers will be among the most difficult. Faced with the challenge of empowered consumers, Madison Avenue has been flailing about, contemplating ways of paying people to watch their ads, with coupons, advantage miles, movie tickets, and lottery slips. Thus they admit that these exhibits are not ads at all; they are minuses.

In the future, no one will be able to tease or trick you into watching an ad. Your time is too precious and you are too powerful. Advertisements will be value added rather than value subtracted. You look at advertisements when you seek a purchase or when you contemplate your news. Because the ads relate to your interests, they interest you. They come not as intrusions but as attractions. If the product intrigues you, you can seek further information on it. In most cases, you will be able to move step by step toward a transaction, summoning information as you need it from a variety of objective sources.

For an analogy, consider an issue of *PC Magazine* or *MacWorld*. These are two of the world's most successful publications, with ads that are more closely read than any others. *MacWorld* actually leads the list, because it comprises almost the only way that the poor waifs of the **Apple** (AAPL) universe can find the doughty companies that are still willing to serve them.

On television, people resort to zappers and remotes and other devices to avoid advertisements as much as possible. These are minuses, time wasters. Through cable, you actually pay extra to receive programming without ads. But in computer magazines, people seek out the ads. Indeed, most subscribers would pay extra for issues with ads rather

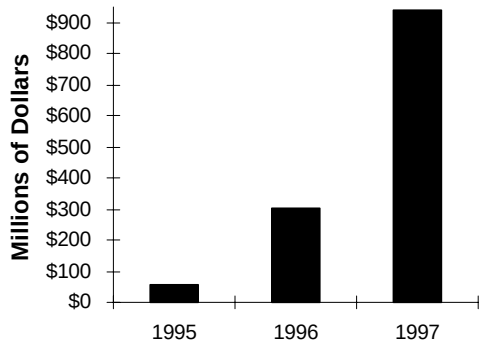
than extra for issues without. The reason for the superiority of magazine and Web advertisements is that they are targeted. The purchasers of these publications partake of a community of interest. They are Apple or PC owners and they are interested in enhancing their purchase.

In targeted advertisements, the advertisers assume substantial knowledge in the audience. Disciplined by their customers, they must be objectively informative. The ultimate model is the infomercial–the commercial program that is eagerly watched by the viewers. Because TV infomercials must address a broad lowest common denominator audience, they are crude. But the concept does not need to be crude, as technical publications show.

The best edited of all the publications in electronic technology is *Electronic Engineering Times*, EETimes, a weekly tabloid of over 100 pages and perhaps 75 thousand words. Perhaps a third of the content is infomercials–articles written by engineers and marketers at technology firms explaining their high tech products. Often these articles are more informative than reports by journalists. After all, the journalist may just visit a firm for a day and contrive a story. The engineer spends his life contemplating his product.

Chart 14

US Online Advertising



Source: Jupiter Communications

Surprisingly, the technical infomercials are also often just as objective as articles by journalists. In order to gain credibility, the company writers have to describe and explain competitive products, and they do. In a world where advertisements are read only by people who choose to read them, the quality sharply improves. Freed from the meretricious need to appeal to passing strangers, advertisers ascend to a higher cultural level. The hokiness and smarm we associate with Madison Avenue dissipates and the advertiser makes an honest effort to convey as much information as possible in as compelling as possible a style.

Advertising becomes an art of truth rather than an art of deceit. No more will the huckster confront the paradox of Crest 22: faced with the need to introduce the first flouride toothpaste, a product that actually halted tooth decay, the advertisers were confounded. Having already ascribed to every paste the power to captivate the opposite sex with teeth that gleamed like jewelry and a mouth fragrant as a mountain lily, a mere remedy for caries seemed hopelessly dull. Madison Avenue had reached the point at which they could only cry wolf, or sing it. The truth was beyond them. Their only craft was in wasting the customers time.

As the world wide web moves beyond the broadcast advertising model–the billboard flash at the top of the screen–advertisers will have to stop wasting the customer's time with teasers and learn how to tell the truth. When they do, they will discover that targeted ads are hugely more effective than broadcast ads and that a smaller quantity of programming can support a larger amount of free, value added services. Today television purports to be free, but in fact the culture pays dearly for these gratuitous distractions, in cultural decay, educational decline, family breakdown, criminal activity, and aesthetic degradation. The new regime of choice will vindicate the claims of freedom.

The greater efficiency of targeted advertising springs not only from the superior knowledge of products by customers but also from the superior knowledge of customers by advertisers. As Don Pepper and Martha Rogers observe, by using database tools a company can now remember each customer as readily as a customer can remember a company. Open Sesame, a division of **Charles River Analytics** in Cambridge, Mass., is a prime mover in this technology, giving companies the means to create simple and powerful one to one personalization by non-intrusively learning users' interests and tastes directly from their actions at the site. A larger player, Softbank Interactive Marketing Network, which was recently acquired by **ZULU-tek Inc**. (NETZ), has signed up a pantheon of Forbes 500 companies by providing state of the art technologies for serving, targeting, optimizing and reporting advertising performance.

Many observers fear this increase in advertisers' knowledge as an invasion of privacy. This view misconceives the nature of privacy. Invasions of privacy reflect inadequate knowledge, not excessive knowledge. In a sense, telemarketers and other advertisers fail to invade our privacy enough. Someone calling you at dinner hour to sell you a product of no interest is intruding on your time out of ignorance. This ignorance may even increase as a result of laws that make it more difficult for companies to collect information about their customers, and what they want, and how they prefer to be alerted to new products. Most customers are pleased to be surprised by advertisements of products that they want.

In general, the threat to your privacy and the menace of intrusion on your life does not come from true information. Throughout much of history people have lived in small towns and villages where your reputation could be destroyed without recourse because someone imagined that you were a witch. Even today far too many court proceed-

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TELECOSM TECHNOLOGIES

ASCENDANT TECHNOLOGY	REPORT(S) Volume: No.	COMPANY (SYMBOL)	Reference Price	Price as of 1/30/98
Cable Modem Service	I: 2, 3 II: 7, 8, 9, 11, 12	*@Home* (ATHM)	19 1/2	23 1/8
Analog to Digital Converters (ADC), Digital Signal Processors (DSP)	II: 3, 7, 12; III: 2	*Analog Devices* (ADI)	22 3/8	29 1/2
Java Thin Client Office Suite, Rapid Application Development (RAD)	II: 6, 7, 12	*Applix* (APLX)	4 1/2	6 1/8
Digital Video Codecs	II: 5	*C-Cube* (CUBE)	23	18 3/4
Low Earth Orbit Satellites (LEOS)	I: 2 II: 1, 3, 4, 8, 10	*Globalstar* (GSTRF)	21 3/4	56 7/8
Single Chip ASIC Systems, CDMA Chip Sets	II: 8	*LSI Logic* (LSI)	31 1/2	24
Telecommunications Equipment, Wave Division Multiplexing (WDM)	II: 1, 2, 7, 9, 10, 11, 12 III: 1, 2	*Lucent Technologies* (LU)	47 1/8	88 1/2
Single Chip Systems	II: 8, 12	*National Semiconductor* (NSM)	31 1/2	28 1/8
Internet Software	I: 1, 3, 4 II: 1, 4, 6, 7, 8, 10, 12	*Netscape Communications* (NSCP)	53	16 1/16
Telecommunications Equipment, Wave Division Multiplexing (WDM), Code Division Multiple Access (CDMA), Silicon Germanium (SiGe)	II: 1, 7, 9, 11, 12 III: 1, 2	*Northern Telecom* (NT)	46	45 1/2
Wave Division Multiplexing (WDM), Satellite and Wireless Systems, Code Division Multiple Access (CDMA)	II: 10	*Ortel* (ORTL)	20 3/4	13
Point to Multipoint System for 7-50 Ghz, Spread Spectrum Broadband Radios	II: 10, 11	*P-COM* (PCMS)	22 3/8	19 1/2
Code Division Multiple Access (CDMA)	I: 1, 2 II: 1, 3, 4, 7, 8, 9, 10, 11	*Qualcomm* (QCOM)	38 3/4	51 7/8
Nationwide Fiber Network	II: 9, 10, 11 III: 1, 2	*Qwest Communications* (QWST)	40 3/4	70 7/8
Java Programming Language, Internet Servers	I: 1, 2, 3, 4 II: 1, 5, 6, 7, 8, 10, 12	*Sun Microsystems* (SUNW)	27 1/2	47 15/16
Optical Equipment, Smart Radios, Telecommunications Infrastructures	I: 1 II: 1, 2, 3, 9	*Tellabs* (TLAB)	29 1/8	51 1/5
Broadband Wireless Services	II: 9, 10, 11, 12	*Teligent* (TGNT)	21 1/2 *	28 3/4
Digital Signal Processors (DSP), DRAM	I: 2, 3, 4 II: 5, 8, 11, 12	*Texas Instruments* (TXN)	23 3/4	54 5/8
Wave Division Multiplexing (WDM) Modulators	II: 7, 9, 10	*Uniphase (UNPH)*	29 3/8	36 3/4
Code Division Multiple Access (CDMA) Testing Gear	II: 1, 2, 7	*Wireless Telecom Group* (WTT)	10 3/8	6 3/16
Telecommunications, Fiber, Internet Access	II: 9, 10, 11, 12 III: 1, 2	*WorldCom* (WCOM)	29 15/16	35 13/16
Field Programmable Logic Chip	I: 3	*Xilinx* (XLNX)	32 7/8	37 15/16

* Initial Public Offering

Removed from the Table: Ciena. While Ciena held the early lead in transforming the vast potential of wavelength division multiplexing into commercial systems, established telecom players Nortel and Lucent have surpassed Ciena in envisioning the next generation of systems (see Chart 4, page 4).

Note: This table lists technologies in the Gilder Paradigm, and representative companies that possess the ascendant technologies. But by no means are the technologies exclusive to these companies. In keeping with our objective of providing a technology strategy report, companies appear on this list only for these core competencies, without any judgement of market price or timing.

ings wallow in ignorance, enhanced by fake expertise comparable in validity to the testimonies of seers and sorcerers of previous eras.

By leaving a trail of encrypted information about purchases and activities, even if much of the data is captured by businesses that want to sell goods and services, people can regain control of the truth of their lives. Rather than onerously wasting their time collecting alibis and friendly testimonies, people can efficiently respond to unfounded charges with documented information.

Many people who constantly fear for their privacy actually hold a highly exaggerated view of the interest of others in their affairs. The existence of huge amounts of data, spread through databases around the world, will be significant chiefly to people who want to sell you things that you actually want, and to yourself. Most of the time, you will know best where it is and will be able to use it most effectively.

It should be needless to say that the Internet will not solve all the problems of human life. People will continue to suffer and die, continue to sin and pay, continue to waste time and money, continue to gain wealth through the Gilder paradigms. But businesses will no longer see time as the externality; it will be the central test of commercial viability. Does this new good or service reduce the wavelengths and frequencies of tedium and trivia and pettifoggery in the lives of customers? In pursuing the new requirements, businesses will adopt new means of marketing, expanding on the insights of the one-to-one marketing guides and gurus. They will adopt their businesses to the new king and sovereign: the customer and his time.

George Gilder, February 2, 1998

After much consideration, we have decided to allow ForbesASAP exclusive rights to publish an occasional adapted text from the reports some six to eight weeks following receipt by GTR subscribers. In practice this will mean there is a possibility of a second wave of impact after initial publication.

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