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[illegible]

Pre-requisition
Openness & Imagination

Bits
 $1280 \times 1024 = 1,310,720 \times 50 \text{ pages}$
 $= 65,536,000 \times 32 \text{ bits/pixel}$
 $= 2,097,152,000 \text{ (2Gbits)}$

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vision & revision

revision - mind - vision - Invention - innovation -
growth - capital - customer - surplus - marketplace -
collision - measure - congealed - curves

digital property

bits - digitization - miniaturization - display -
communication - computing - pilot -
standard - congealed - alwaysOn - hub - sharing
simplicity - mobilityScore - Interface

palpable exploration

multimedia - Intermedia - thinks that think -
symbiosis - ubiquitous - Danalyzer - eniac - memex -
Dynabook - thinking machine - tangible - mapping -
net - 50x15 - all IP - takeOff - diverse - workshop

revision

more bits are co-mingled for the next decade, more products and services are diversified. in fact, digital convergence with technological commodities ties to industry dynamics that enable bits interconnect to converge media.

while multimedia get more in-common, intermedia, the intersections of multimedia over networks will open the next paradigm of the media.

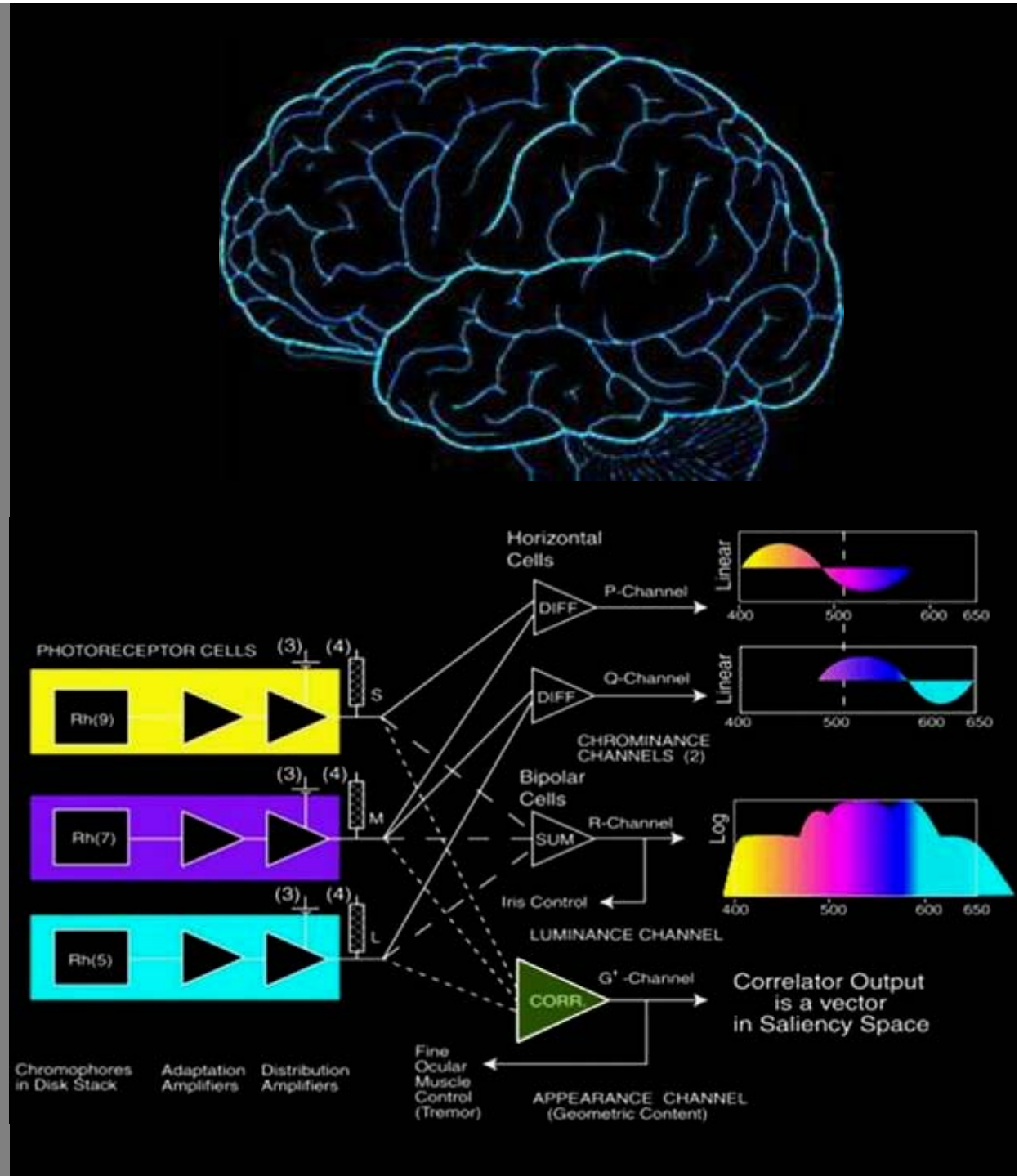


mind

the brain doesn't produce an output for every input. instead, it stores experiences and sequences and makes predictions based on those memories.

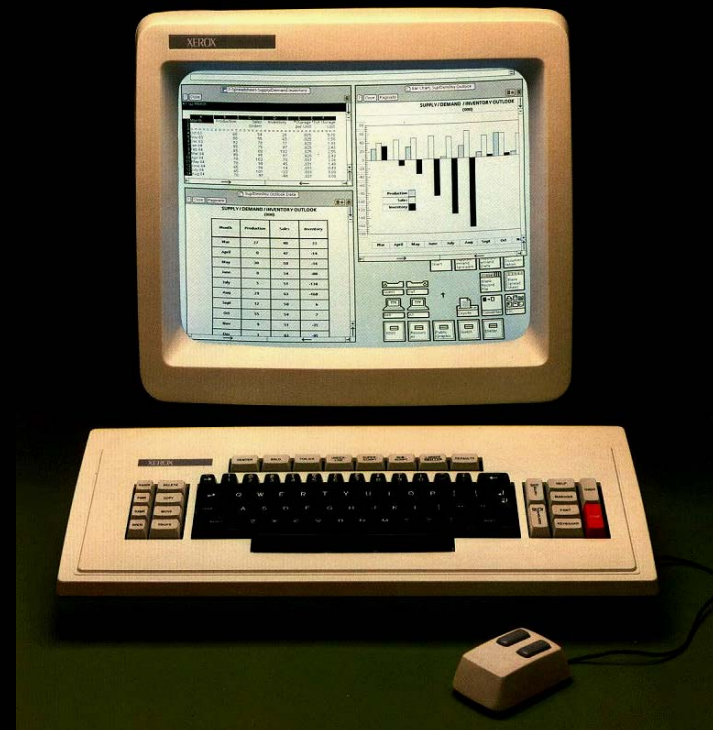
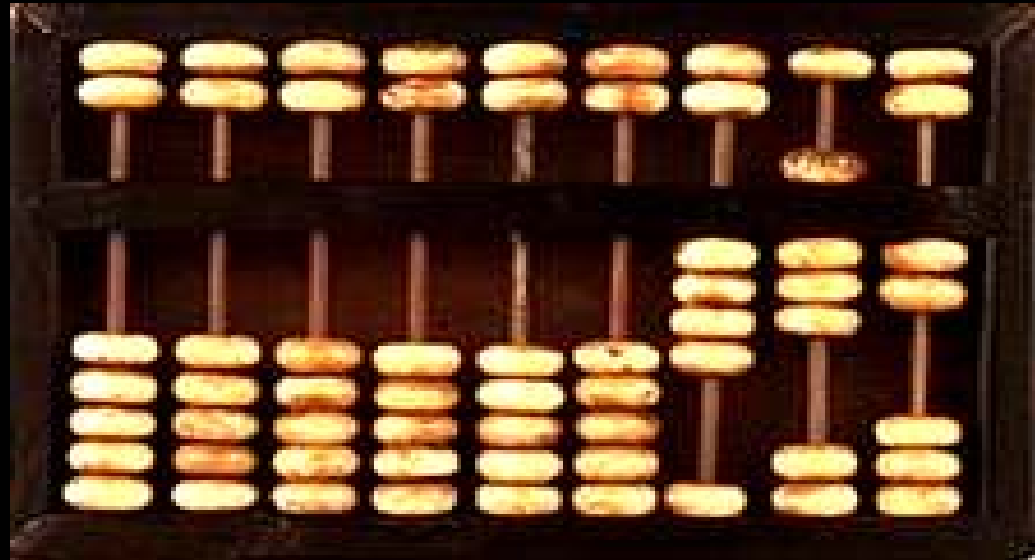
vision

the signaling architecture of the human visual system used in long wavelength. three distinct signaling paths found in vision as well as the unique correlation channel (labeled the G'-channel) found in only the highest primates and used by the analytical mode of vision for reading and other functions requiring maximum acuity and perception of detail.



invention

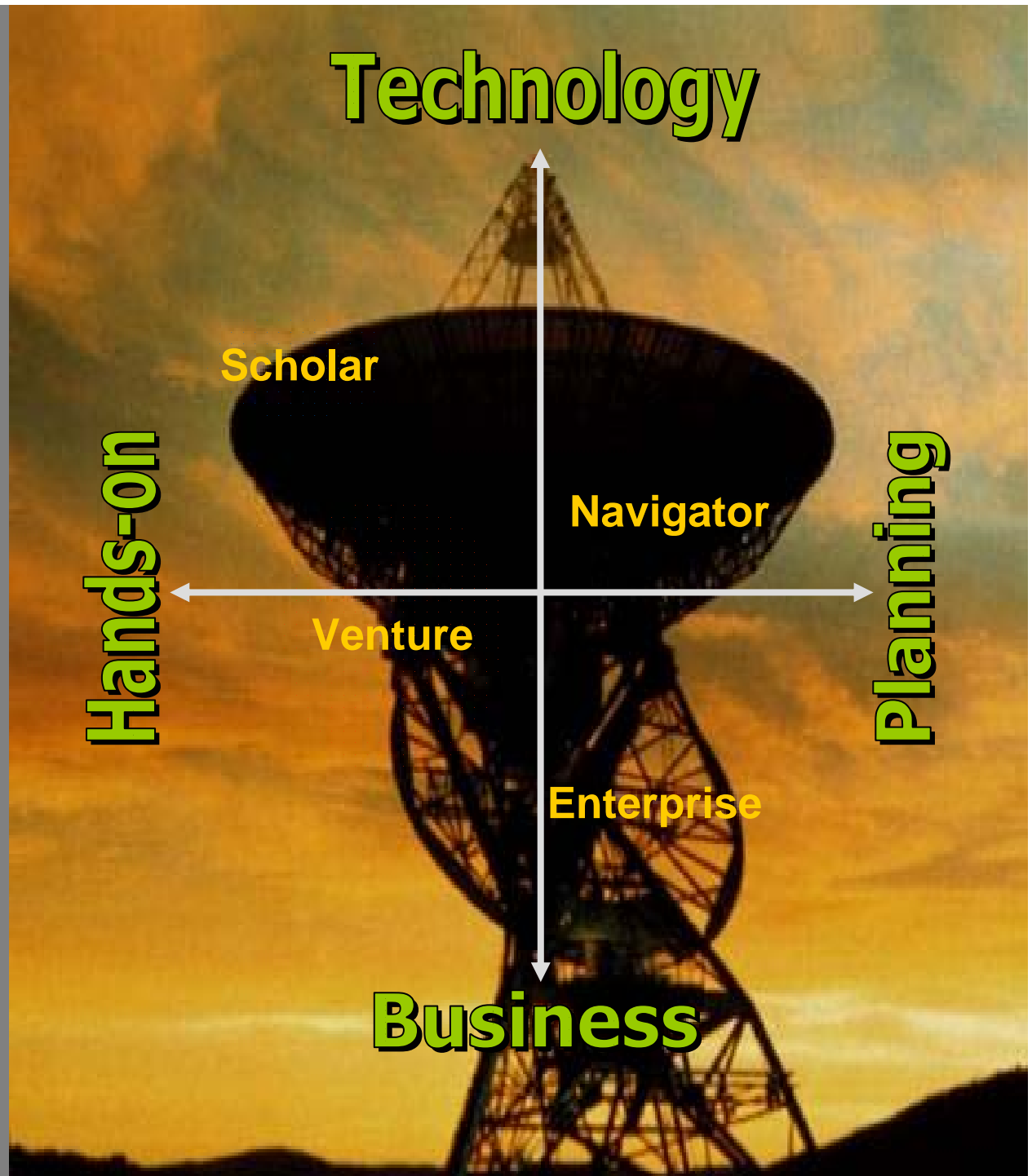
as discovery is likely not to have the same value as the past: the equivalents are not going to be able to generate transformative impact in real business value or wealth as the transistor had or the automobile had, but incremental one.



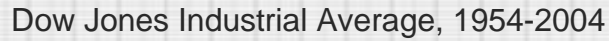
innovation

triggers creativity on top of duplication. albeit, the dilemma of innovation used to happen when each preliminary strategy and positioning stays where they used to belong. the big mistake is that venture items in innovation are often likely misread or discard because they are not fit into enterprise businesses.

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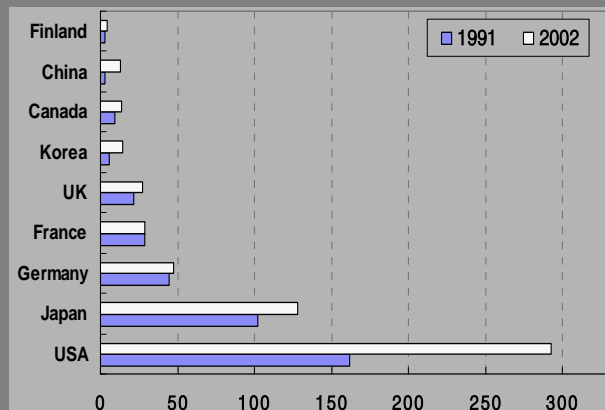
endless industrial growth with relentless evolution of technology has proved by the fact that technology leaders in Dow 30 have grown more than 55 times (\$212 → \$11497) for the past century. the rate of growth for all major sectors of the economy has been decreasing for a quarter century—with the exception of technology and financial industry sector.



TOP RANKED INDUSTRIES (1990s)	AGR %
software, hardware, networking, semiconductors, peripherals	13.59
telephone service, & equipment, cellular/wireless	12.53
pharmaceuticals, biotechnology, medical & managed health care	14.30
money center, regional banks, insurance, investment banking	22.64

capital

each nation's R&D expenditure in the field of science & technology has been doubled for the last decade. an alternative economic system in which all citizens are free to explore and develop their creative potential to reap the greatest economic gains with creativity will be an ultimate goal of capitalism.

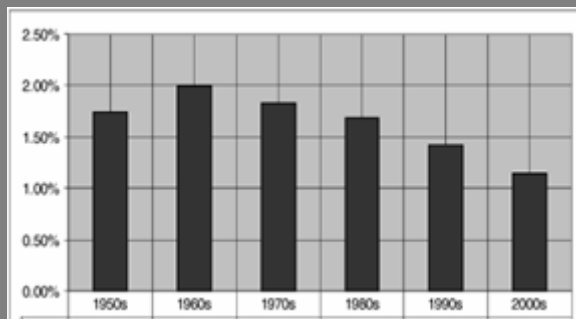


National R&D Expenditure 1991-2002



customer

how to feed and to equip a population which will exceed 7.2 billion-1.7B household (2.5-person/household), especially in emerging market with risk credit? the earth has yielded more food than we can possibly consume; yet geopolitical structures continue to leave millions of people dying of starvation.



World Population Growth Rate, 1950-2000

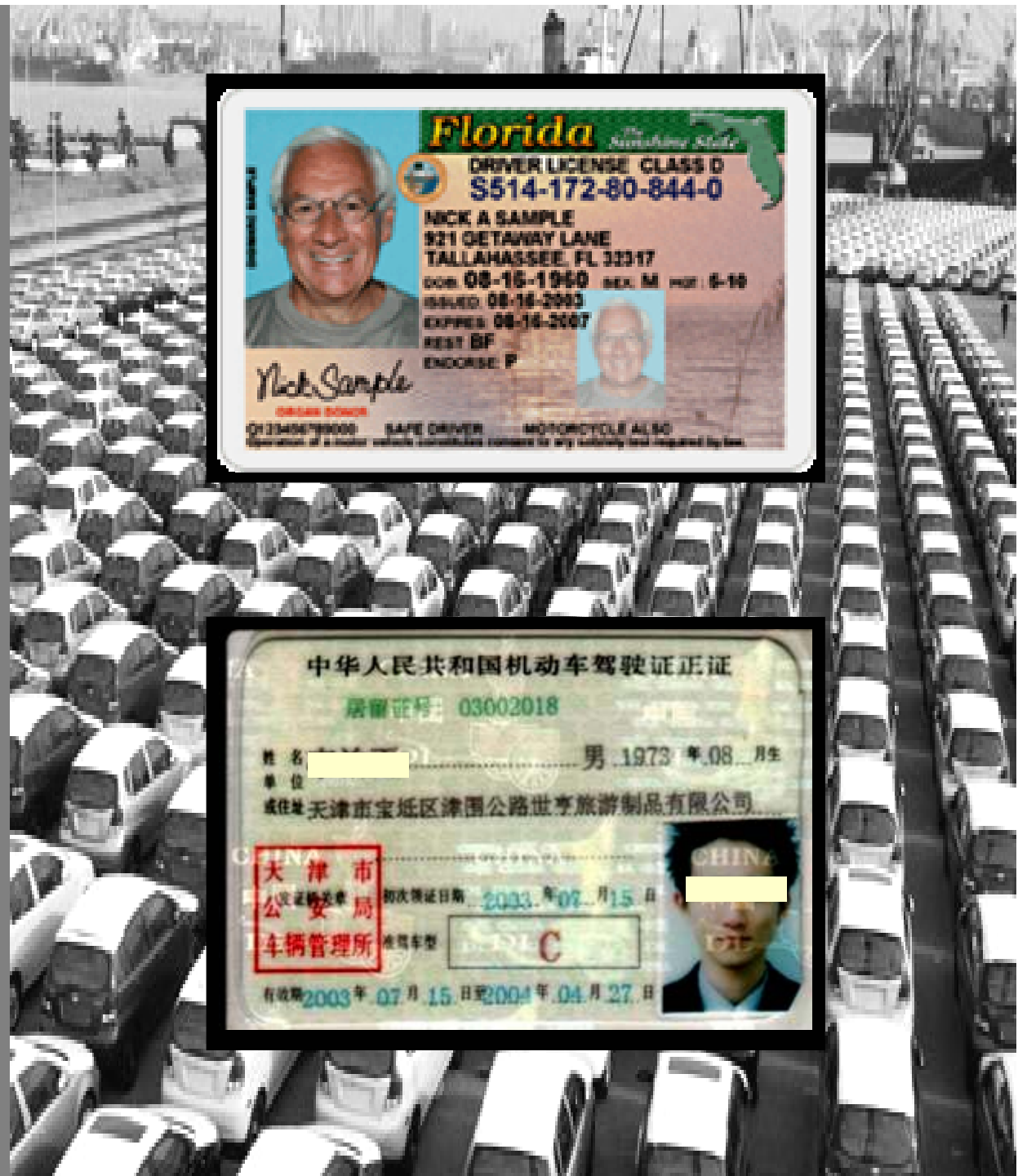


surplus

in reality, a slowdown in population growth has already reached natural saturation levels for any product sales. the number of vehicles registered over exceed to the licensed drivers, 1.16car/person.

Chinese car market surged 4.4M. 1% of population = 130M. 20M vehicles annually will produced in China, the biggest market with \$13B foreign investment. 75M licensed Chinese drivers.

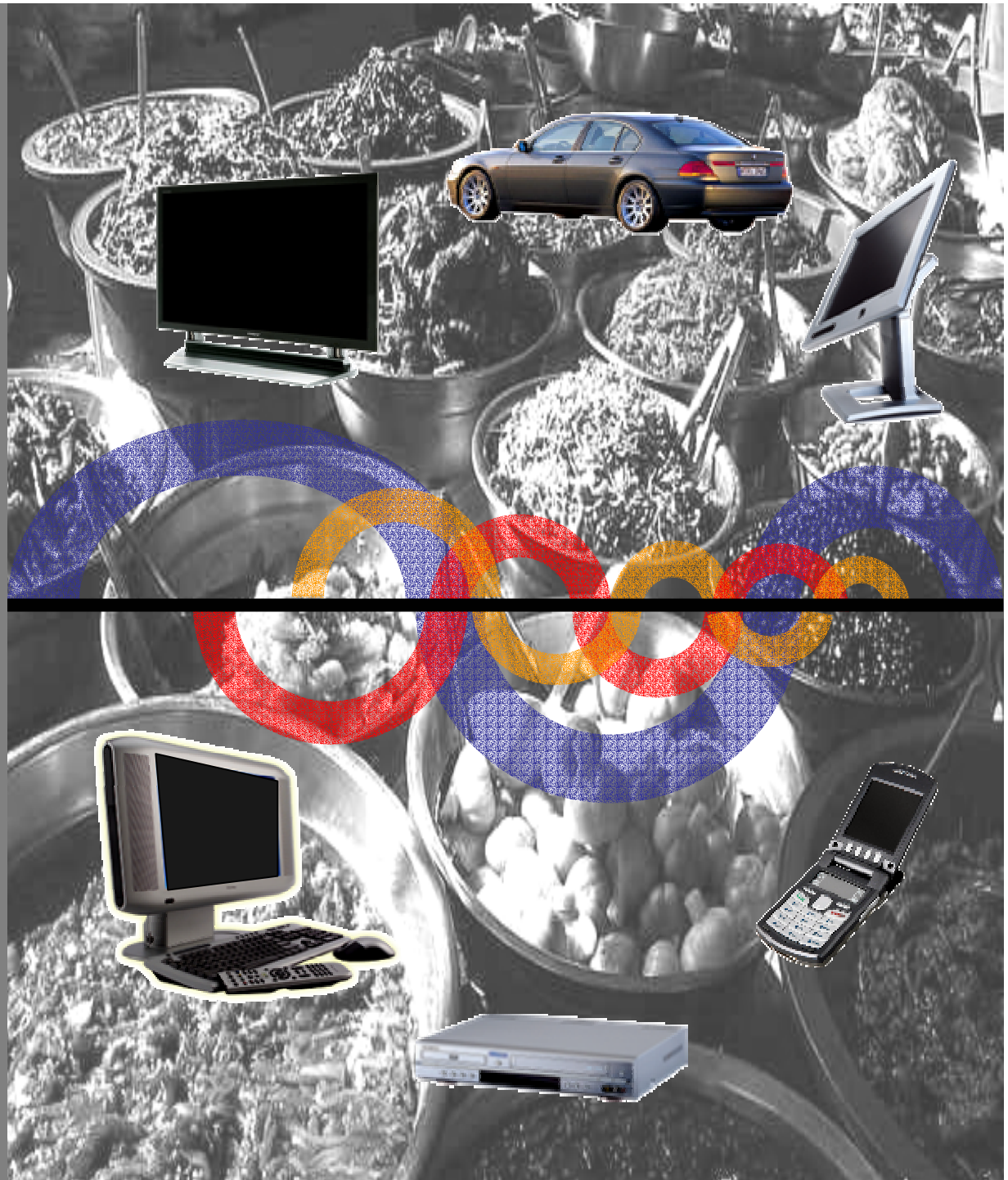
YR	NUMBER OF REGISTERED U.S. MOTOR VEHICLES	NUMBER OF LICENSED U.S. DRIVERS
1950	49,161,691	62,193,495
1960	73,857,768	87,252,563
1970	108,418,197	111,542,787
1980	155,796,219	145,295,036
1990	188,797,914	167,015,250
2000	221,475,173	190,625,023



marketplace

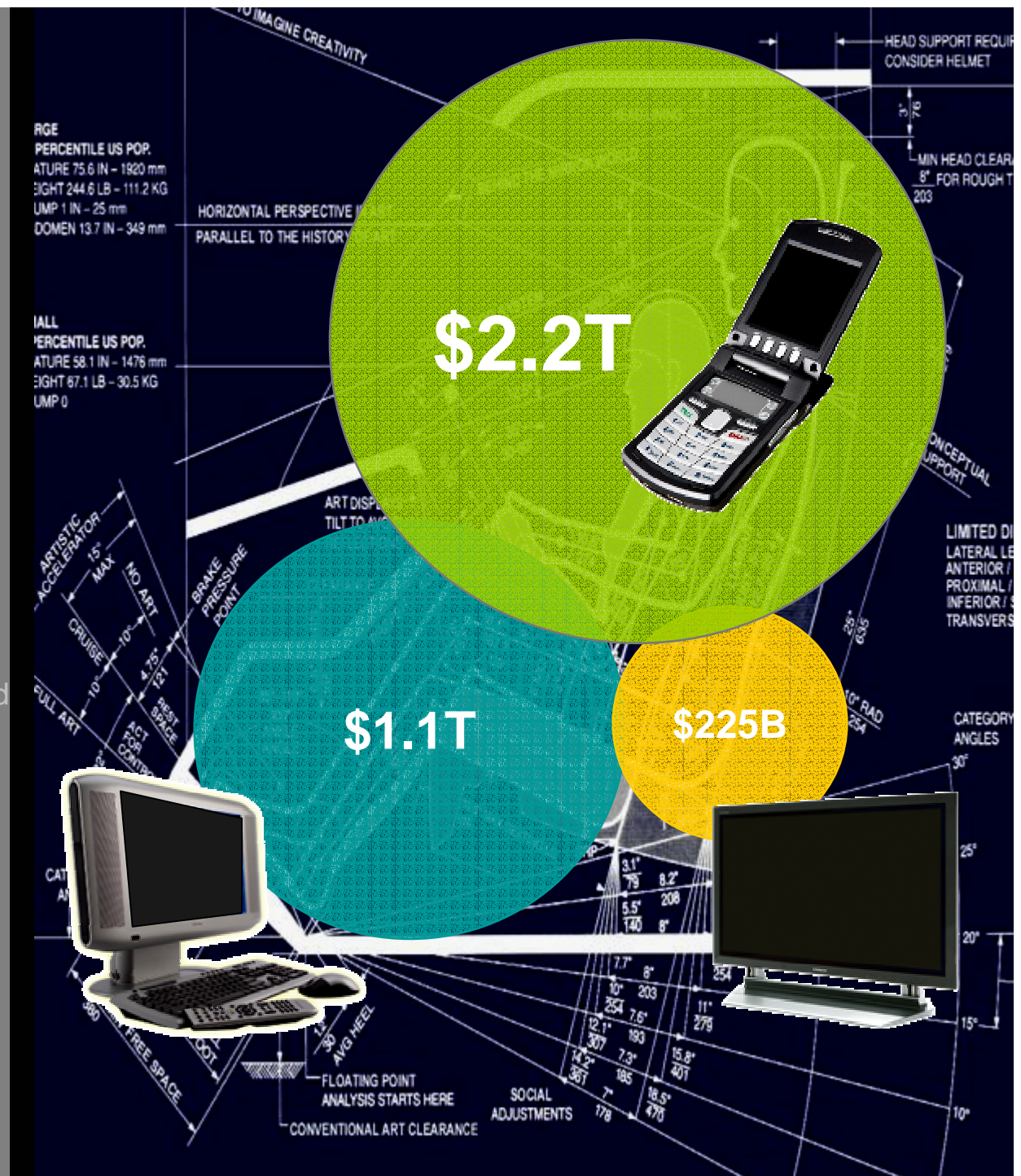
product replacement cycle tends to how long last, but digital technology has changed the cycle due to its commodity and interconnection. major products are released to the market place in short cycle as much as customer preferences are diversified.

Category	Products	R-Cycle month	Vol. 2004
Handset	Phone	12	600M
Display	DTV, monitor	60	70M
Player	VCR, DVDP/R	60	140M
Camera	Digital Still Camera	36	13M
Camcorder	Digital Video Camcorder	36	10M
Portable AV	MP3P, PMP	24	8M
PC	Desk/Laptop		
PDA	Palmtop	24	25M
Telematics	GPS, LBS	36	3.5M



collision

merges among Telecom, CE, Computer Industry in electronics venture into adjoining territories forge new partnerships and take on new rivals. we're definitely heading for collision, rather than convergence-and the collision is going to be between competing industries.



measure

Cost

evaluation, deployment, maintenance
level of disruption (process)

Status

Current maturity
Time to full maturity
Current penetration
Penetration by 200x
Competitors' adoption

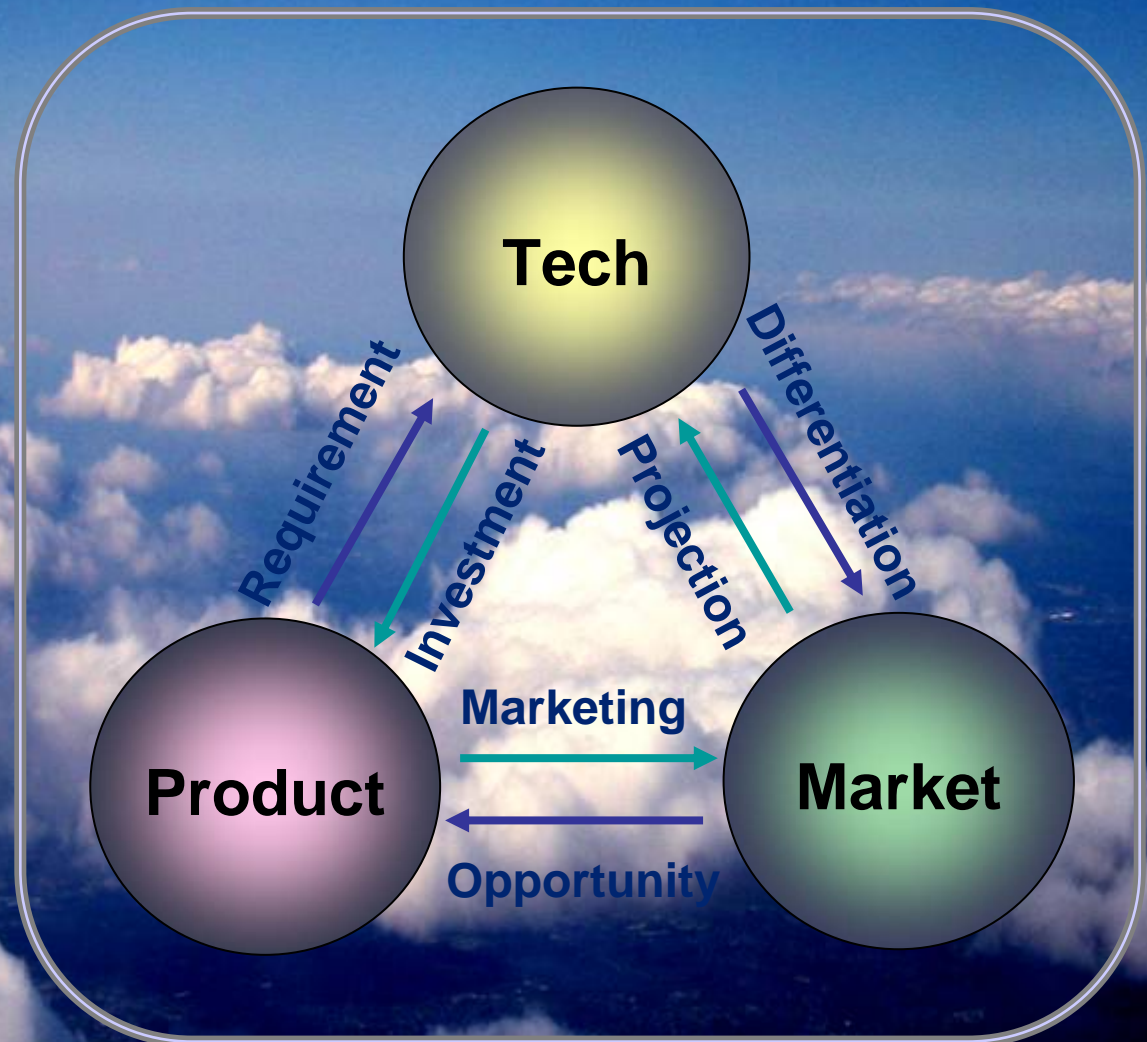
Value

Benefit-impact
Contribution to goals-vision
Return on investment
Cost/risk of not adopting

Risk Factors

Contingency plan
Lack of management support
Non-adoption by users
Benefit not achieved
Lack of maintainability

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congealed

convergence is primarily important in business, or is important in the way that businesses run. especially the ownership of delivering means having contents, distribution, and services all together such as triple play service (TPS: voice+video+data). among networks, contents, and devices manufacturers, network providers have privileges to diversified business models whereas other industries get focus what they are used to.

- amazonBay: transaction
- microOracle: networked OS
- i n v e n t: quantum computing
- newsCorp: VoD and telepresence
- indiSoft: on-off searching engine
- sinoBicorp: human genome DB

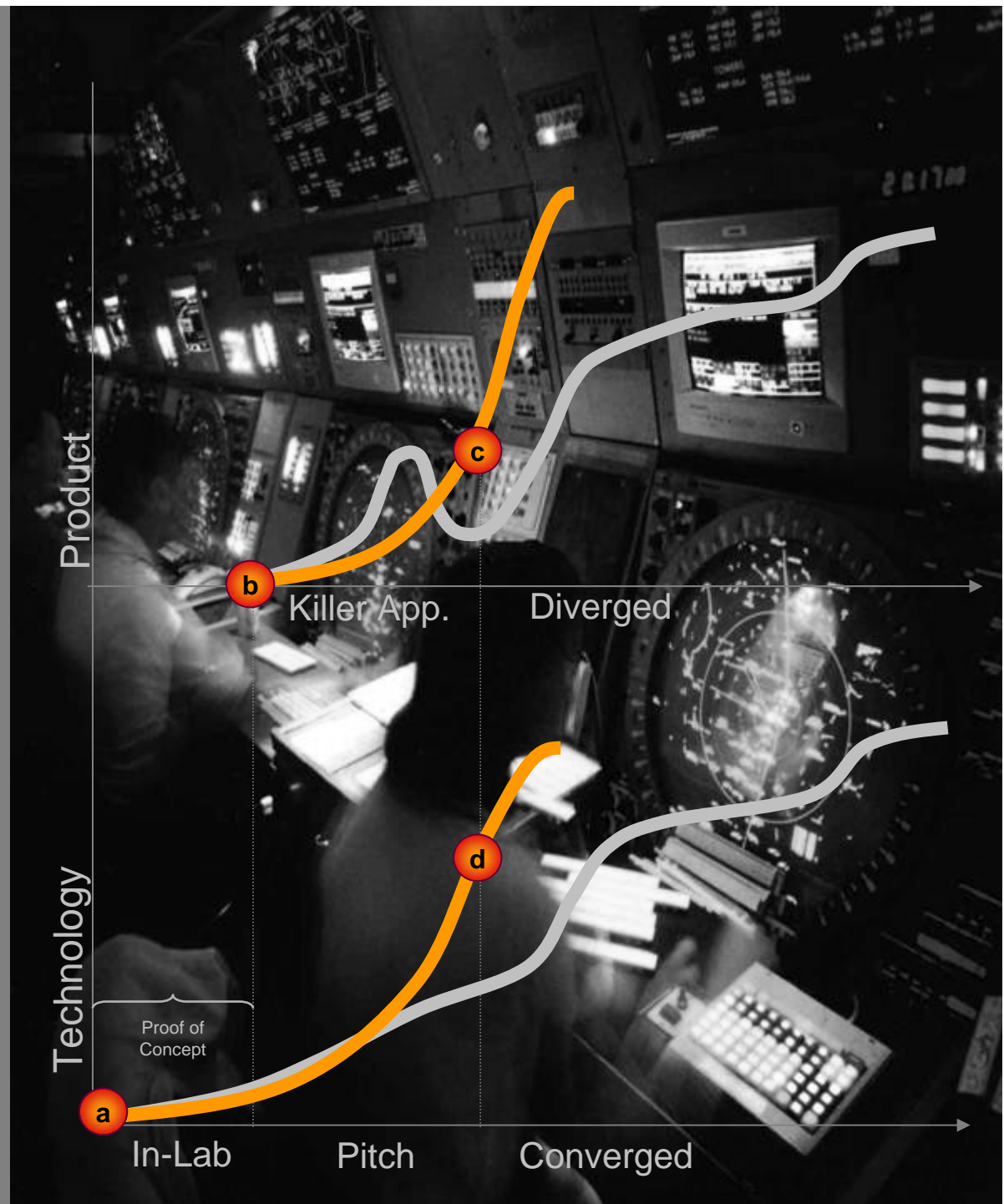


curves

while the digital technology becomes commodity in terms of its uniformity and flexibility, products are increasingly diversified and tie to business model. to keep compelling strengths in the rapidly changing harsh world, the key is how;

- a) to foster doing by learning
- b) to assure the tech adoptability
- c) to drive business flexibility
- d) to converge platforms

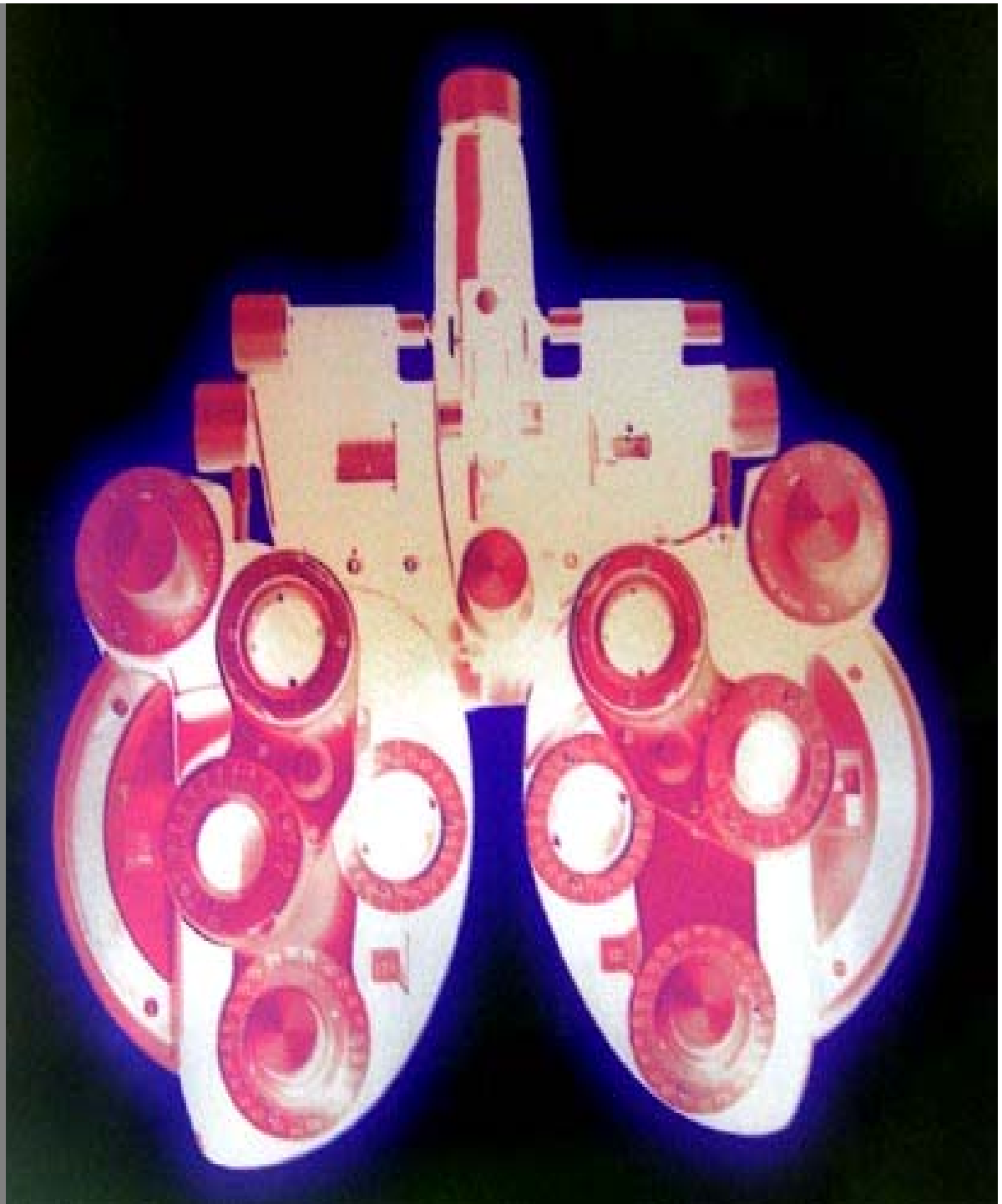
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recap

changes ahead will be as significant as the most disruptive period. as tech converges, the opportunities expand.

chips & software & network connections that have defined the computer industry are spreading quickly into other biz domains. tech companies grappling with maturing computer industry, these new markets brim with potential growth. Likewise, IT industries attempt to enter CE and HA spaces.



AD1800

AD1900

AD2000

AD2100

Atoms

Bits

bits

No Color, Size, Weight, Travels at the Speed of Light, Precise on/off, true/false, up/down, in/out, black/white, 1/0, 1, 10, 11, ... 111, 1000 (8Bits= 1Byte), 64Kbps (voice), 1.2Mbps (music), 45Mbps (video, 32bits/pixel)

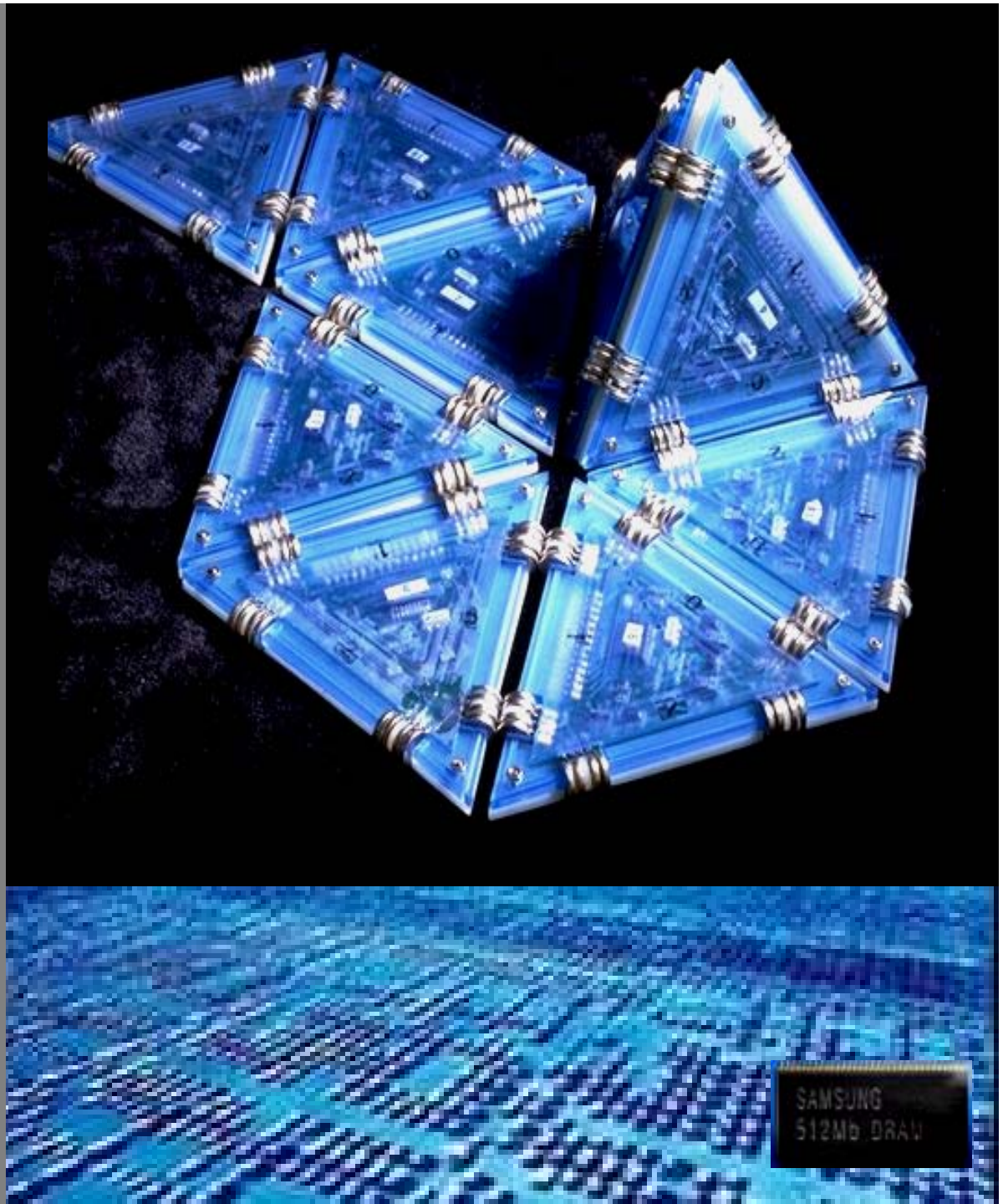
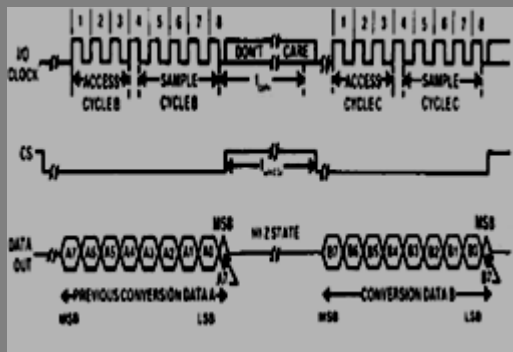
Analogue

Silicon + Network

Digital

digitization

digitization has really enabled the exchanging of data and co-mingling them--an ability to capture, record, transform, transmit, etc. any digital data then shared at any medium by enabling this kind of hypothetic network, enabling some kind of useful functionality of things -- which are tools we think of, talking about information appliances, or network-enabled appliances. not in terms of how they function or what technologies enable them, but in terms of how the data flow and being managed.

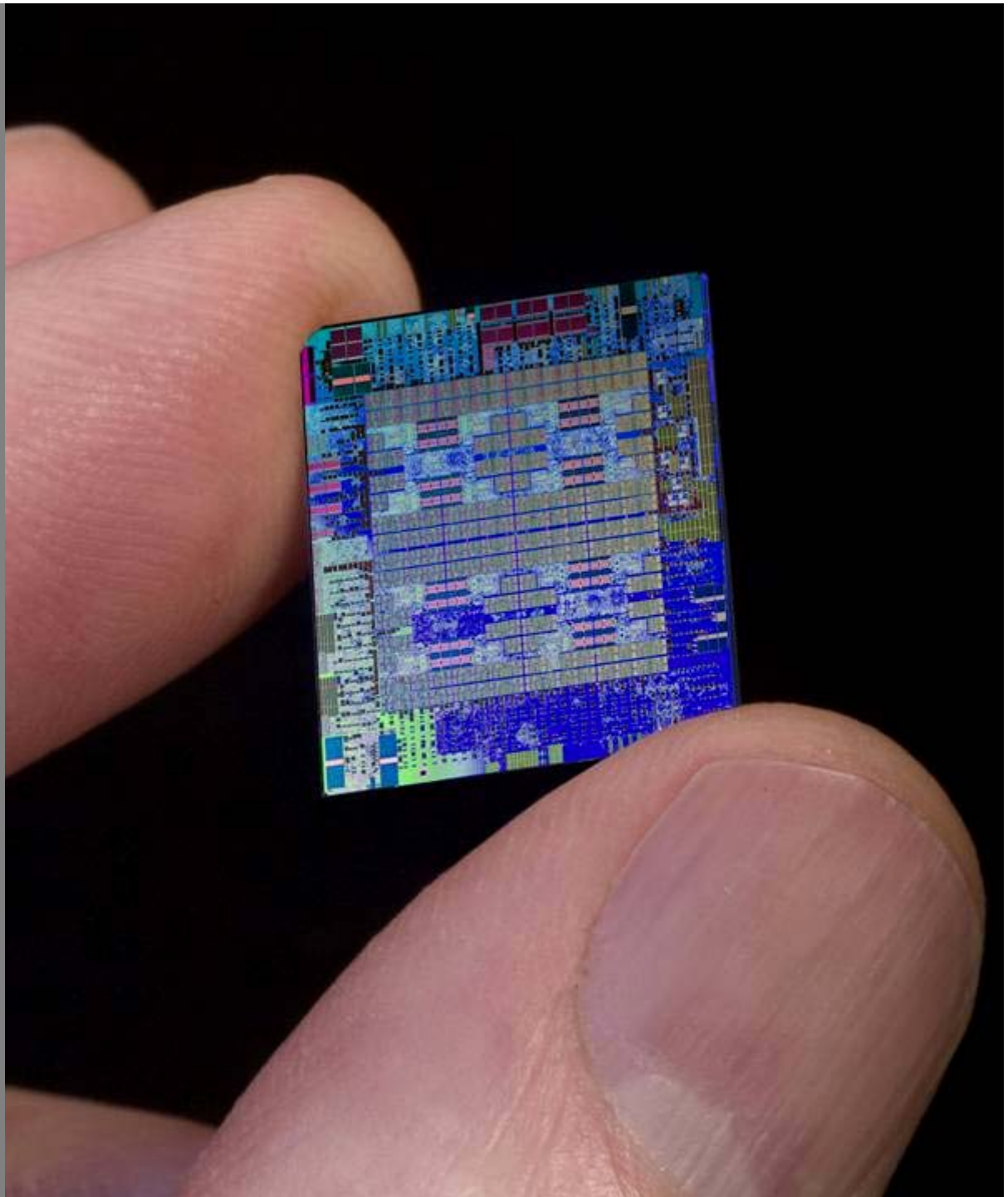


miniaturize

after the invention of the integrated circuit, the tremendous benefits of miniaturizing and integrating larger numbers of transistors into the same integrated circuit has realized.

miniaturization in digital technologies were so essentials to converge two different thing as one. this advancing digital technologies are providing new opportunities for rapidly shrinking size and cost of electronics that allow us to build more intelligence and flexibility into products.

Silicon Packet Processor (SPP) by IBM & Cisco System is powered by 38 million gates, approximately 185 million transistors and 188 high-performance programmable 32-bit RISC processors executing 47 billion instructions per second



display

for the half of the last century, display system in home entertainment industry has always pushed more vivid and cinematic view. (ultra definition, 20-channel, 300-inch). soon enough the system will equip as timeless & placeless hub of services through networked interactivity, nomadic real-time contents ecosystem.



comm.

communications industry is in an upheaval equivalent to that caused by the advent of personal computers and standardization. beyond the gifts from precise, efficient and incremental adoption and instant turnover, decentralized communication services will grow in heterogeneous network topology. the device will be even more radically embedded into our everyday fabrics with ubiquitous surroundings than we ever imagine.



computing

the way in which we communicate with information through machine has literally hampered by existing interface providing text-typing and two-axis navigation on graphical user interface. both 10Ghz calculation speed with trillion bytes of personal database and embedded sensing system can drive human-adopted behavioral interface and interaction to increase the capability of human-machine communication in zero configuration.



pilot

digital technologies is of help from design to manufacturing to marketing to eventually management. the network and convergence allow businesses to manufacture things in a different and more efficient way, a way that allows better physical products more cheaply, more efficiently, and more faster. and that's really where the pilot products can be a success.

it's going to be more important for manufacturing things than it will be for delivering things. the future of industry is driven almost 100% by the ability of a company to render its product or services in digital form and to serve them on the net.

**life recorder
memory browser
16 hours / day
QCIF (176 x 144, 6fps)
97 Terra Byte**



standard

the basis of digital uniformity makes networked things useful. once the existing network communication protocols get inter-networked, every bits can be seamlessly connected and shared at any device, any contents, at anytime anywhere.



alwaysOn

digital electronics devices in both IT and CE will be able to provide people diversified applications 24/7. the device are intelligence to properly contain customized contents, to always connect to the net, and to efficiently operate. more things become complex, more contents are fluid and flux.



hub

different flavors of the same machine:
TV, computer, cellular phone. With
customized information and services,
who is more capable of moving bits
from one to another among home
entertainment, personal computing, and
viral communication.



sharing

Home Media
Multimedia Content Management
Seamless Device Convergence

Home AV
Multi-room and Multi-casting
Multimedia Content Sharing

Home Mobile
Multimedia Telecommunication
Mobile Office and entertainment

Home Care
Monitoring Service Agent
Power Line Control

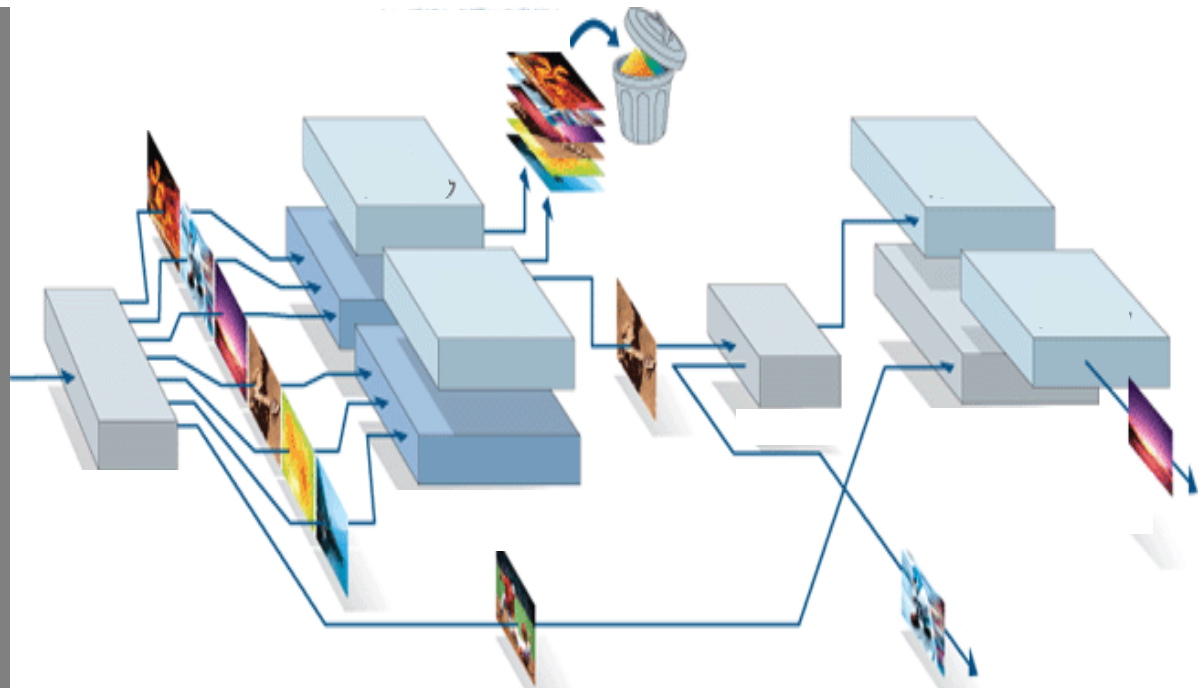


simplicity

multimedia ecology is based on how people utilize bits. the clear direction is to let the bits work time-less & place-less & media-less. mis-concept of how human brain works generate wrong notion of how the machine works. the key element is not to make the machine as complex as human as possible as human can focus what he/she is doing.

Reception → Store → Retrieval →
Stream ← Distribute ← Record ←

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mobility SCoRE

Small vs. Cheap, Rich vs. Easy
24/7

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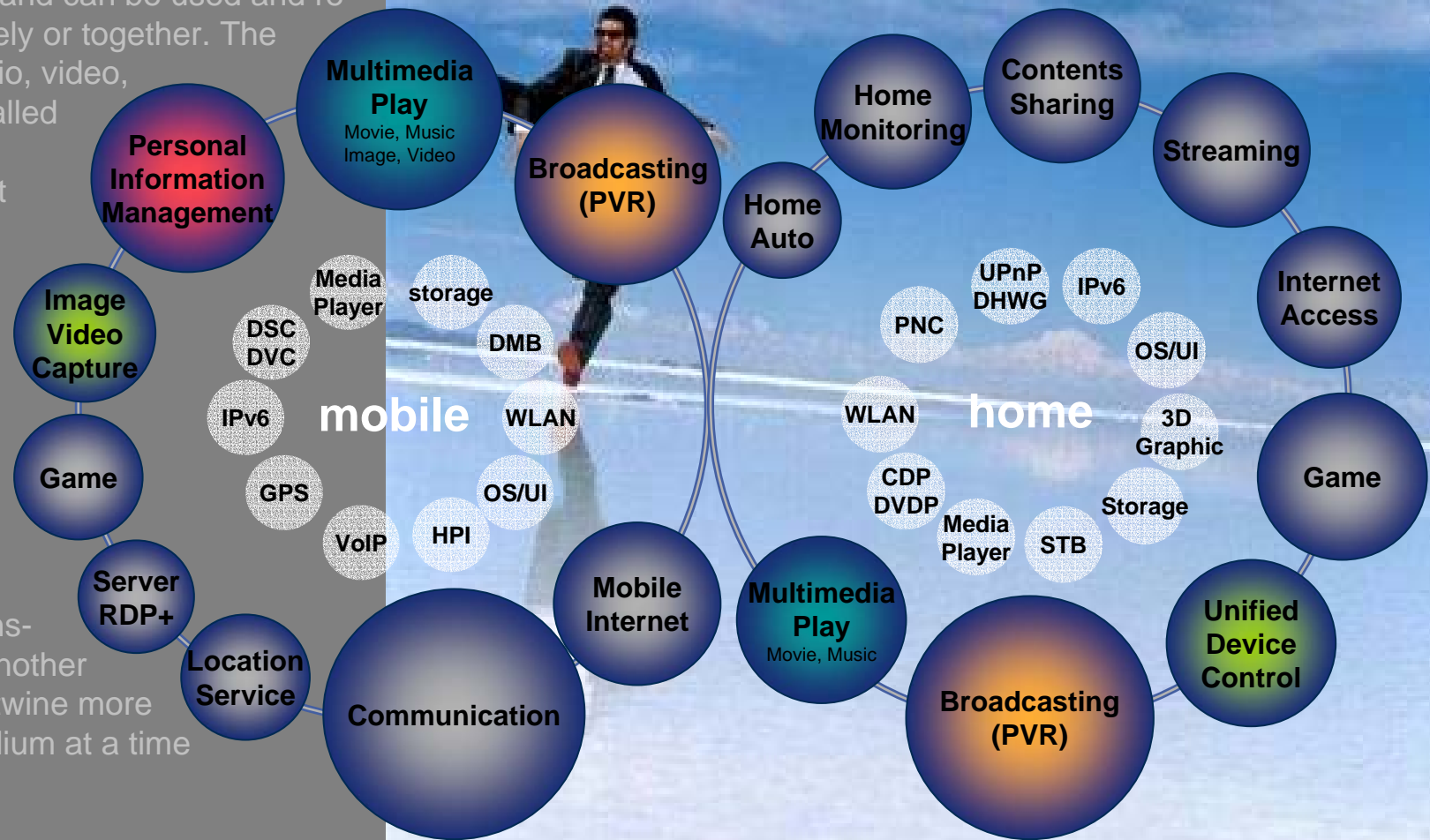
interface

in between the spaces and enclosures, there are always transition that is made between two elements which form common boundary between two parts of matter or space. a reaction bridging them in the process of intellectual and boundary-crossing transitions becomes a vital to navigate, articulate, or redefine the new territories.



multimedia

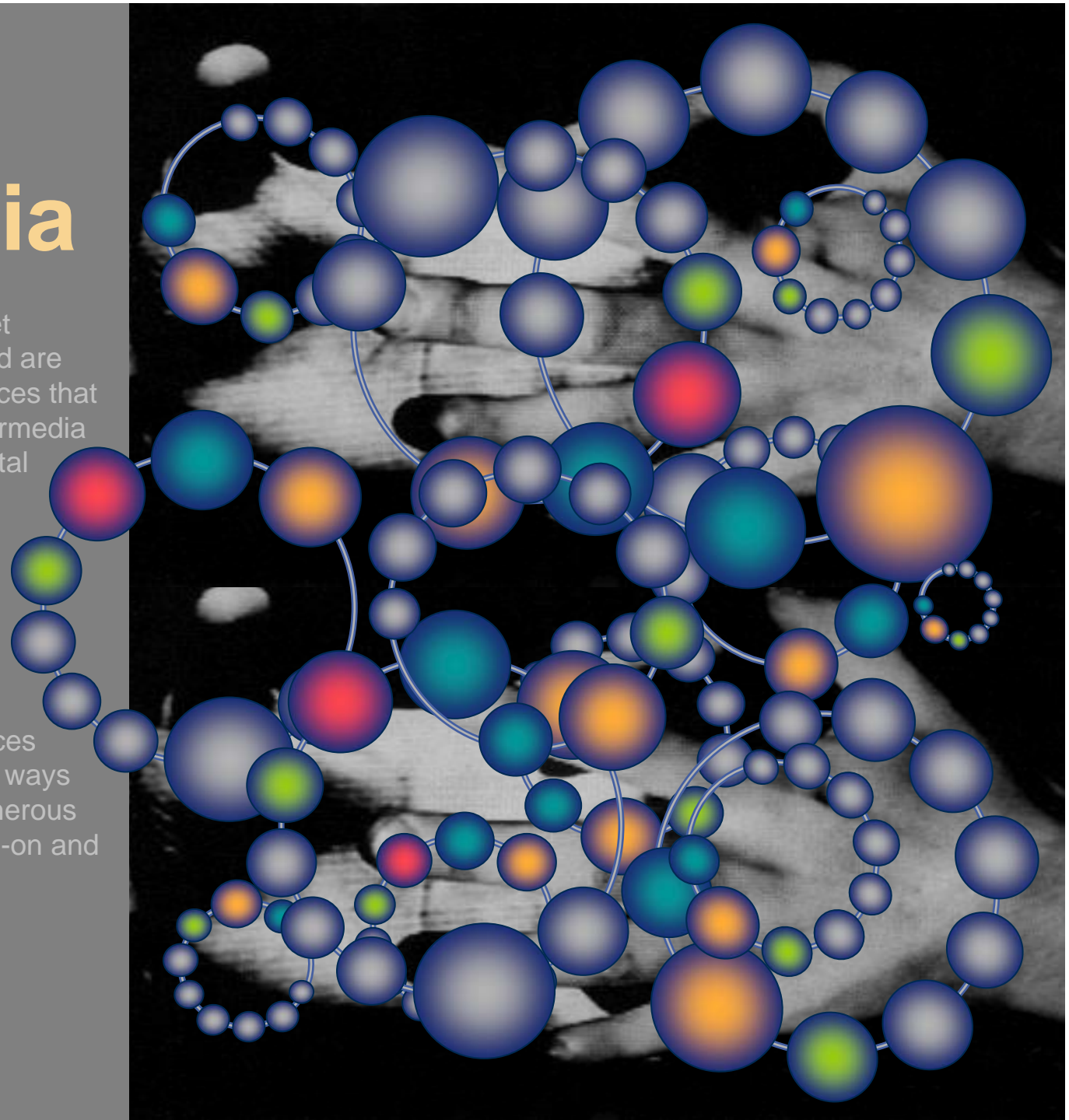
bits co-mingle effortlessly and start to get mixed up and can be used and re-used separately or together. The mixing of audio, video, and data is called multimedia. questions that capture the essence of intersections between digital tech, seamless flow of bits information that can be efficiently transformed into another and can intertwine more than one medium at a time over network.



intermedia

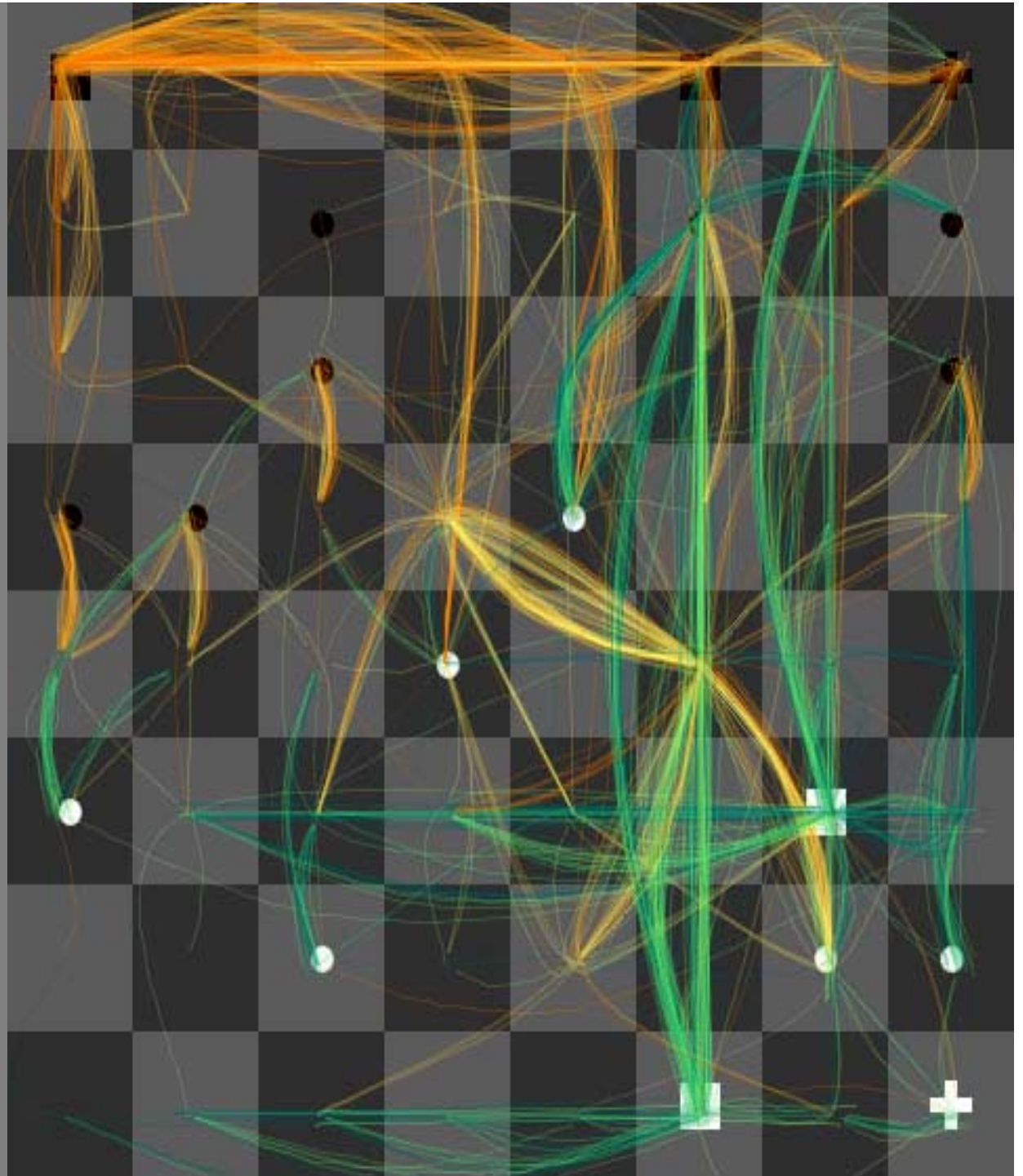
intermedia being networked multimedia, travel over internet protocol network efficiently and are transformed on whatever devices that are connected on the net. intermedia as palpable exploration of digital convergence of multimedia intelligently reshapes multimedia.

people will not have to do anything to stay connected, but they will know their lives are just better. trillions of devices will be connected to the net in ways people will not know. The numerous networked devices are always-on and intelligently share multimedia contents in customized and personalized ways.



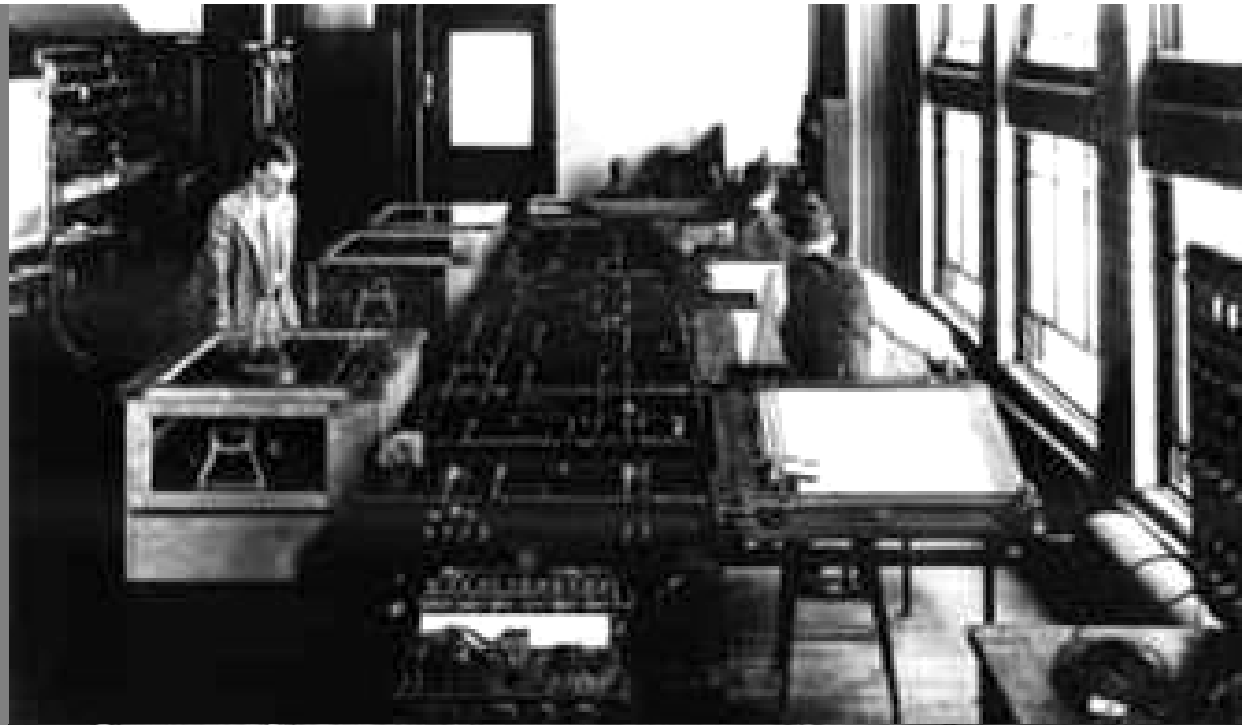
thinks that think

when things start think, things
become knowledge worker whose
main purpose is to communicate
with human intelligence with
efficiency.



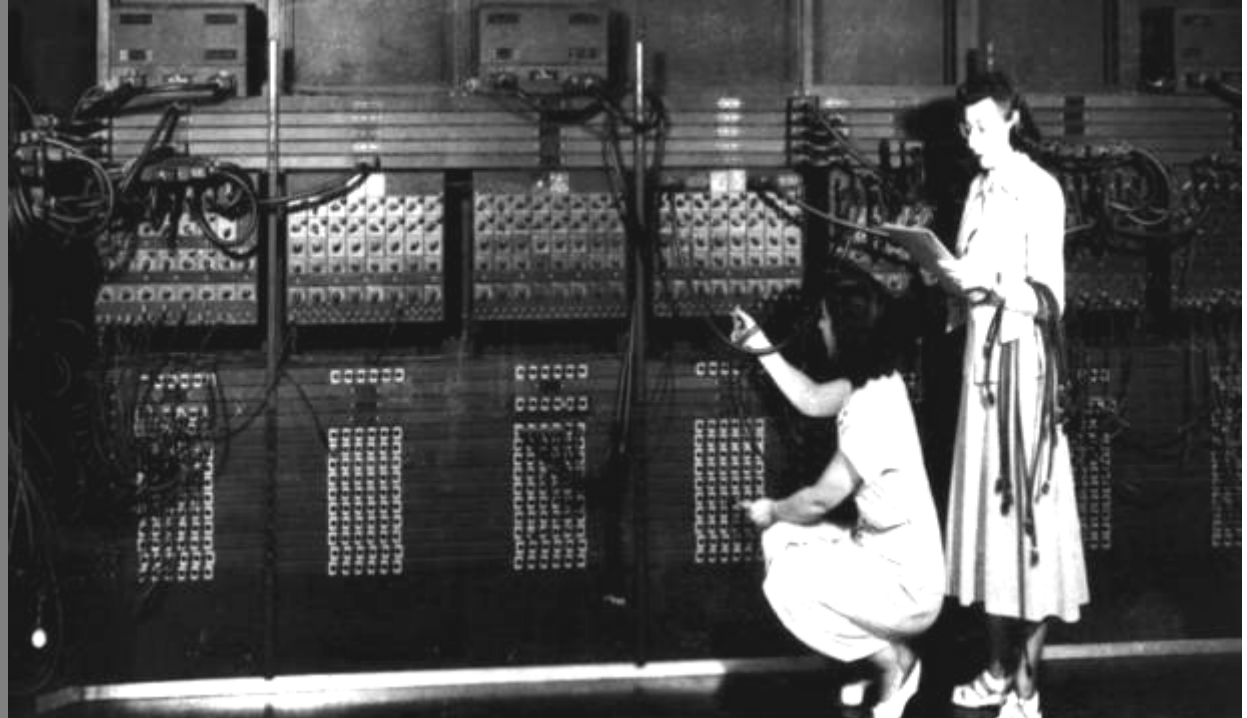
d-analyzer

mathematical computing: An analog computer using mechanical integrators, gears for constant multiplication, (+/-), was primarily used for evaluating and solving differential equations by mechanical integration. Bush at MIT 1935



eniac

electronic computing, consisted of 1500 relays and hundreds of thousands of resistors, capacitors, and inductors. All of this electronics were held in 42 panels: 9 feet tall, 2 feet wide, and one foot thick. Eckert & Mauchly 1945



symbiosis

computer as a intellectual partner or a facilitator of aspects of human creativity and problem solving. human brains and computing machines will be synthetically coupled together very tightly, and that the resulting partnership will think as no human brain has ever thought. Licklider 1960

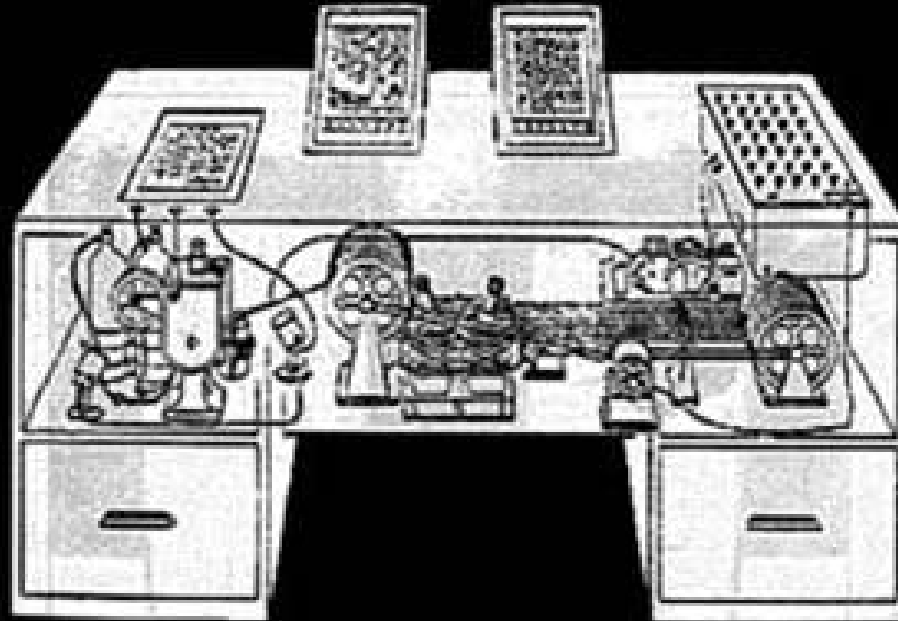
ubiquitous

the most profound technologies are those that disappear. they weave themselves into the fabric of everyday life until they are indistinguishable from it. computational services are delivered through a variety of computational devices such as Tabs, Pads, and Boards, with the infrastructure to allow these devices to talk with each other. Weiser 1991



memex

desktop computer as a fundamental tool for transforming human thought and creative activity. as we may think, the form of a desk, a device for individual, is a sort of mechanized private file and library: information storage, retrieval, and multimedia. Bush, 1945



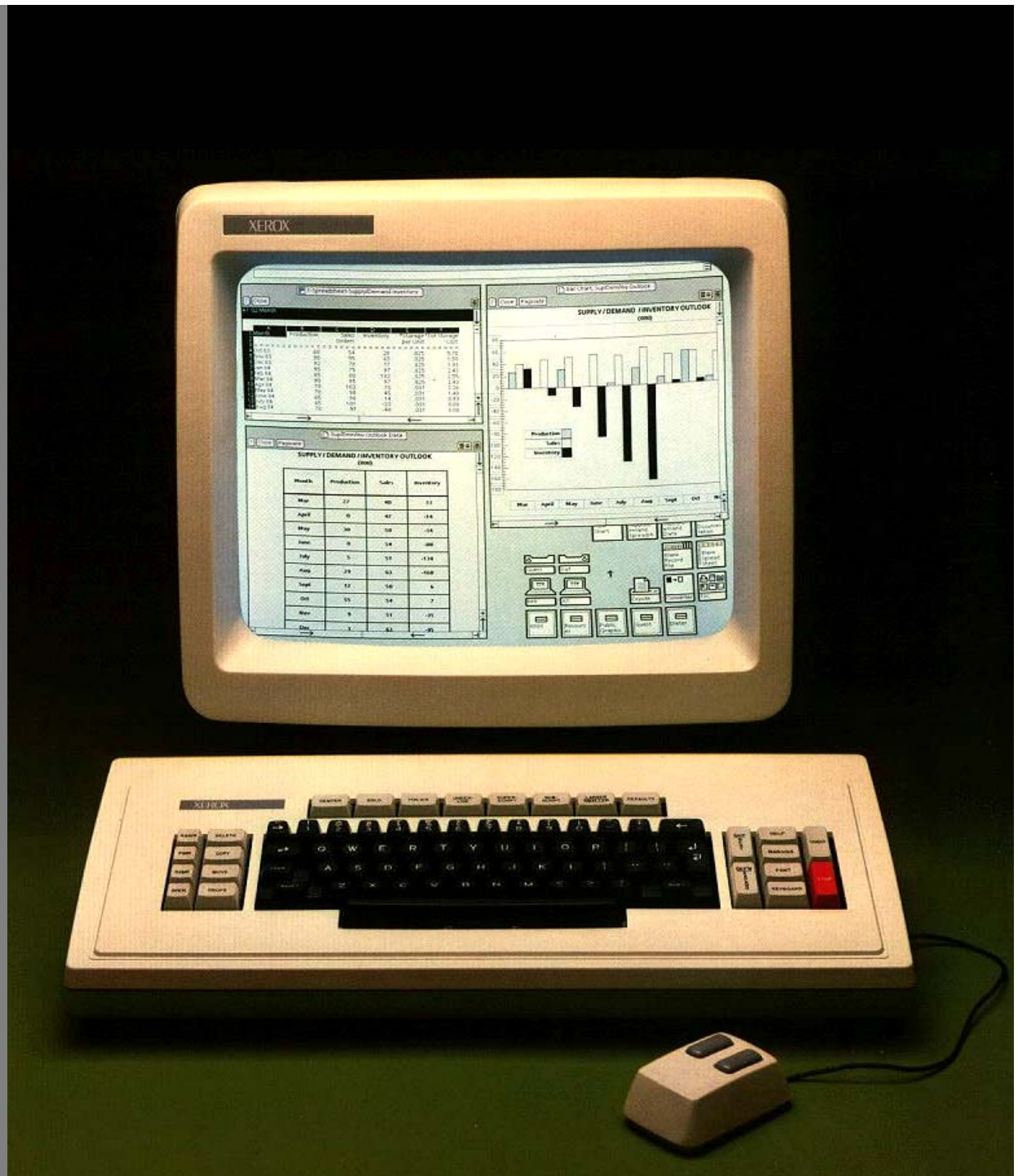
dynabook

when we better understand how our minds worked, user interface would completely shift the paradigm of interaction. as a dynamic medium for creative thought through synthesizing static media, with the intimacy and responsiveness of the personal computer. Kay 1972



thinking machine

forty years ago, the first prototype computer mouse was made to use with a graphical user interface. This direct manipulation (WYSWYG) of information allows people to work with the thinking machines. paradigm of personal computing transformed human activity in coming 50 years.



tangible

physical interfaces between atom, bits, and people; making physical forms to digital information and talking advantage of human senses and skills in everyday life.



mapping

interpreting systems of objects
spatial, relational, constructive,
associated, metaphorical, etc.

- static data (text, image, av file)
- dynamic data (streaming)
- combination of data
- attributes, operations
- material properties



network

virtually all the world is linked by packet switched communications service which become the revolution of human communication.



IP network analyzer at MIT

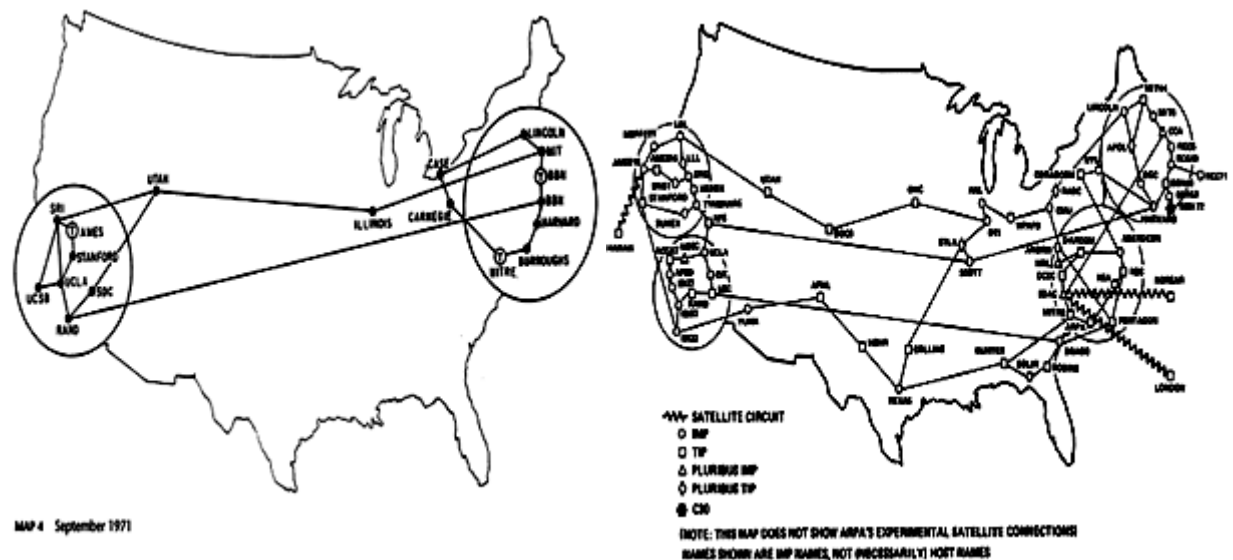
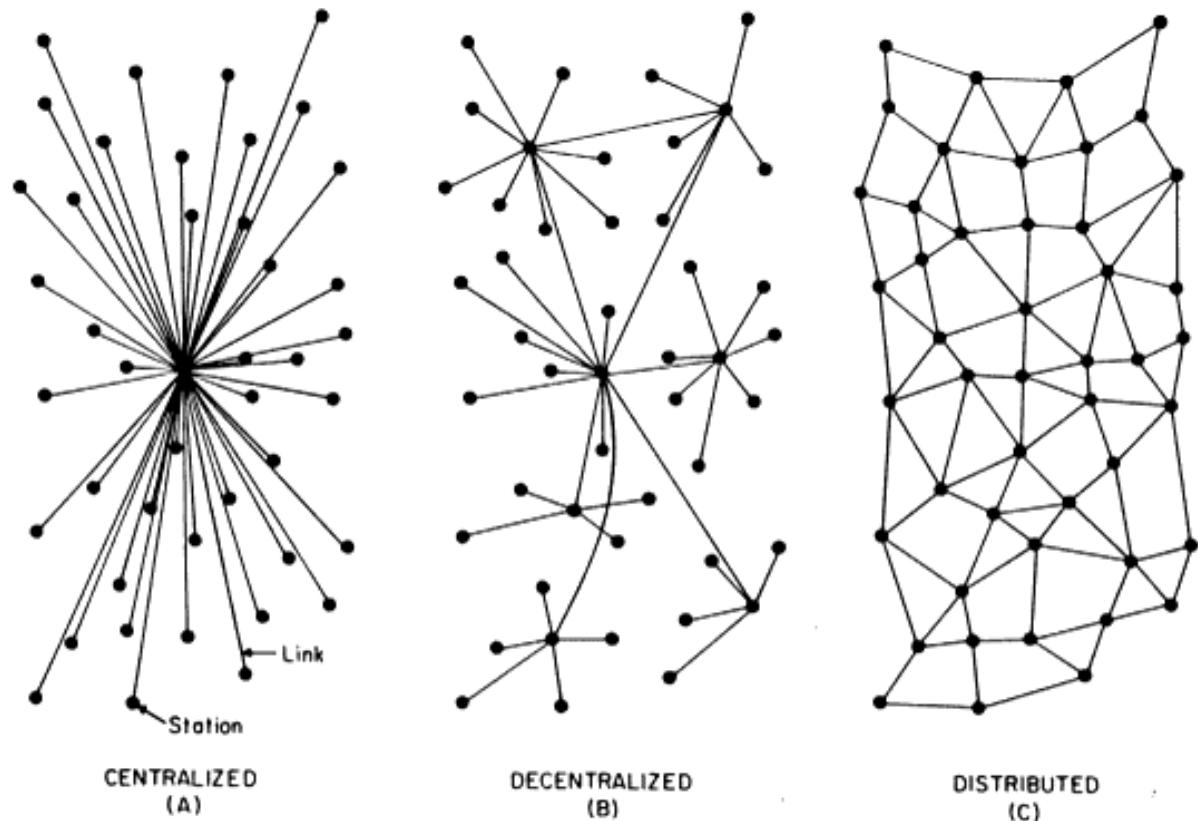


net

human brains and computing machines will be coupled together very tightly, and that the resulting partnership will think as no human brain has ever thought. Ted Nelson 1963

a collaborative method of sharing knowledge through interactive linking is now modern on-line system, supplying a coherent, comprehensive environment in which a knowledge worker can do all of his central, everyday work. Douglas Elgelbart 1968

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50x15

computation Industry is in an upheaval equivalent to that caused by the advent of personal computers. Beyond the gifts from precise, efficient and incremental adoption and instant turnover, de-centralized services grow in network

50 % of the World population will access internet by 2015

Σ Networked Lifestyle

People + Device + Service

X

(All IP Network)

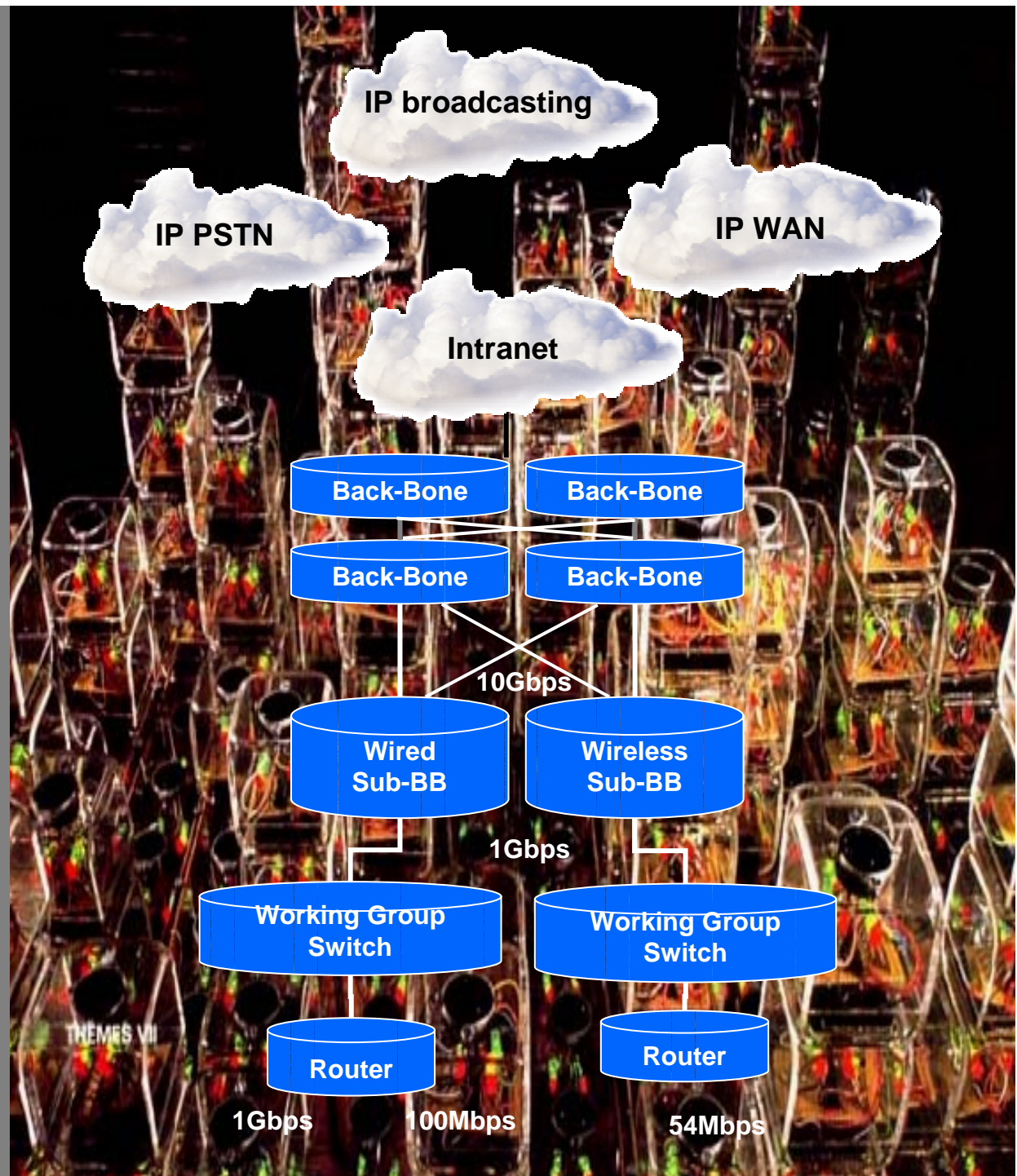
Telecom + Internet + Broadcast

Broadband

FTTH/D + 100Mbps + Wi-Fi

all IP

more broadband network infrastructure spreads out, more internet protocol eat up all applications. The convergence of broadcasting, telecommunication, and internet will happens when the stalling point of installation of new infrastructure meets the cost of packet use.



take-off

to build networks around existing human functions, markets for ubiquitous devices must be driven by viral networks, and seamlessly integrated into everyday machines.

enabling networked devices is to be aware of their surroundings and peers, and to be capable to provide services and use services from peers effectively. the bits pervasive means having information to spread throughout. when multimedia travel over unlimited internet and be available to connect to/from every devices that's the intermedia.

1999: a music file : 5 MB, 56kps, 13mins
2004: a video file: 150MB, 1.5Mbps, 14mins

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- **Digital Multimedia Broadcasting**

- WAN portable internet
- VoIP/MoIP

- **Triple Play Service (TPS)**

- **contents download service**

- Telemetrics
- all IP home networking

multimedia → **intermedia**

- **Broadband (true 54Mbps)**
- **Internet Protocol v.6**

- **AV communications**

- **4G phone**

- **zero configuration**

- **E-ink Display**

- **home server (100GB)**

2005

2010

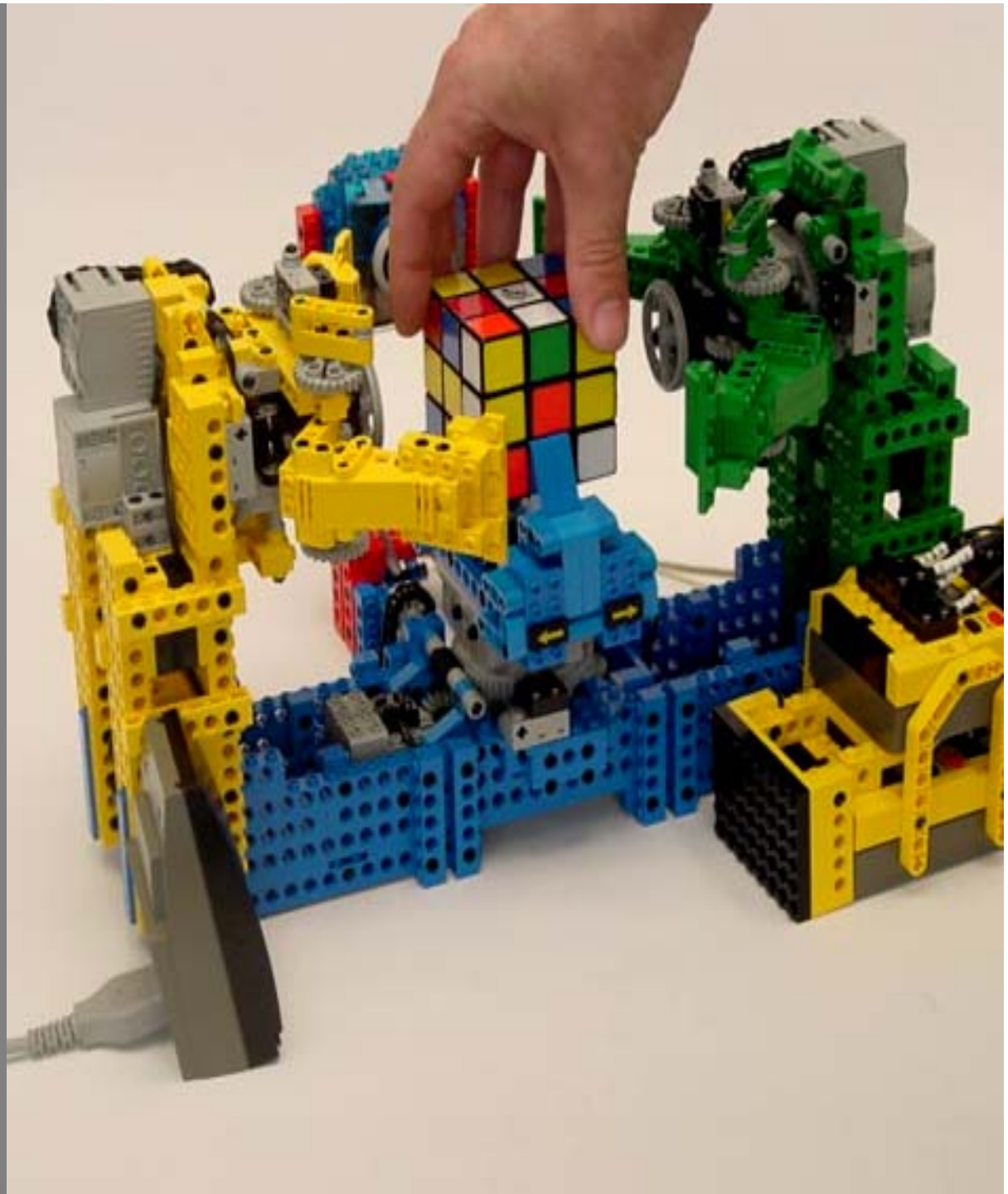
diverse

multidisciplinary and collaborative.
having technologies that are aware of
diversity of contexts, commands, and
requirements.

integration
the combination of aesthetical and
technological creativity into the hybrid
form of expression and use.

interactivity
the ability to conduct physically
embedded digital technology through
directly manipulate and effect our
experience to media.

intelligence
conceptual and technological design
archived through intense cross-
disciplinary collaboration and nobel
hardware/software engineering and
implementation



future ideas at work today

track trends for timing
conceal the sources
get the unit of economics right

unique perspective
peripheral vision
play alone
focus on want not think
go hollow



intermedia devices
intermedia applications
intermedia lifestyles

