بسم الله الرحمن الرحیم

فضای سایبر

جلسه ۲۶

مورد مطالعاتی:

تطور وب

Case Study: Web Evolution

کاظم فولادی قلعه
دانشکده مهندسی، دانشکدگان فارابی
دانشگاه تهران

http://courses.fouladi.ir/cyber

مورد مطالعاتی: تطور وب

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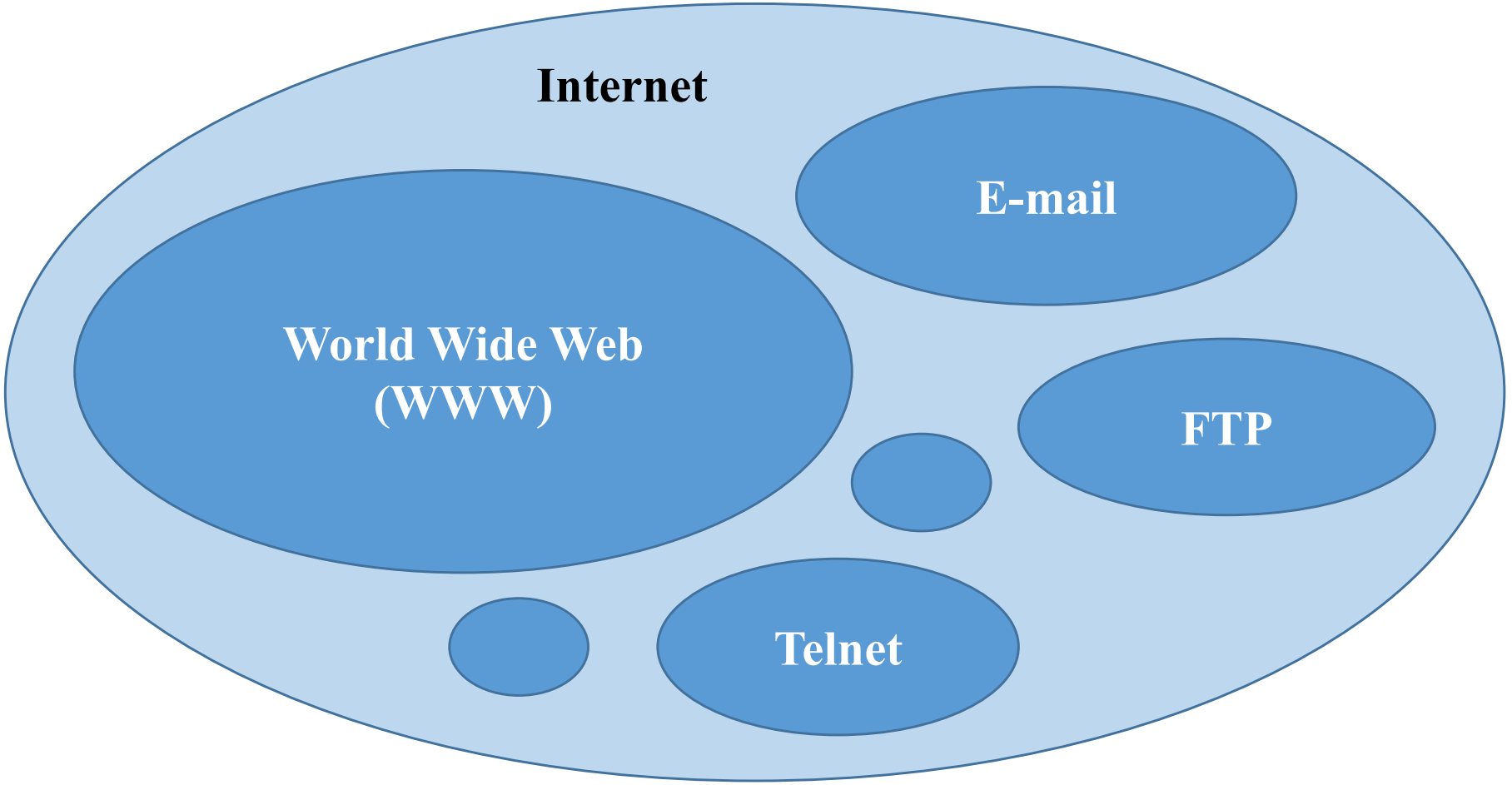
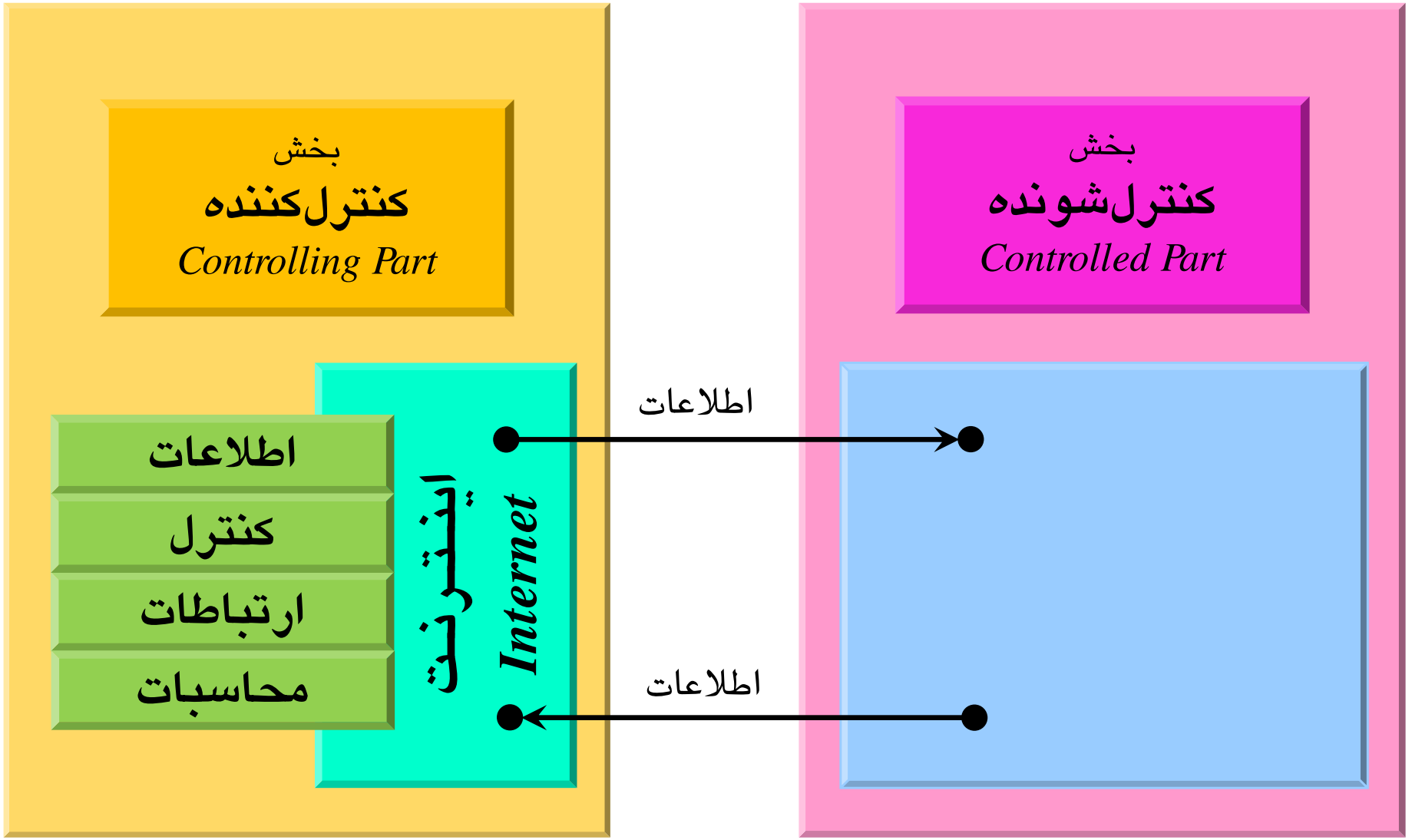
مقدمه

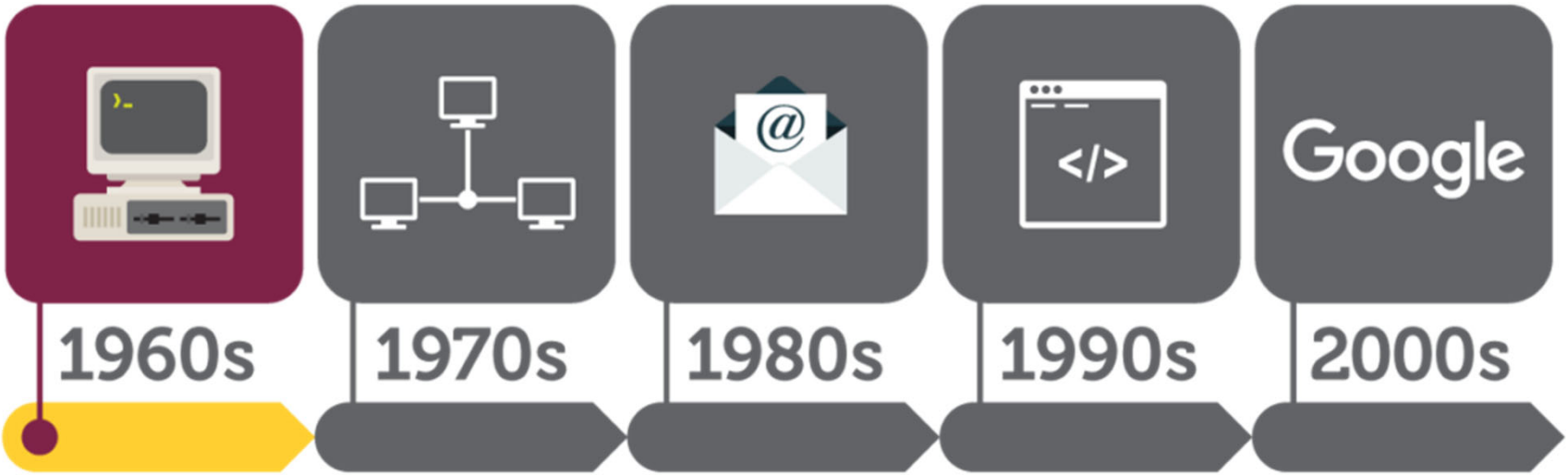
اینترنت و وب

وب پر استفاده‌ترین بخش از اینترنت



اینترنت به‌عنوان یک کاربرد




1960s
1970s
1980s
1990s
2000s
Google

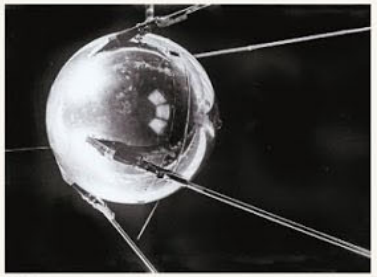
تاریخچه‌ی اینترنت

1960s-1970s	US Department of Defense network called ARPANET initial services: electronic mail, file transfer
late 1980s	opened to commercial interests
1989-1991	WWW created by Tim Berners-Lee
1994-1995	popular web browsers released: **Netscape** 1994, **IE** 1995
1995	Amazon.com opens
1996	Google!

A BRIEF HISTORY OF THE INTERNET

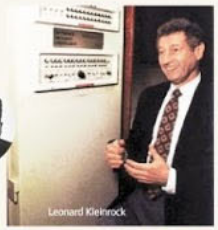
THE INTERNET AGE

Much like the industrial revolution, the Internet revolution has changed the way people live, shop, socialize and work, and the way companies operate. In the run-up to the 20th anniversary of the 9 August 1995 listing of Netscape's shares on Nasdaq, Mint lists the important landmarks in the evolution of the Internet as we know it today, with special emphasis on India.



1958: The US establishes the Defense Advanced Research Projects Agency (Darpa) in response to the USSR's launch of Sputnik during the Cold War.

1961: Leonard Kleinrock at the Massachusetts Institute of Technology (MIT) publishes the first paper on packet-switching theory—a theory that comes into use later for sending data through the Web.



1962: J.C.R. Licklider of the MIT proposes the concept of a "Galactic Network", similar in concept to today's Internet. Licklider is chosen to head Darpa's research efforts.

1965: Computers TX-2 in MIT and Q-32 in California are connected via a telephone network. With the first wide-area computer network comes the realization that time-sharing works well, although not over telephone networks (circuit switching), but through packet switching.

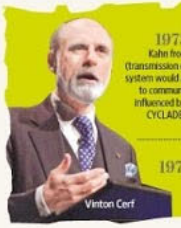
1967: Lawrence G. Roberts of MIT goes to Darpa, comes up with his plan for Arpanet and publishes it. MIT (1961-67), RAND Corp. (1962-65) and the National Physical Laboratory (NPL), the UK (1964-67), all research in parallel about packet switching without the knowledge of each other's work.

1968: BBN Technologies wins a contract to build the first network switch. Bolt Beranek and Newman (BBN) was a group set up by former MIT professors and headed by Frank Heart.

1969: Four different nodes in different universities in California and Utah are connected—the University of Utah, the University of California at Santa Barbara, Stanford and the University of California, Los Angeles (UCLA). Charley Kline of UCLA sends the first Arpanet transmission to Bill Duvall of Stanford. He attempts to send "LOGIN", but the system crashes before he can reach "G". Only "LO" reaches.

1970: Packet-switched network Mark I is built to serve the NPL in the UK. Developed by Donald Davies, a Welshman and a colleague of Alan Turing while at NPL in the late 1940s.

1972: First program devoted to electronic mail (email) is created by Ray Tomlinson at BBN. The concept of 'name@destination' is created; Network Control Protocol (NCP) is also introduced to allow computers running on the same network to communicate with each other. First email sent out by Tomlinson is a test message; it isn't preserved and he calls it insignificant, something like 'QWERTYUIOP'.



1973: Vinton Cerf from Stanford and Bob Kahn from Darpa begin work developing TCP/IP (transmission control protocol/Internet protocol). The system would allow computers on different networks to communicate with each other. TCP/IP is heavily influenced by the French packet-switching network CYCLADES, which was decommissioned in 1981.

1974: Kahn and Cerf refer to the system as the Internet for the first time.

1976: The Ethernet is developed by Robert M. Metcalfe. It's a way of connecting computers together in a local area network (LAN).

- SATNET, a satellite program, is developed to link the US and Europe. Satellites are owned by a consortium of nations, thereby expanding the reach of the Internet beyond the US.
- Queen Elizabeth II sends out an email from England promoting a new programming language developed by the British ministry of defence via Arpanet. Her username: HME2 (Her Majesty, Elizabeth II).
- AT&T Bell Labs develops UUCP (Unix-to-Unix Copy) and UNIX.

1979: USENET, the first news group network, is developed.

- International Business Machines Corp. (IBM) introduces BITNET to work on emails and listserv systems.

1981: The National Science Foundation (NSF) releases CSNET 56. Allows computers to network without being connected to government networks.

1983: TCP/IP becomes the standard for Internet protocol. For this reason, 1 January 1983 is celebrated as the unofficial birthday of the Internet.

- Domain Name System is introduced to allow domain names to automatically be assigned an IP number.

1984: The number of hosts crosses 1,000. MCI Communications creates T1 lines for faster transportation of information over the Internet.

1989: The number of hosts crosses 100,000. Traffic rises and plans are to find a new replacement for the T1 lines.

- The first link is established between Australia and NSFNET via Hawaii on 23 June. Australia was limited to USENET up until then.
- Arapnet is decommissioned.

1990: Advanced Network and Services (ANS) develops the T3 line for faster speeds.

- A hypertext system is created and implemented by Tim Berners-Lee while working for CERN (European Organization for Nuclear Research).
- Archie, the first search engine, is created at McGill University, Canada. Archie's developer Peter Deutsch insists it is short for "archiver" and has nothing to do with the comic strip. Parker is disgusted when two follow-up search engines Veronica (Very Easy Rodent-Oriented Net-wide Index to Computerized Archives) and Jughead (Jonzy's Universal Gopher Hierarchy Excavation And Display) are created.

1991: The US gives the nod to commercial enterprises to take off on the Internet; the first item to be purchased off the Internet was a Pizza Hut pizza in 1994.

- NSF creates the National Research and Education Network (NREN).
- CERN releases the World Wide Web publicly on 6 August.

1992: The Internet Society (ISOC) is chartered.

- The number of hosts breaks 1 million.

1993: InterNIC is released. It provides general services, a database and an Internet directory.

- The first Web browser, Mosaic (created by the National Center for Supercomputing Applications), is released. Mosaic later becomes Netscape. Erwise, a browser developed by Finnish students, was created a year earlier, but discontinued due to a lack of funding.

1994: The first Internet bank is opened. First Virtual. The World Bank went online two years earlier.

- Yahoo is founded as Jerry Yang and David Filo's guide to the World Wide Web (WWW). It is incorporated a year later.

1995: WWW edges out Telnet to become the second most popular service.

- Registration of domains is no longer free; NSF sells them for an annual fee of $50 apiece.
- Netscape launches its initial public offering (IPO) on Nasdaq; the stock's value soars to $75 from $28 per share on the first day of trading before closing at $58.25.
- Rajesh Jain launches IndiaWorld Communications.
- Videsh Sanchar Nigam Ltd (VSNL) launches India's first full Internet service.
- Satyam Infoway is founded.

1996: WWW browser wars waged, mainly between Microsoft Corp. and Netscape.

- Internet service providers (ISPs) begin appearing, such as Sprint and MCI.
- Nokia releases the first cellphone with Internet access—Nokia 9000 Communicator—in Finland via two local networks.
- Ajit Balakrishnan launches Rediff.com.
- Several Indian newspapers set up websites.

1997: Sanjeev Bhikchandani launches Naukri.com, a jobs portal.

- Pradeep Kar's Micromedia holds the first Internet World exhibition.

1998: Satyam Infoway becomes India's first private ISP.

- Netscape releases the source code for Navigator.
- The Internet Corporation for Assigned Names and Numbers (Icann) is created to oversee a number of Internet-related tasks.
- Google is founded in Menlo Park, California.

1999: Satyam Infoway acquires IndiaWorld for ₹499 crore.

- Ashish Dhawan and Raj Kondur launch Chrysalis Capital, a venture capital fund.
- Wireless technology called 802.11b, more commonly referred to as Wi-Fi, is standardized.

2000: The dotcom bubble bursts, numerically, on 10 March. The Nasdaq Composite Index peaks at 5,048.62.

- Avnish Bajaj and Suvir Sujan launch auction site Baazee.com.
- Deep Kalra launches MakeMyTrip.com.
- India's Parliament passes the Information Technology Act.
- Rediff lists on Nasdaq.
- Spectranet launches broadband services.

2001: Blackberry releases the first Internet cellphone in the US—Blackberry 957—with "push email".

- Indian Railways allows online booking of tickets through Irctc.com.

2003: The French ministry of culture bans the use of the word "email" by government ministries, adopts the use of the more French sounding "courriel".

- Airtel launches broadband services in India.

2004: Web 2.0 rises in popularity. Tim O'Reilly and MediaLive host the first Web 2.0 conference.

- Mydoom, the fastest spreading email computer worm, is released. An estimated one in 12 emails is infected.
- India approves broadband policy.
- eBay buys Baazee for $50 million.
- Mark Zuckerberg launches Facebook.
- Google launches social networking site Orkut.

2005: YouTube is launched.

- Dot in sites are launched.
- Estonia offers Internet voting nationally for local elections.

2006: The number of Internet websites reaches more than 92 million.

- Twitter is launched.
- Info Edge (India) Ltd, the parent company of Naukri.com, files for an IPO.
- Zimbabwe's Internet access is almost completely cut off. Intelsat cuts service for non-payment of dues.
- Internet2 announces plans for the launch of a brand new nationwide network. Aims to boost capacity from 10gbps to 100gbps.

2007: Sachin Bansal and Binny Bansal start Flipkart.

- Google News launches Hindi service.

2008: Google Index reaches one trillion URLs.

- Apple launches its first iPhone in India, almost a year after its global launch.
- Google releases the Chrome Web browser.
- Nasa successfully tests the first deep-space communications network modelled on the Internet.
- Dozens of space images are transmitted to and from a Nasa science spacecraft located more than 32 million km from Earth.

2009: Icann gains autonomy from the US government. Opens up applications for internationalized domain names.

- Kickstartor is founded in April. Crowdfunding becomes popular with start-ups.

2010: The first tweet from space: astronaut T.J. Creamer tweets from aboard the International Space Station.

- WikiLeaks collaborates with media organizations to release US diplomatic cables.
- Snapdeal is started as a daily deals platform.
- 3G and broadband wireless access spectrum auctioned (in India).
- The number of registered domains reaches 200 million.
- Photo sharing evolves with the launch of Pinterest and Instagram.

2011: The number of Internet users reaches two billion.

- Number portability is launched in India.
- Microsoft buys Skype for $8.5 billion.
- The Stop Online Piracy Act (SOPA) is introduced in the US by Republican Representative Lamar S. Smith.
- iPad enters the India market.

2012: Facebook files for an IPO. It also reaches one billion monthly active users (604 million on mobile).

- Icann begins accepting applications for new generic top-level domains.
- Amazon becomes the largest hosting location with 118,000 Web-facing computers.
- Twitter passes 200 million active users (December), and 500 million tweets per day (October).
- Nasa's Curiosity Rover checks in on Mars using the mobile application FourSquare.
- The Gangnam Style video on YouTube reaches one billion views.

2013: Twitter files for an IPO.

- Former US Central Intelligence Agency (CIA) employee and National Security Agency (NSA) contractor Edward Snowden leaks classified documents to media organizations.
- Netflix and YouTube account for over 50% of Internet traffic measured by bytes.
- The number of Internet hosts surpasses one billion.

2014: The number of Web servers surpasses one billion.

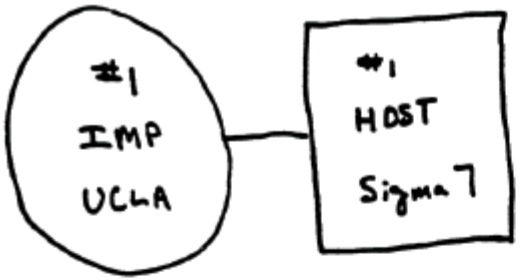
- Google shuts social networking site Orkut.
- Facebook buys WhatsApp for $19 billion.
- A European Union court orders Google to honour "requests to be forgotten"; 12,000 requests are submitted on the first day after this.
- Icann domain auction sales fetch more than $32 million.

2015: A debate on network neutrality garners public attention after Airtel announced in December 2014 that it plans to to levy additional charges for making voice calls from its network using services such as WhatsApp and Skype.

- In March, the Telecom Regulatory Authority of India releases a formal consultation paper on a regulatory framework for Over-the-top (OTT) services, seeking comments from the public. The consultation paper is criticized for being one-sided and having confusing statements.

Graphic: Mohsin Shaikh/Mint

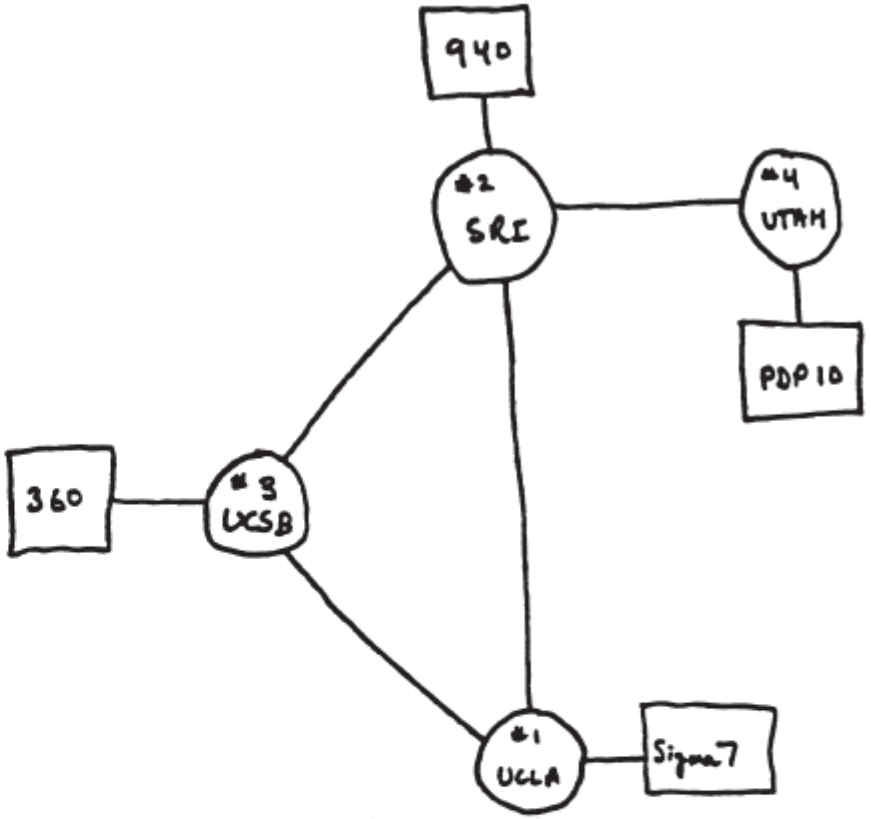
Source: ISOC, Zakon.org, Mint research



THE ARPA NETWORK

SEPT 1969

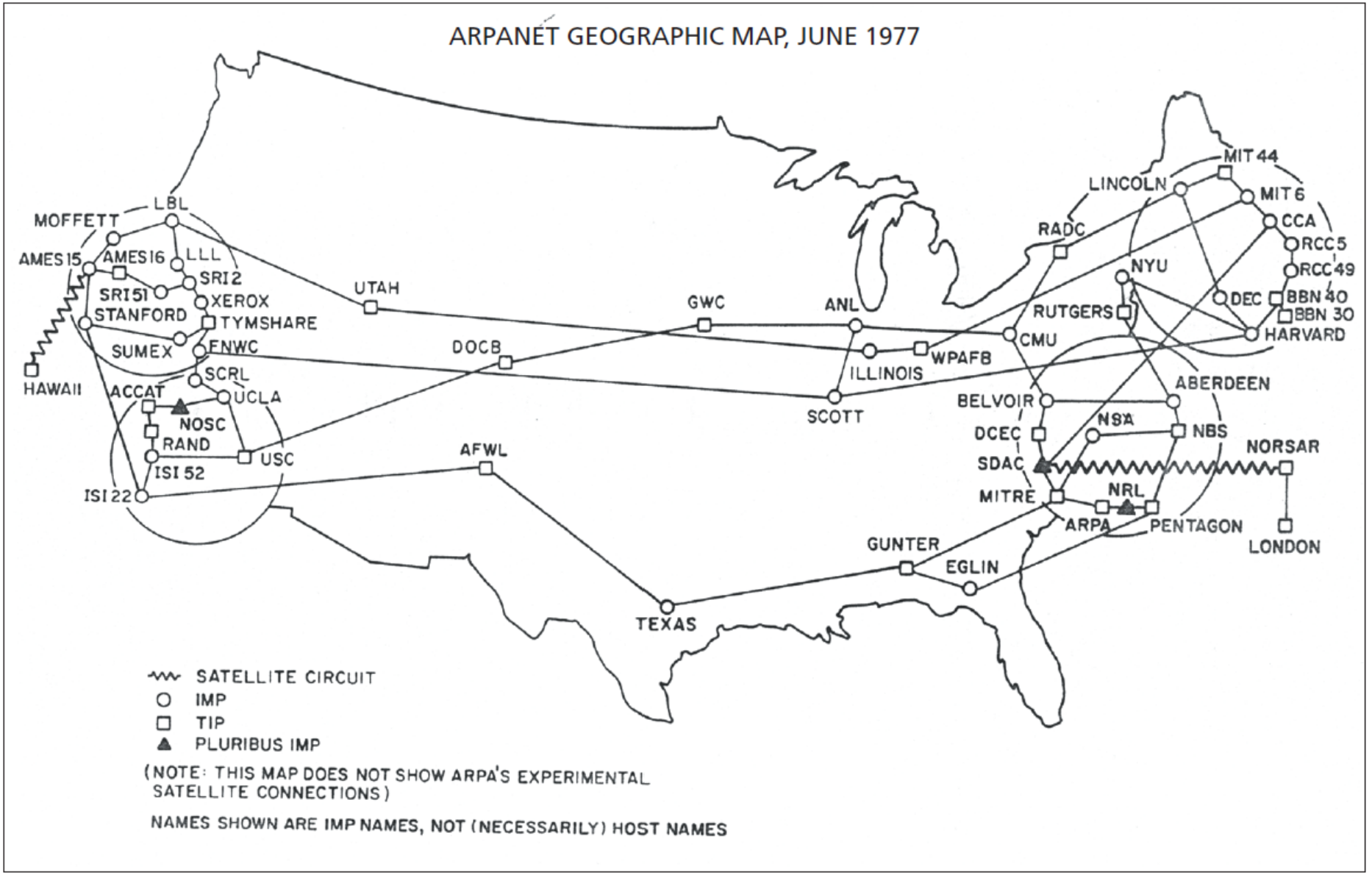
1 NODE



THE ARPA NETWORK

DEC 1969

4 NODES



Source: Heart *et al.*, *ARPANET Completion Report*, 1978. Scanned by Larry Press

نهادهای حاکم بر اینترنت

1986

نیروی ضربت مهندسی اینترنت

The Internet Engineering Task Force

http://www.ietf.org/

1998

بنگاه اینترنت برای نام‌ها و شماره‌های منتسب

Internet Corporation for Assigned Names and Numbers

http://www.icann.org/

1998

کنسرسیوم وب جهان گستر

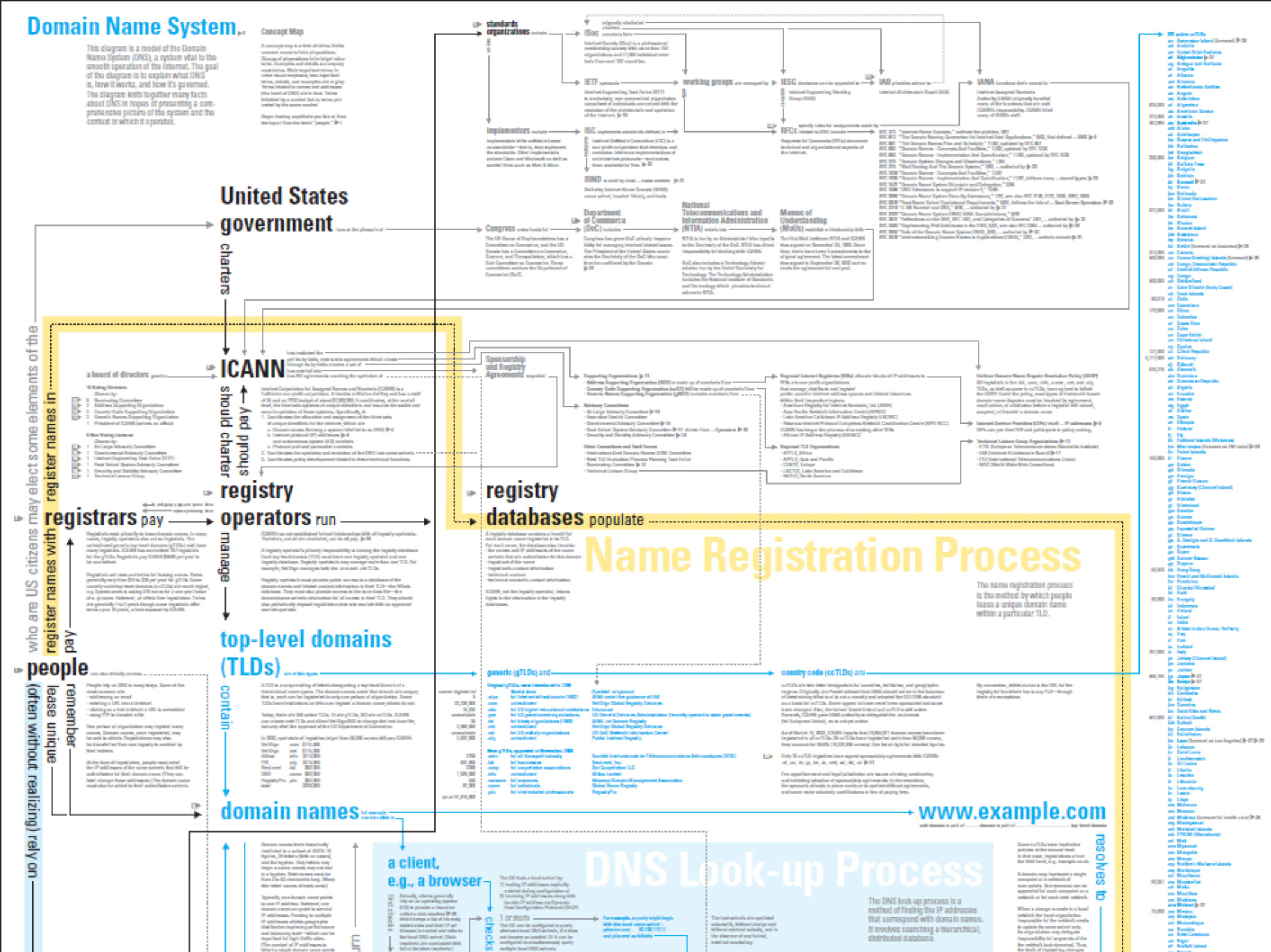
World Wide Web Consortium

http://www.w3c.org/

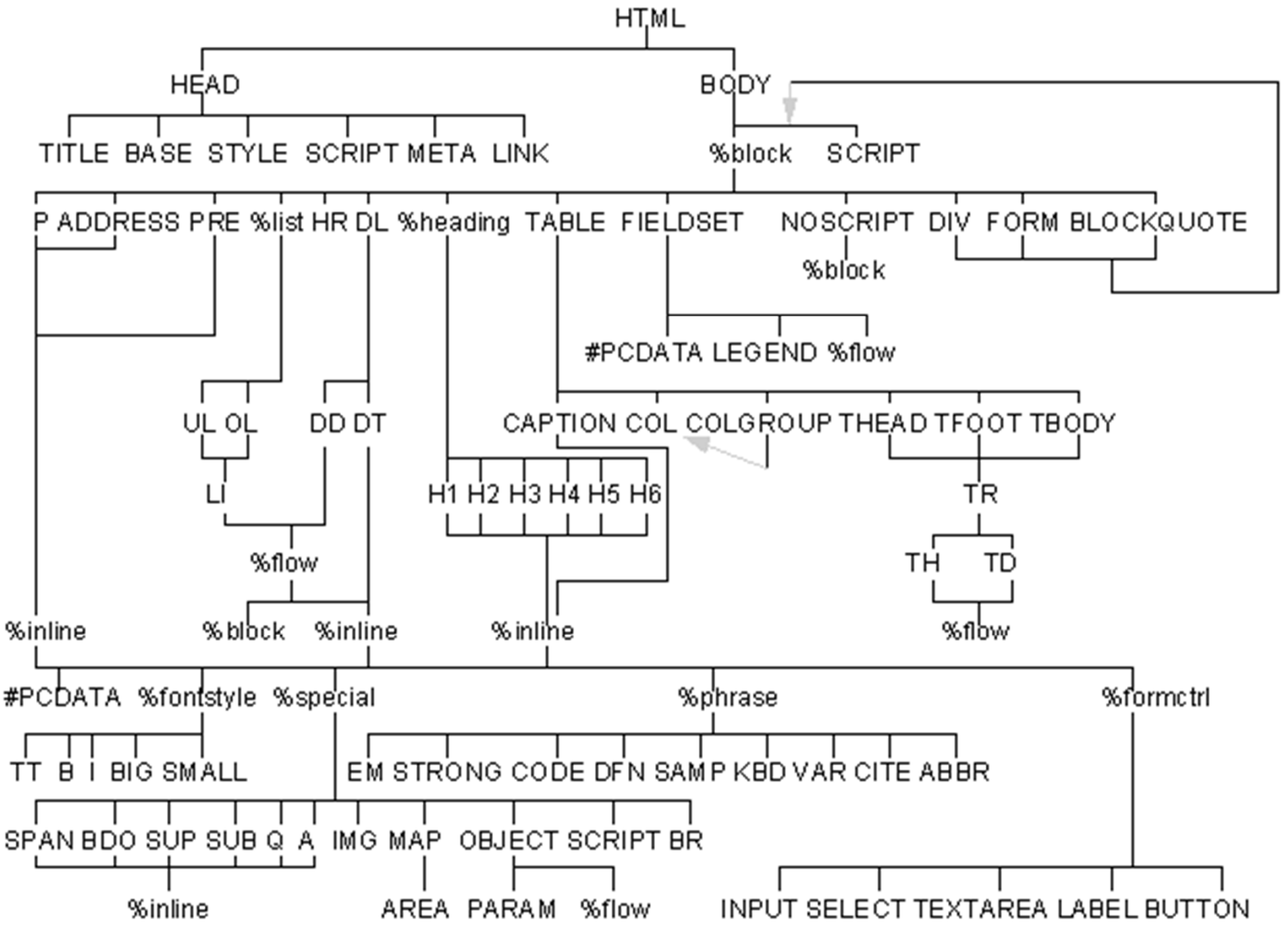
Domain Name System

This diagram is a model of the Domain Name System (DNS), a system vital to the smooth operation of the Internet. The goal of the diagram is to explain what DNS is, how it works, and how it's governed. The diagram knits together many facts about DNS in hopes of presenting a comprehensive picture of the system and the context in which it operates.

Concept Map



زبان HTML

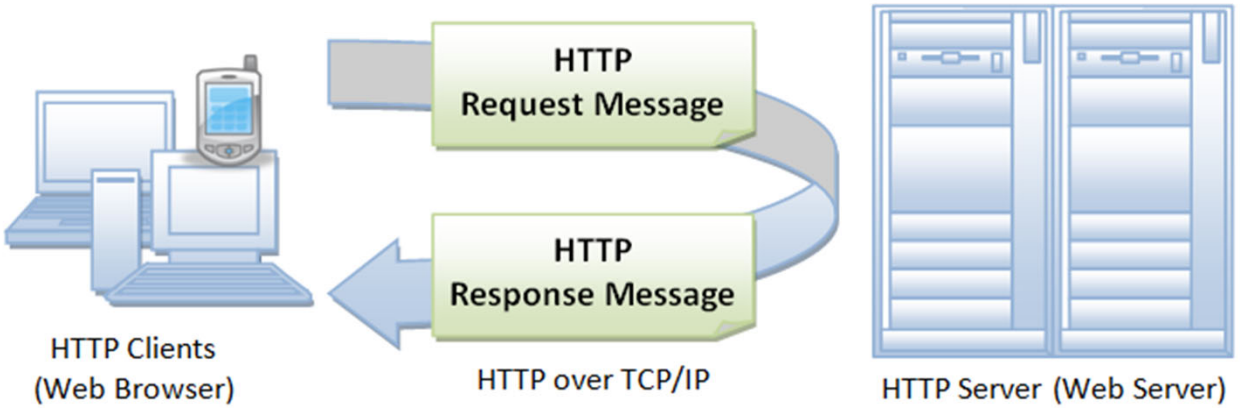

HTML
HEAD
BODY
TITLE BASE STYLE SCRIPT META LINK
%block SCRIPT
P ADDRESS PRE %list HR DL %heading TABLE FIELDSET NOSCRIPT DIV FORM BLOCKQUOTE
%block
#PCDATA LEGEND %flow
UL OL DD DT
CAPTION COL COLGROUP THEAD TFOOT TBODY
LI
H1 H2 H3 H4 H5 H6
TR
%flow
TH TD
%flow
%inline %block %inline %inline
#PCDATA %fontstyle %special %phrase %formctrl
TT B I BIG SMALL
EM STRONG CODE DFN SAMP KBD VAR CITE ABBR
SPAN BDO SUP SUB Q A IMG MAP OBJECT SCRIPT BR
%inline
AREA PARAM %flow
INPUT SELECT TEXTAREA LABEL BUTTON

Octal Info Solution
Technology Outsourcing Simplified

The Evolution of WEB DESIGN

- 1990 — HTML
- 1991 — 1st Website Created
- 1992 — Table Based Web
- 1994 — W3C Formed
- 1996 — Flash & Javascript
- 1998 — Css Design & PHP Websites
- 2003 — CSS3 & Web 2.0
- 2008 — Mobile Web
- 2010 — HTML5

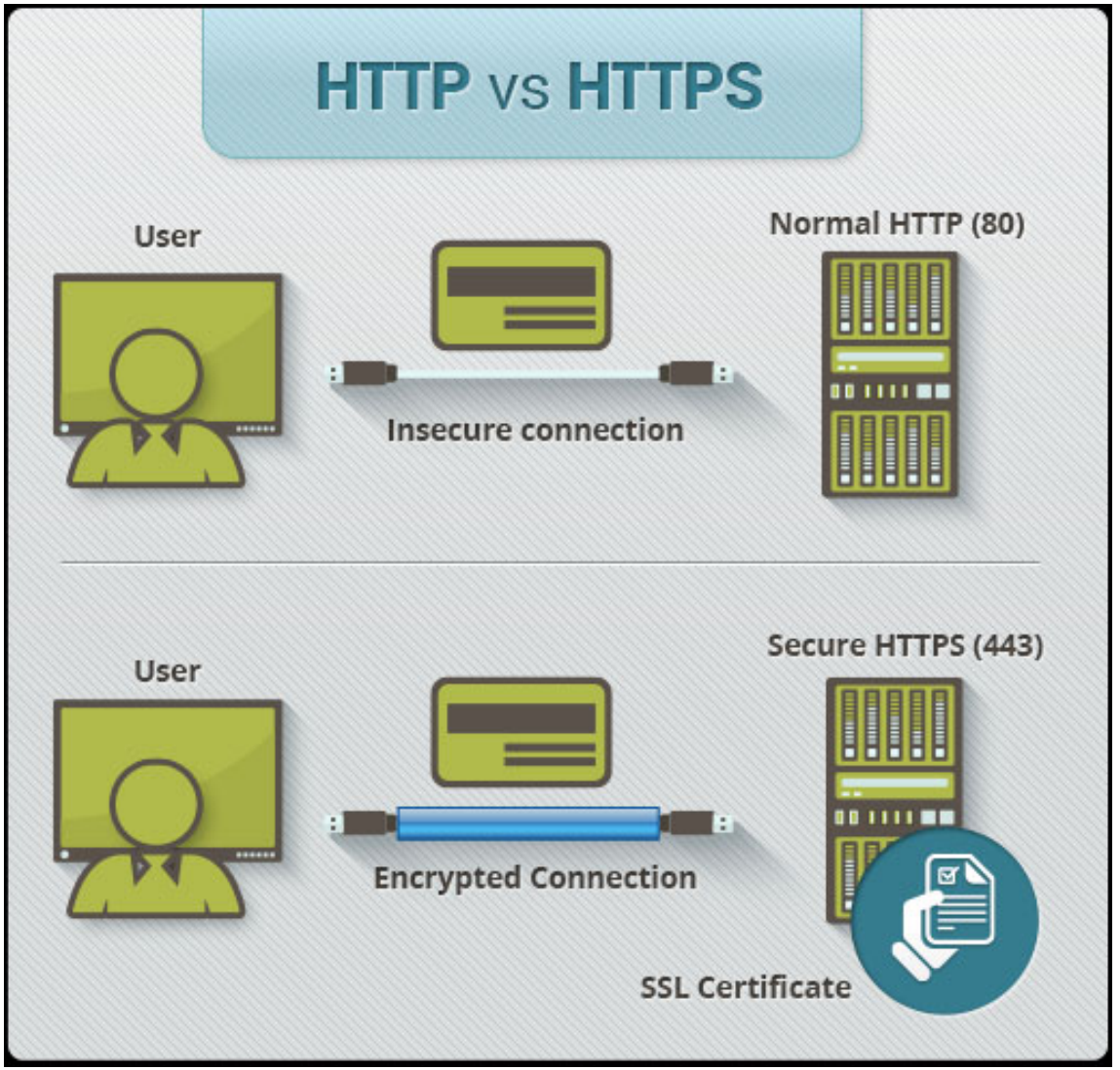
پروتکل HTTP



HTTP Methods

- **GET** ····→ Request for a web page or an object from server
- **PUT** ····→ For sending a document to the server
- **POST** ····→ For sending data or information about client to the server
- **DELETE** ····→ Request to Delete an object on the server
- **HEAD** ····→ Request for information about a web page or a document
- **TRACE** ····→ Used to trace the proxies and tunnels in the path from client to server
- **OPTION** ····→ Used to determine server's capabilities

پروتکل HTTPS



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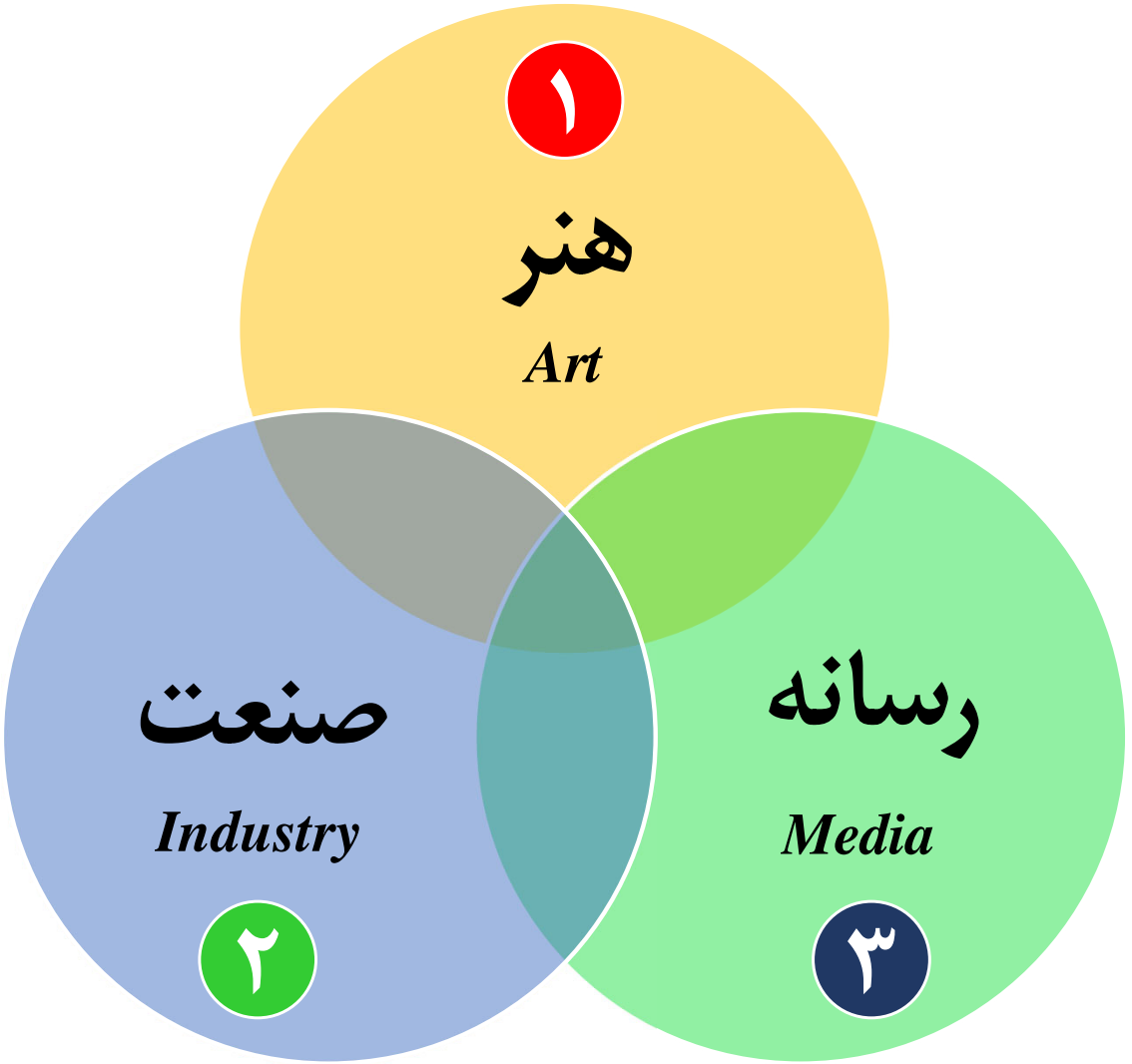

مورد مطالعاتی: تطور وب

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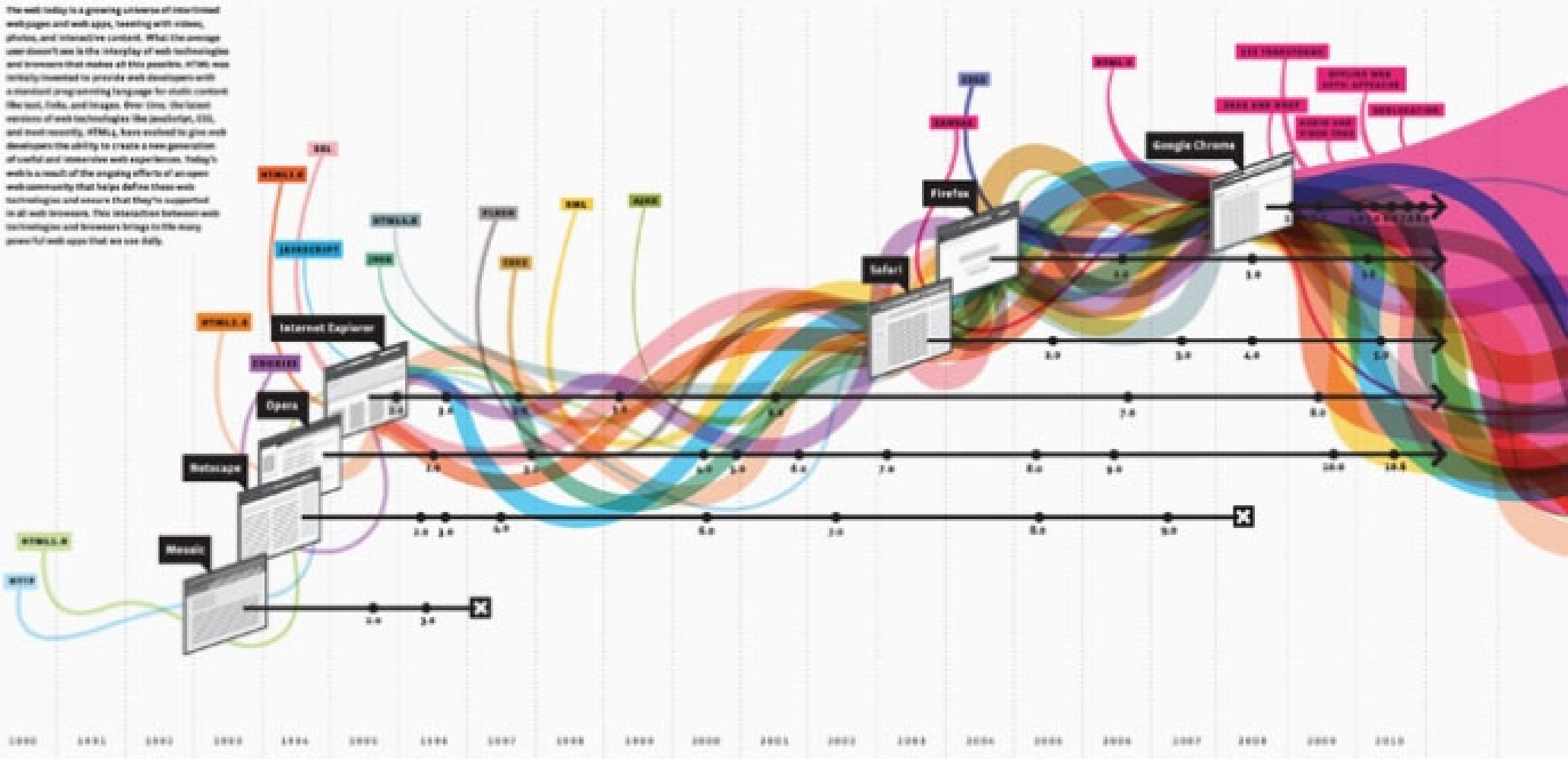
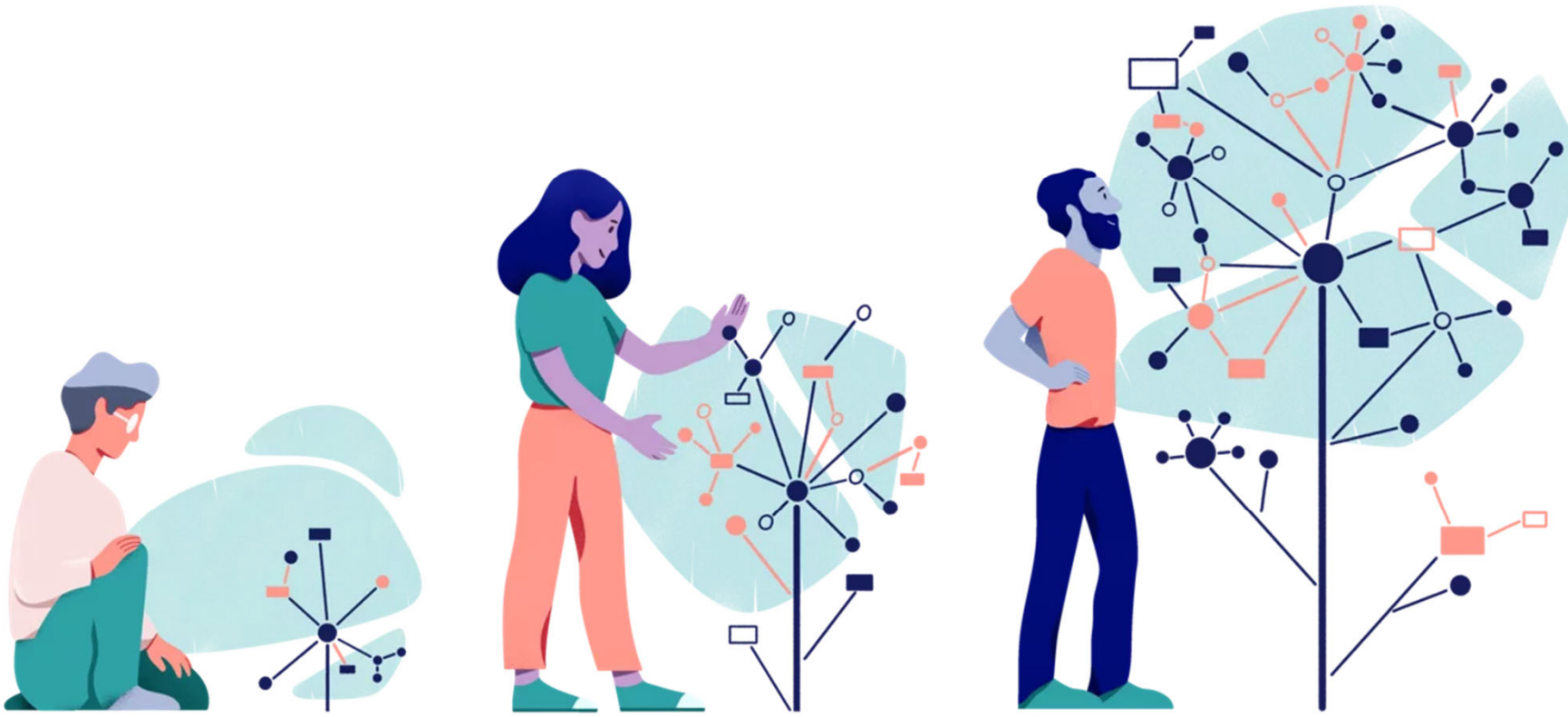
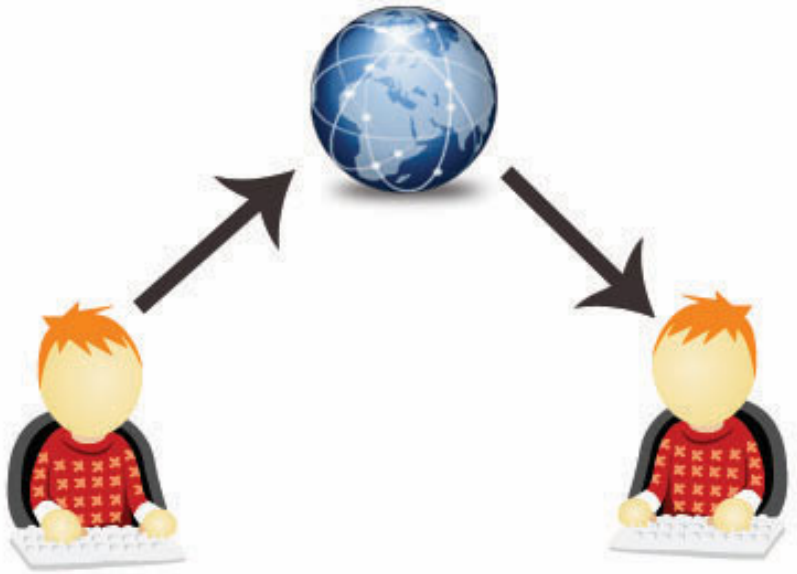
تطور وب

The Evolution of the Web

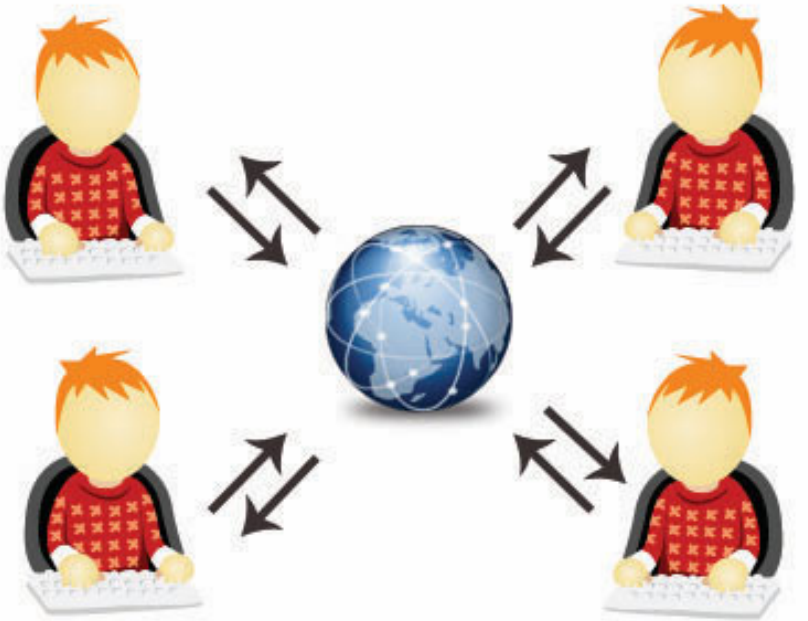




Web 1.0

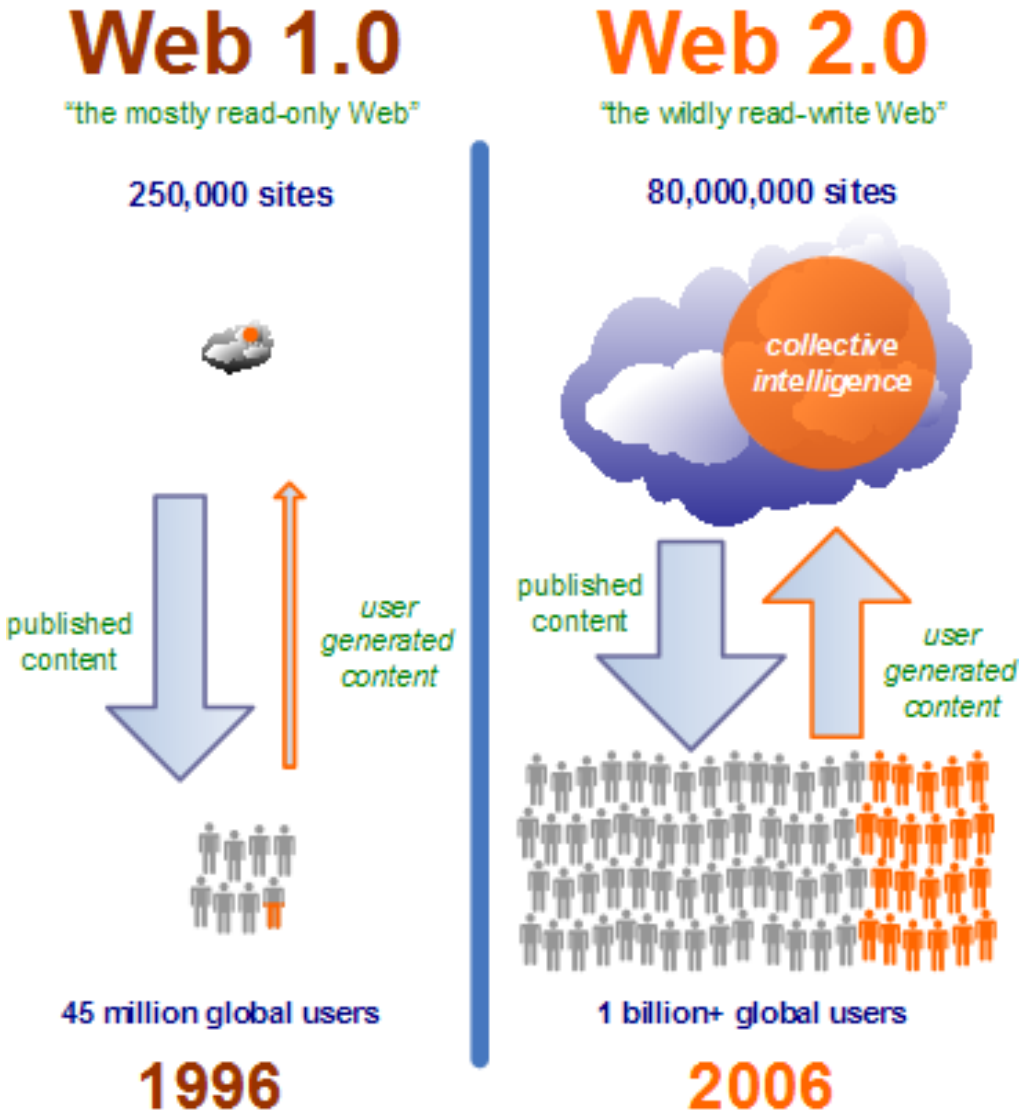


Web 2.0



تطور وب

انتقال از وب یک به وب دو



تطور وب

کاربردهای وب دو


Trumba
eskobo
vimeo
skobee
shadows
groovee
YouTube
Zimbra
smugmug
newsgator
Blogniscient
TiNFINGER
shutterfly
PodDater
Feedster
favoor
ZAZZLE
Tailrank
TagWorld
nuvvo
dogear
yakalike
grouper
ODDPOST
iNods
Lulu
BR
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flagr
FireAnt
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theadcloud
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gather
Pootra
browsr
oyogi
cafépress
Renkoo
standpoint
meebo
last.fm
Jotspot
Frappr!
jeteye
dabble
YEDDA
Writeboard
SHOUTWIRE
iKarma
AirSet
techmemeorandum
CalendarHub
Suprglu
pando
zigtag
Findory
backfence
gOFFICE
AllPeers
Rallypoint
Zoozio
blogbeat
Ziggs
vSocial
Boltfolio
wink
riya
Wordcast
Opinity
measuremap
gumshoo
bluepulse
STREAMLOAD
Tada Lists
FeedSky
jellyBamINC
nativetext
CONGOO
PODZINGER
RSS MAD
FeedTier
phanfare
Fruitcast
PubSub
dPolls
flickr
Ning
Ookles
Strongspace
zoominfo
CASTPOST
yubnub
Bloop
ProjectSpaces
FeedBurner
Bloglines
FOTOLOG
ourmedia
gabbr.com
Gcast
blinkx
openomy
riffs
Yub.com
Spot Runner
NewsAlloy
Alimydata.com
ajchat
jambo
ROLLYO
Alexa
chatsum
PANDORA
looklater
squishy
WebJay
PLAXO
Noodly
30 BETA
windir
diigo
box
Jots
vizu
digg
del.icio.us
drive
AlmondRocks
Tagyu
writely
Simpy
Gtalkr
TRUVEO
egoSurf
mozy
Quimble
pegasus
SQUIDOO
picturecloud
newsvine
Clipfire
Basecamp
Netvibes
goowy
Lexxe alpha
LOOKSTER
PXN8
facebook
43 Things
Technorati
Backpack
Gmail
yelp
Smarkets
inform
filangy
magnolia
ShoZu
unickr.com
feedmarker
mercora MusicSearch
StumbleUpon
ClipShack
Meet With Approval
HOMEPORTALS
Spin spy


Google
omea
RSS
Social Networking
Photos
zoto
Wikis
WEB 2.0
Videos
YouTube
Blogs
Bookmarks
Google

Social Media Landscape

FredCavazza.net

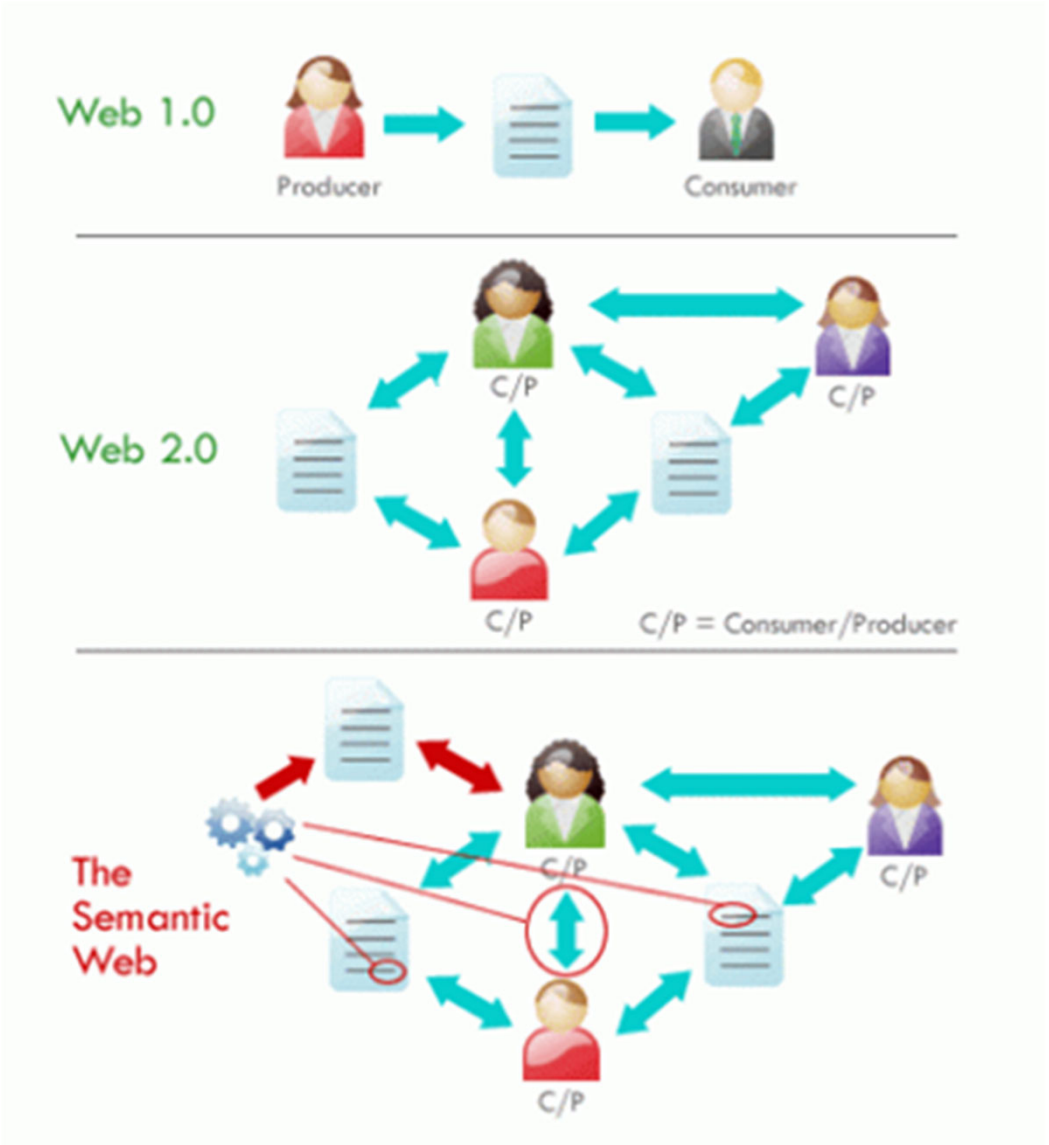
تطور وب

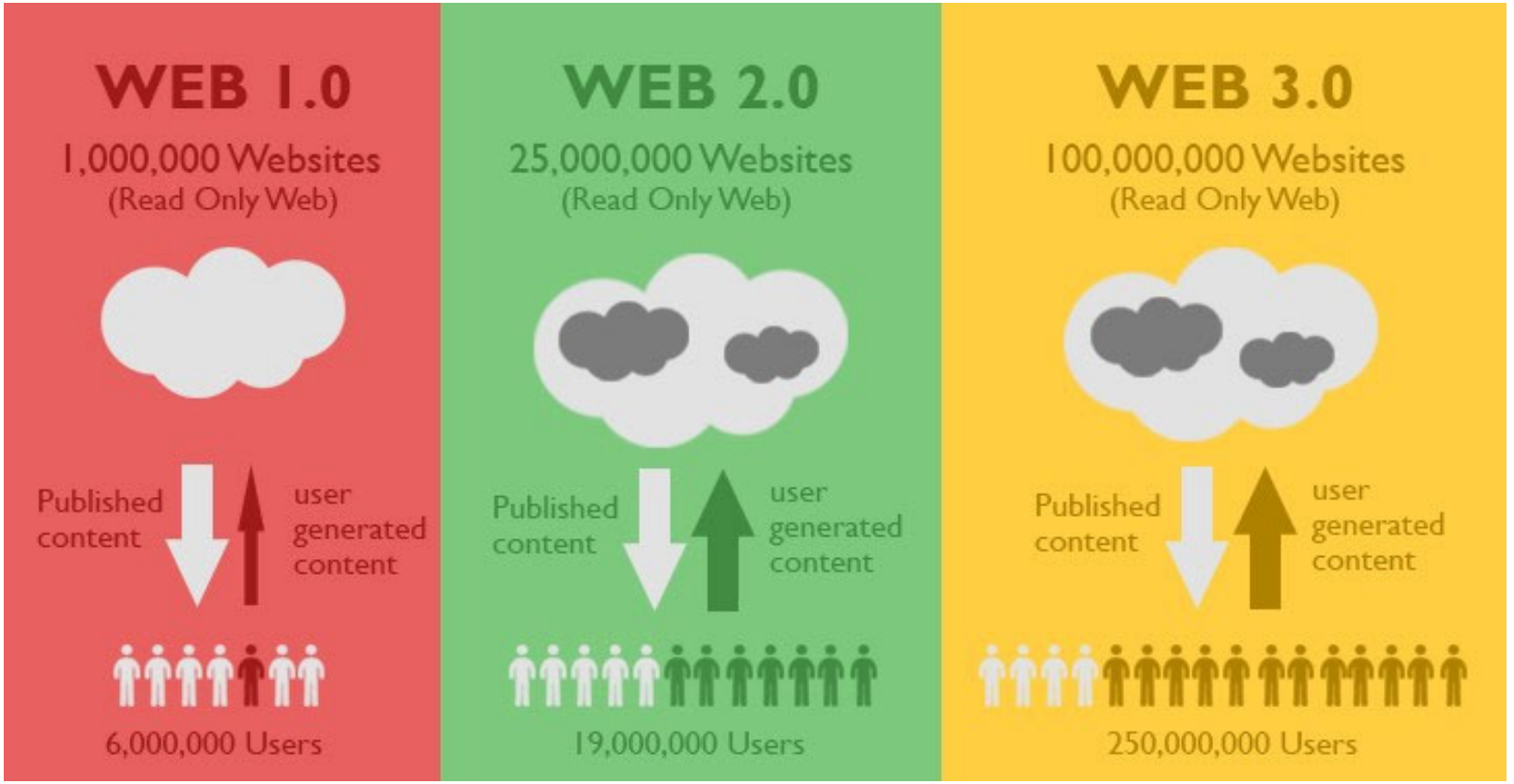
مقایسه‌ی وب یک با وب دو

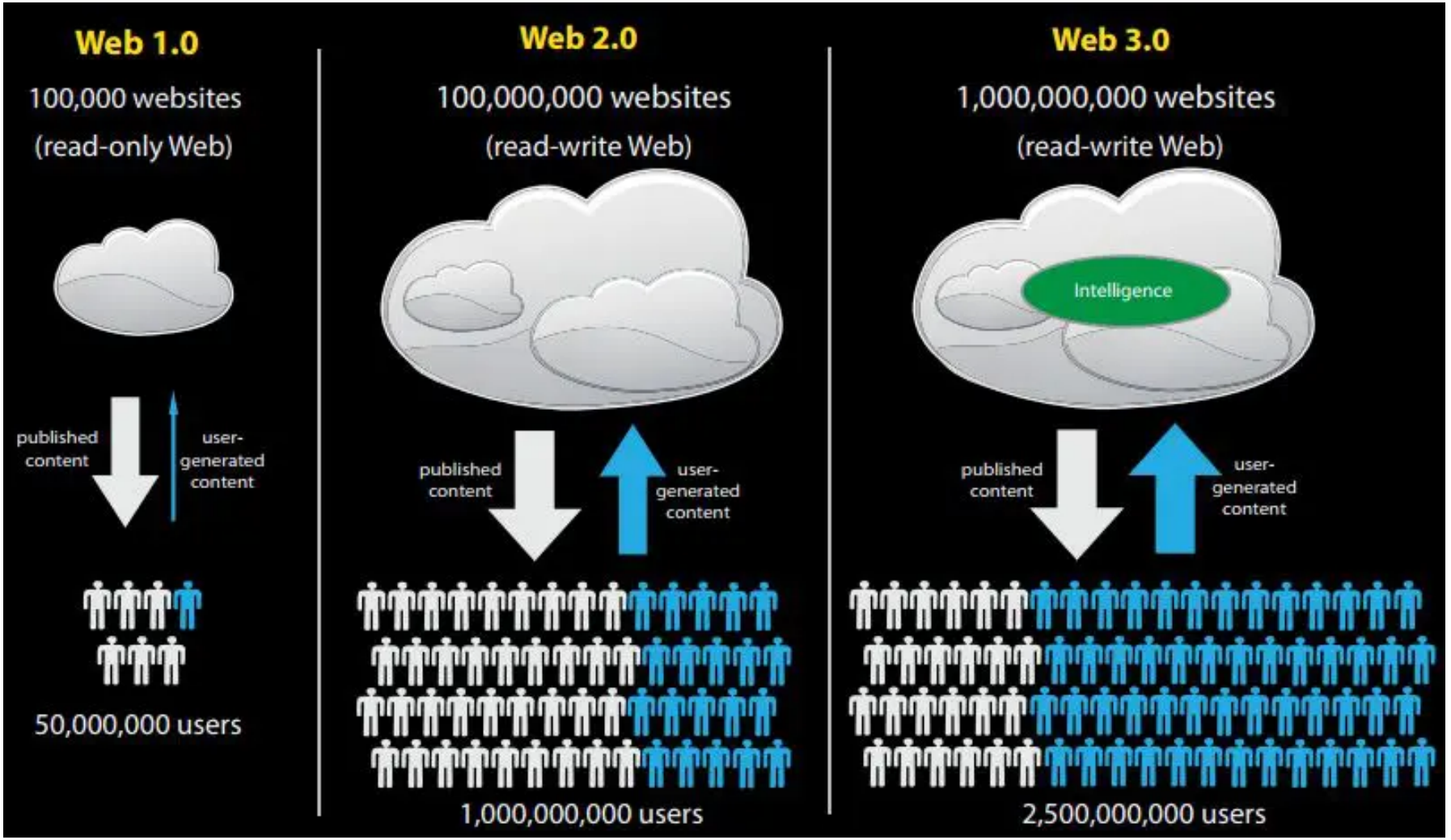
Web 1.0	Web 2.0
Reading	Reading/Writing
Companies	Communities
Client-Server	Peer to Peer
HTML, Portals	XML, RSS
Taxonomy	Tags
Owning	Sharing
IPOs	Trade sales
Netscape	Google
Web forms	Web applications
Screen scraping	APIs
Dialup	Broadband
Hardware costs	Bandwidth costs
Lectures	Conversation
Advertising	Word of mouth
Services sold over the web	Web services
Information portals	Platforms

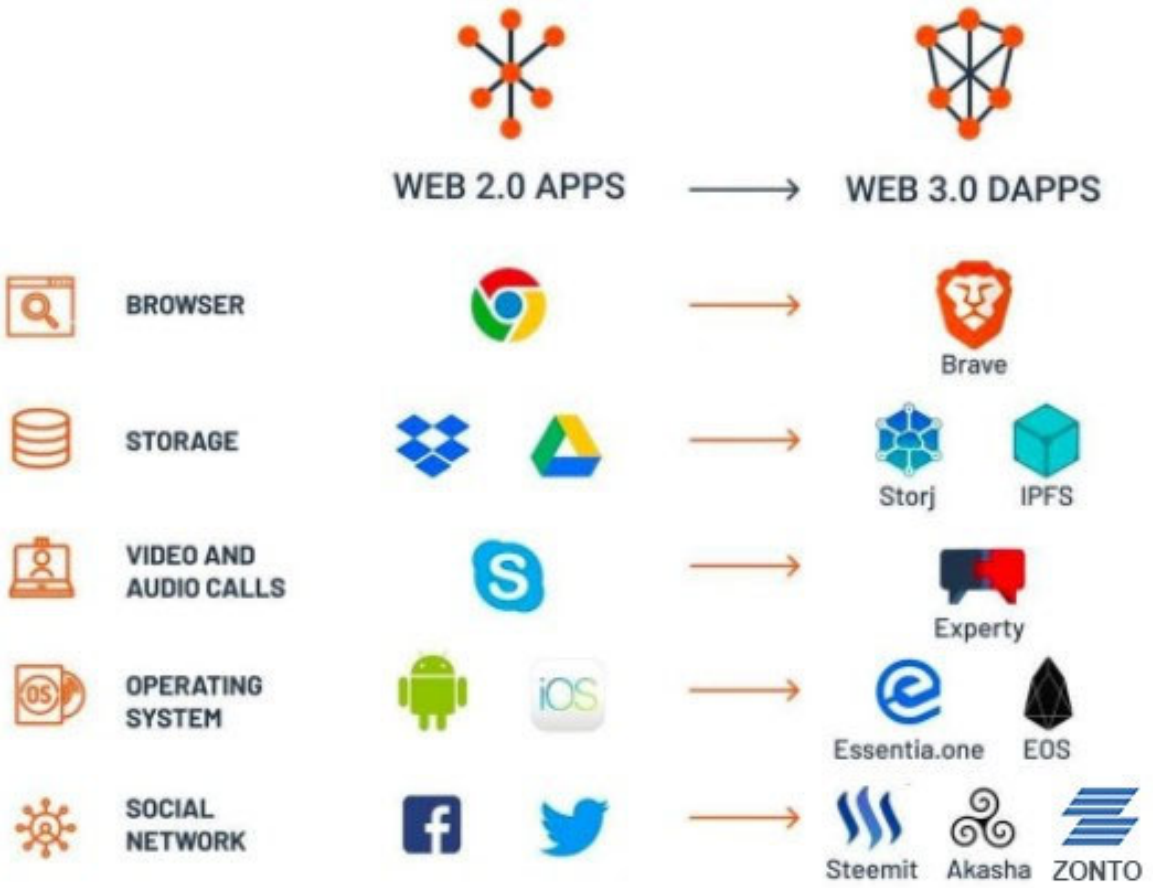
تطور وب

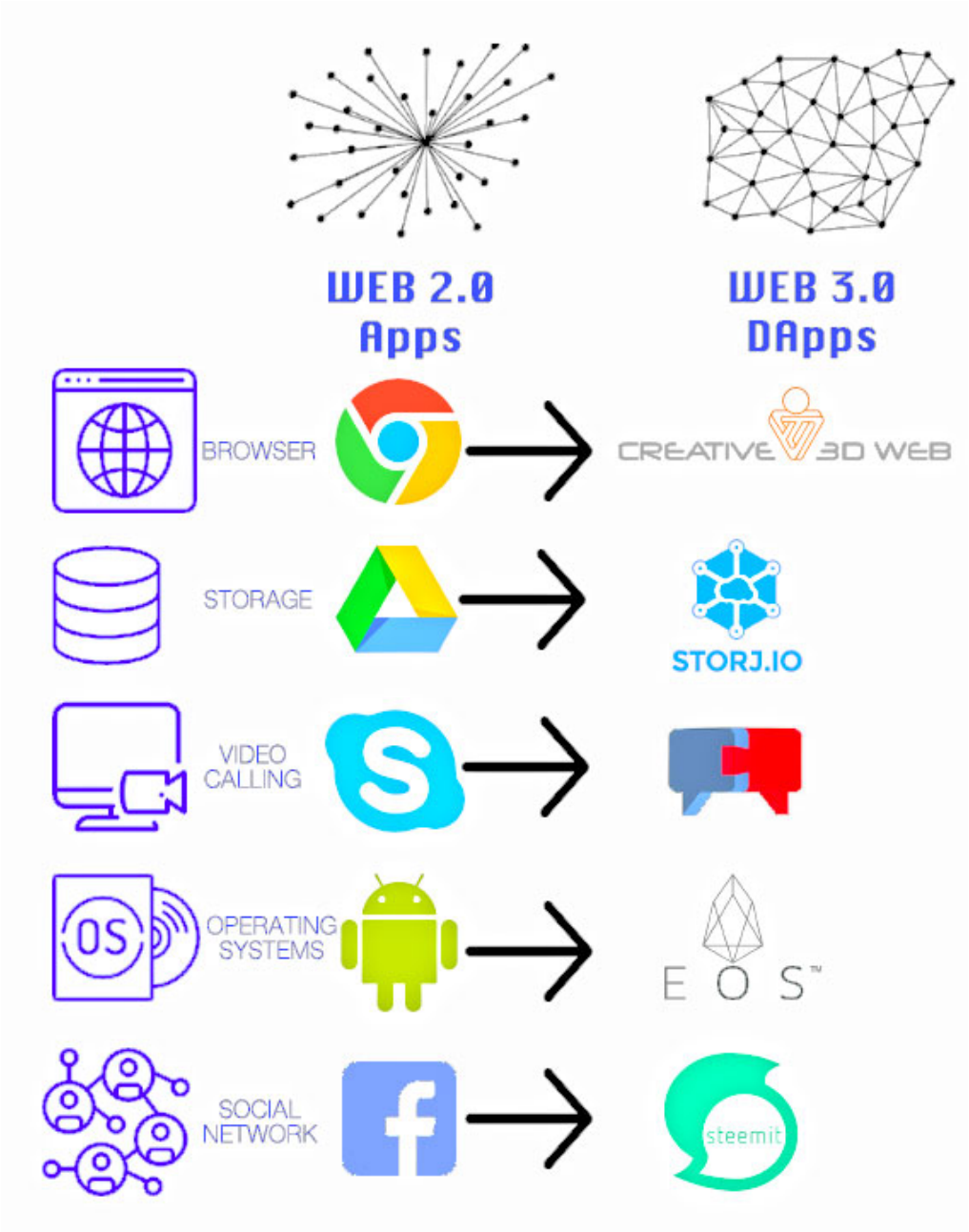
از وب یک تا وب معنایی




WEB 1.0
1,000,000 Websites
(Read Only Web)
Published content
user generated content
6,000,000 Users
WEB 2.0
25,000,000 Websites
(Read Only Web)
Published content
user generated content
19,000,000 Users
WEB 3.0
100,000,000 Websites
(Read Only Web)
Published content
user generated content
250,000,000 Users


Web 1.0
100,000 websites
(read-only Web)
published content
user-generated content
50,000,000 users
Web 2.0
100,000,000 websites
(read-write Web)
published content
user-generated content
1,000,000,000 users
Web 3.0
1,000,000,000 websites
(read-write Web)
Intelligence
published content
user-generated content
2,500,000,000 users


WEB 2.0 APPS
WEB 3.0 DAPPS
BROWSER
Brave
STORAGE
Storj
IPFS
VIDEO AND AUDIO CALLS
Experty
OPERATING SYSTEM
iOS
Essentia.one
EOS
SOCIAL NETWORK
Steemit
Akasha
ZONTO


WEB 2.0
Apps
WEB 3.0
DApps
BROWSER
CREATIVE 3D WEB
STORAGE
STORJ.IO
VIDEO
CALLING
OS
OPERATING
SYSTEMS
E O S™
SOCIAL
NETWORK
steemit

WHAT TYPE OF SOLUTIONS ARE OFFERED WITH WEB 3.0?

تطور وب

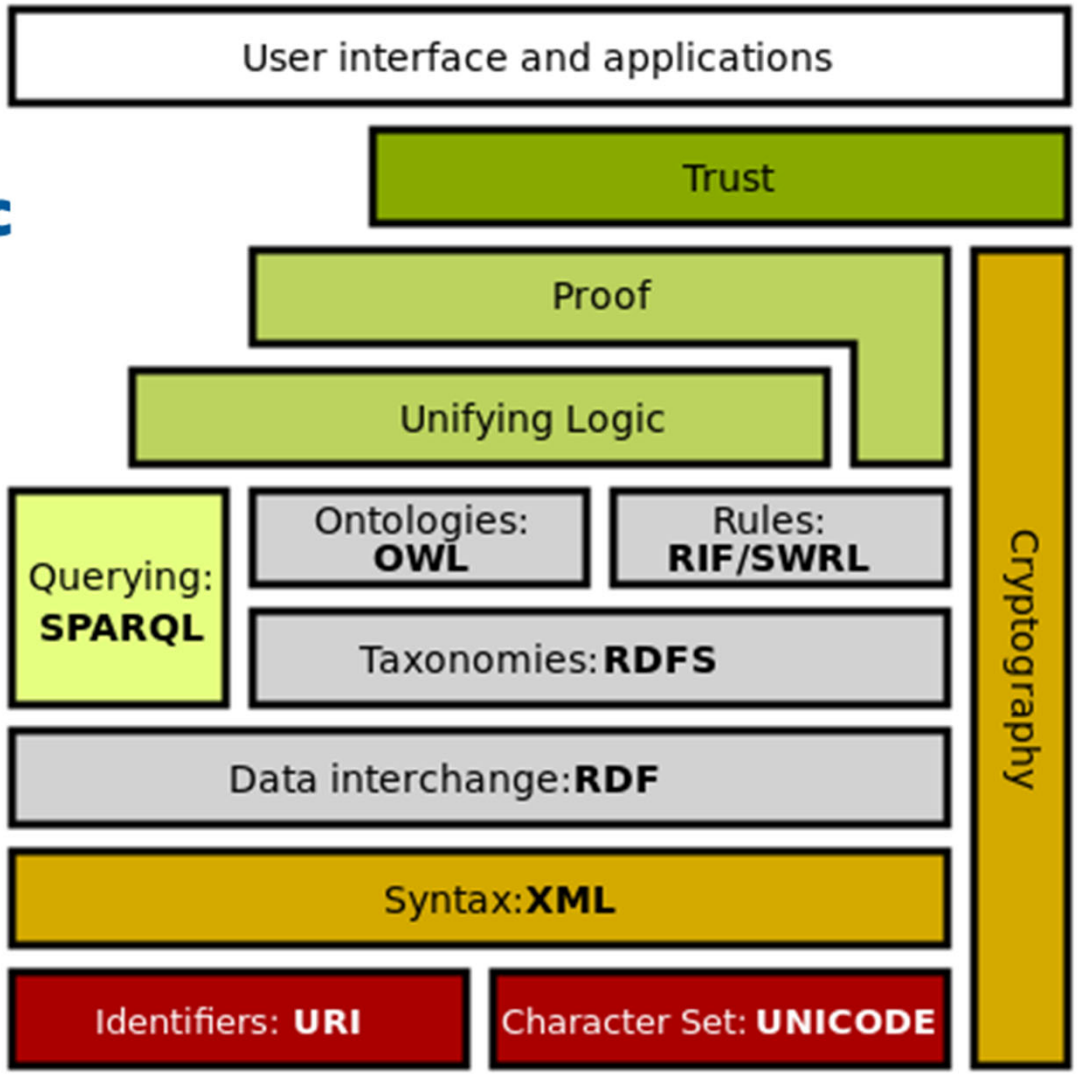
مقایسه‌ی وب دو با وب سه

Web 2.0	Web 3.0
Read/Write Web	Portable Personal Web
Communities	Individuals
Sharing Content	Consolidating Dynamic Content
Blogs	Lifestream
AJAX	RDF
Wikipedia, google	Dbpedia, igoogle
Tagging	User engagement

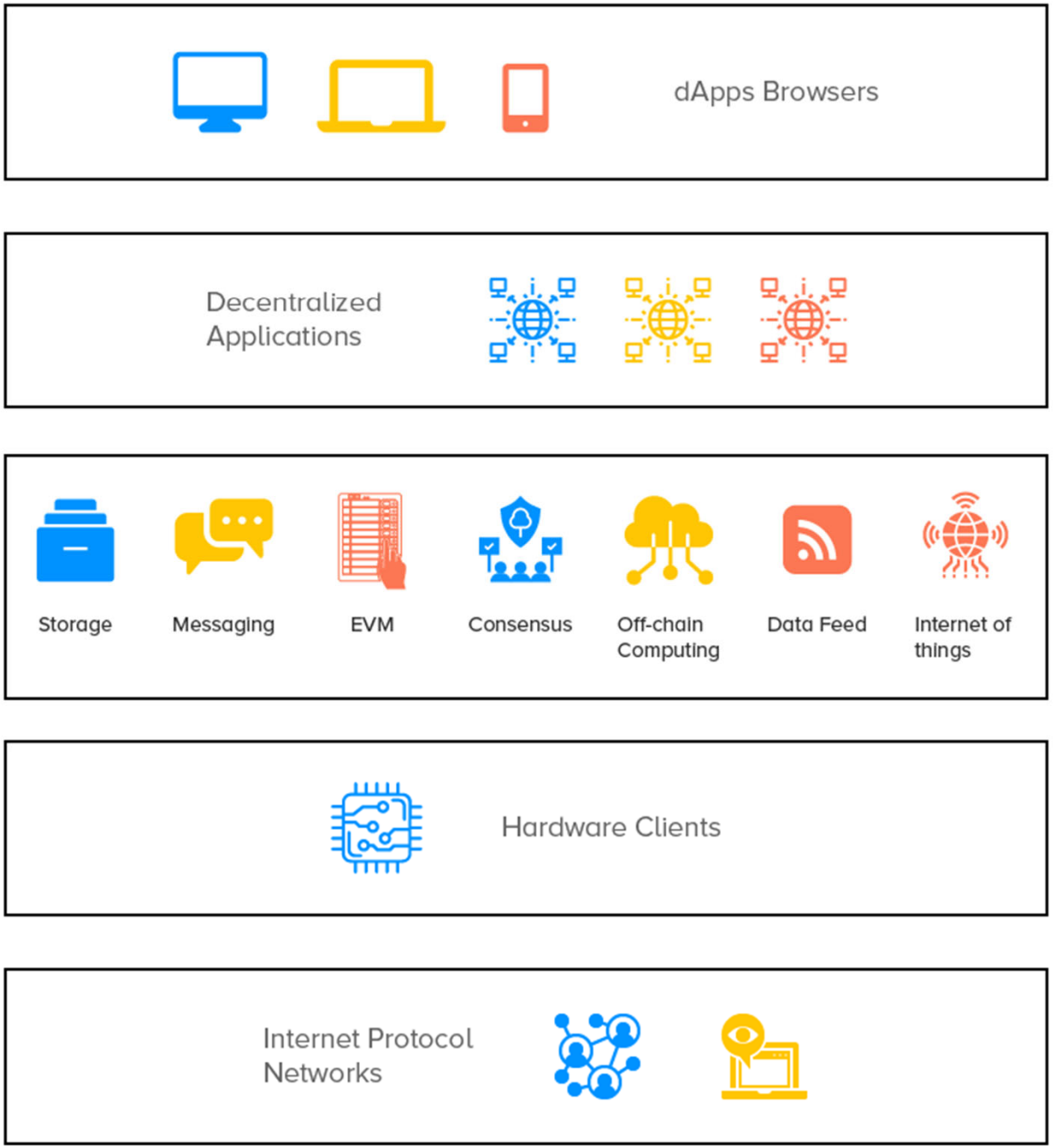
تطور وب

ساختار پشته‌ی وب معنایی

SEMANTIC WEB STACK



Web 3.0 Stack


dApps Browsers
Decentralized Applications
Storage
Messaging
EVM
Consensus
Off-chain Computing
Data Feed
Internet of things
Hardware Clients
Internet Protocol Networks

FOCUS

WTF IS THE SEMANTIC WEB
AND WHY SHOULD WE CARE?

WTF IS THE SEMANTIC WEB?

The **WEB** is a system of interlinked hypertext documents accessed through the internet. Sir Timothy John Berners-Lee is credited with inventing the World Wide Web.

HTML

The **SEMANTIC WEB** is a group of methods and technologies that allows machines to understand the semantics of information on the World Wide Web.

XML

WTF, WEB 2.0 vs WEB 3.0?

WEB 2.0

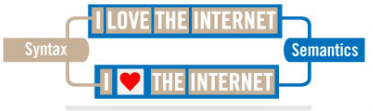
WEB 2.0 focused on communities, social networks, RSS feeds, Google and the immergence of user content.

WEB 3.0

WEB 3.0 focuses on the individual, user behavior, the portable personal web, consolidating dynamic content and the semantic web.

WTF IS SEMANTICS?

Semantics is related to syntax. In most languages syntax is how you say something, while semantics is the meaning behind what you have said. When substituting one part of the sentence with another word or symbol, the syntax of the sentence changes, while the semantics may remain the same.



While the syntax has changed, the semantics of the sentence has remained the same.

WTF DOES THIS HAVE TO DO WITH COMPUTERS?

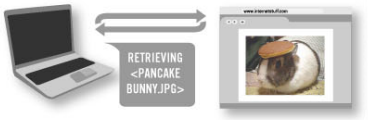
WEB 2.0: HTML

The Internet created a standard way for computers to talk to one another in order to exchange information and data.

However computers merely **mimic** information to one another creating a quick and easy way to view information.

When you type a web address into your browser your computer connects with the website and **retrieves** the data on that website.

This document is written in a language called **HTML**. The **HTML** language defines a syntax that computers understand but not one that provides meaning.



WEB 3.0: XHTML

HTML merely describes the document and the link between other documents, while the components of the Semantic Web can describe what the document is.

By rewriting the original **HTML** code with **Extensible HTML**, interspersed with **XML**, the website data has now become machine-readable. This enables content managers to add meaning to internet content.

COMPONENTS OF THE SEMANTIC WEB

The semantic web uses these tools to construct a giant global graph.

RDF
is a simple language for expressing data models, which refer to objects and their relationships. An RDF-based model can be represented in XML syntax.

RDF SCHEMA
are semantics for generalized hierarchies of such properties and classes.

OWL
adds more vocabulary for describing properties and classes: among others, relations between classes, cardinality, equality, characteristics of properties, and enumerated classes.

XML
provides an elemental syntax for content structure within documents, it associates no semantics with the meaning of the content.

XML SCHEMA
is a language for providing and restricting the structure and content of elements contained within XML documents.

SPRAQL
is a protocol and query language for semantic web data sources.

PROJECTS BASED ON THE SEMANTIC WEB

DBpedia
An effort to publish structured data extracted from Wikipedia: the data is published in RDF and made available on the web for use under the GNU Free Documentation License.

GoodRelations
A popular vocabulary for describing product information, prices, payment options, etc. It also clearly delineates the trends in supply and demand. It is currently being used by Best Buy, Yahoo and O'Reilly Media.

Friend of a Friend
A machine readable ontology describing persons, their usual activities and their relations to other people and events. FOAF allows groups of people to connect without the need for a centralized database.

SIOC
It provides a vocabulary of terms and relationships that model web data spaces. Examples of such data spaces are: discussion forums, weblogs, blogrolls, feed subscriptions, mailing lists, shared bookmarks, and image galleries.

WHY DO WE NEEDS THIS?

The intent of the semantic web is to enhance the usability and usefulness of the internet and its interconnected resources.

TRULY PERSONALIZED SEARCH RESULTS

Where can I get a burrito?

With an ever growing dependency on search engines the semantic web would enable faster and more comprehensive results tailored to your previous searches and personal interests.

24-HR CONNECTIVITY

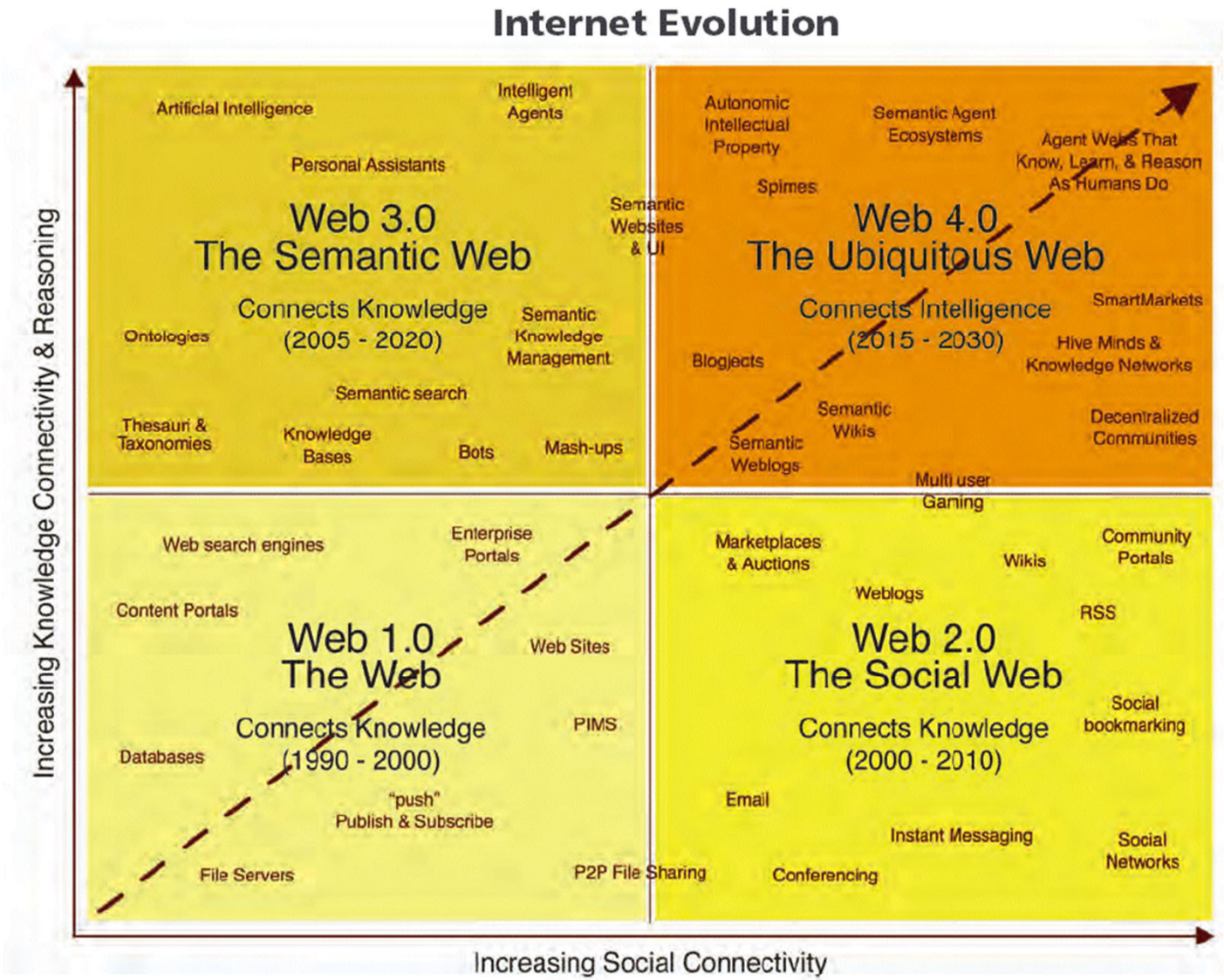
Where is Sam right now?

The semantic web would allow for complete connectivity with people, places and things. The integration of data from all corners of the web would turn your computer from a simple tool to an automated think tank.

SOURCES: W3.ORG | SEMANTICWEB.COM | SEMANTICWEB.ORG | INFOMESG.NET | SCIENTIFIC AMERICAN

تطور وب

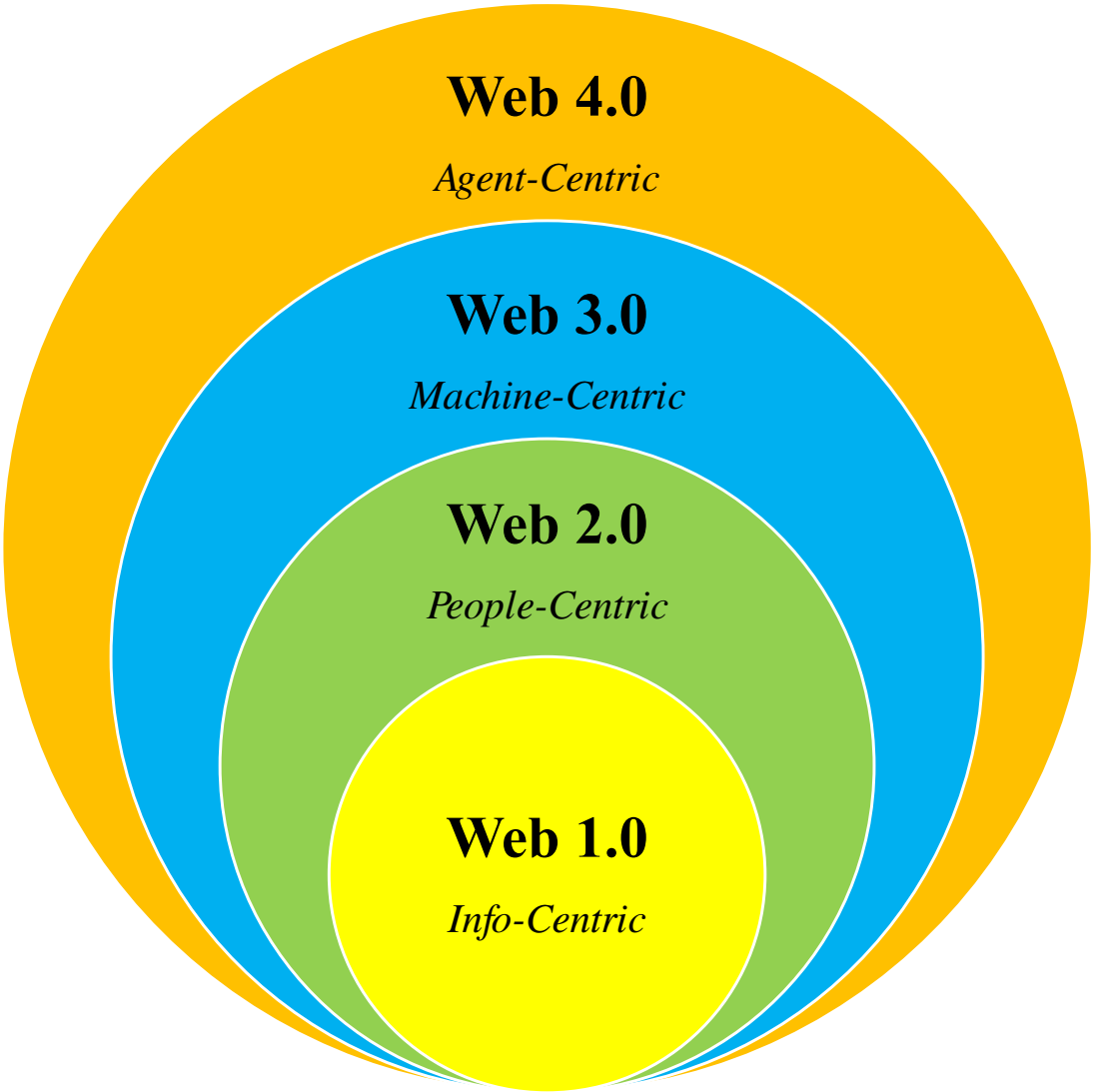
حرکت به سوی وب چهار

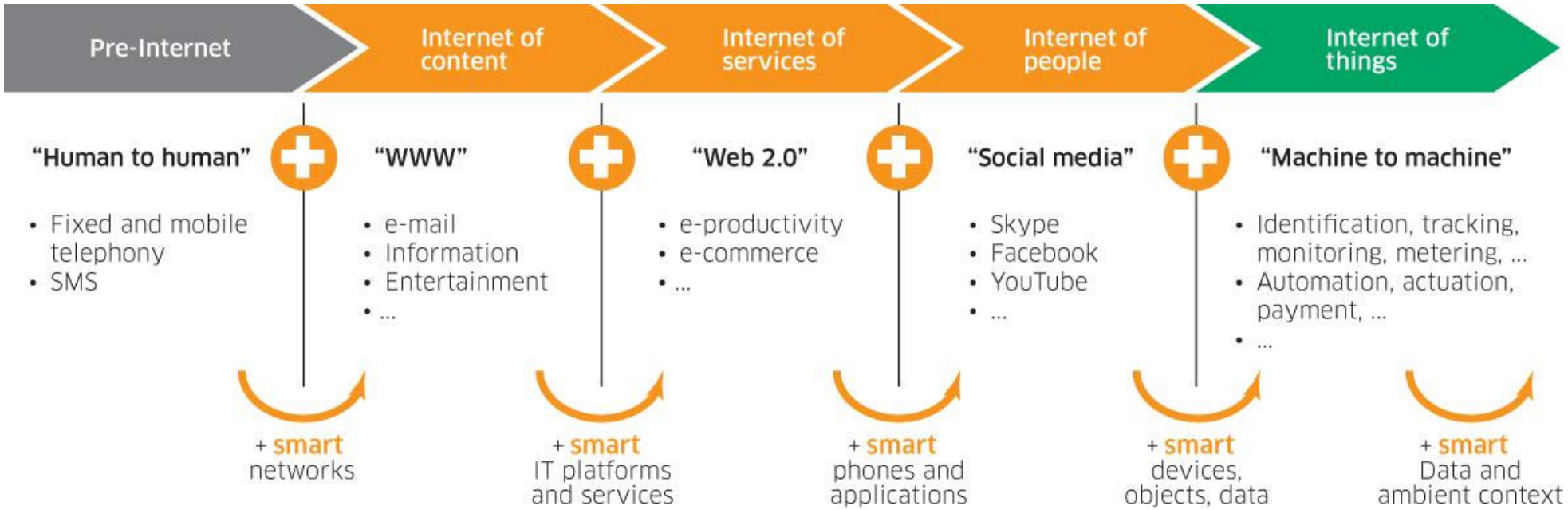


Source: Nova Spivak, Radar Networks & Mills Davis, Project10x

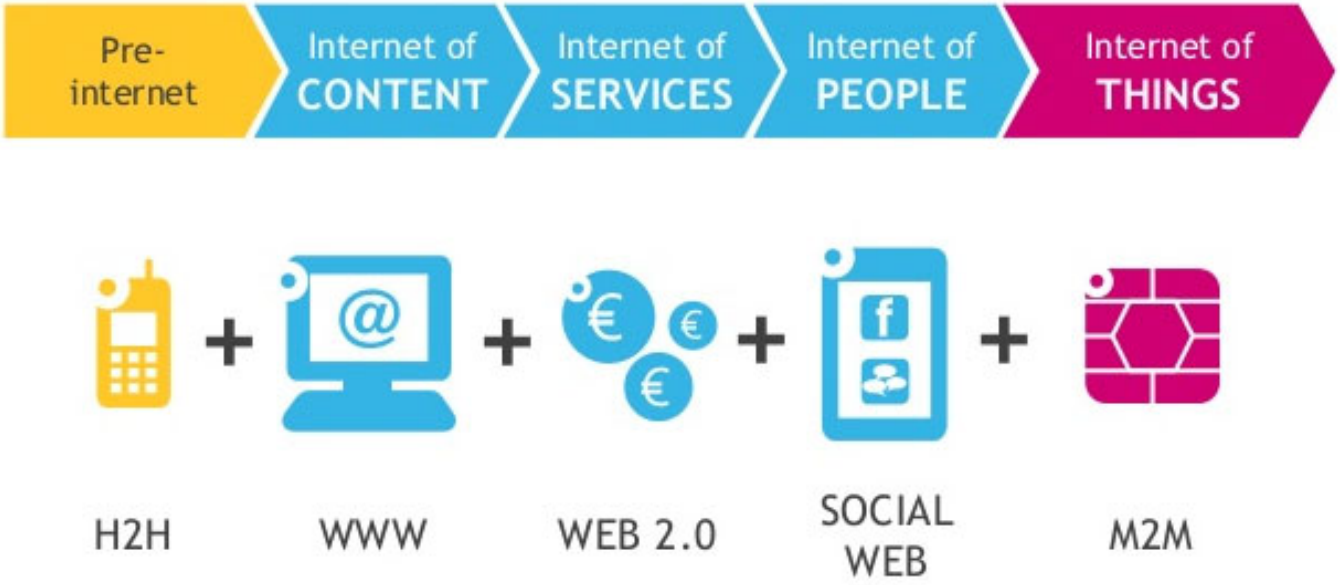
تطور وب

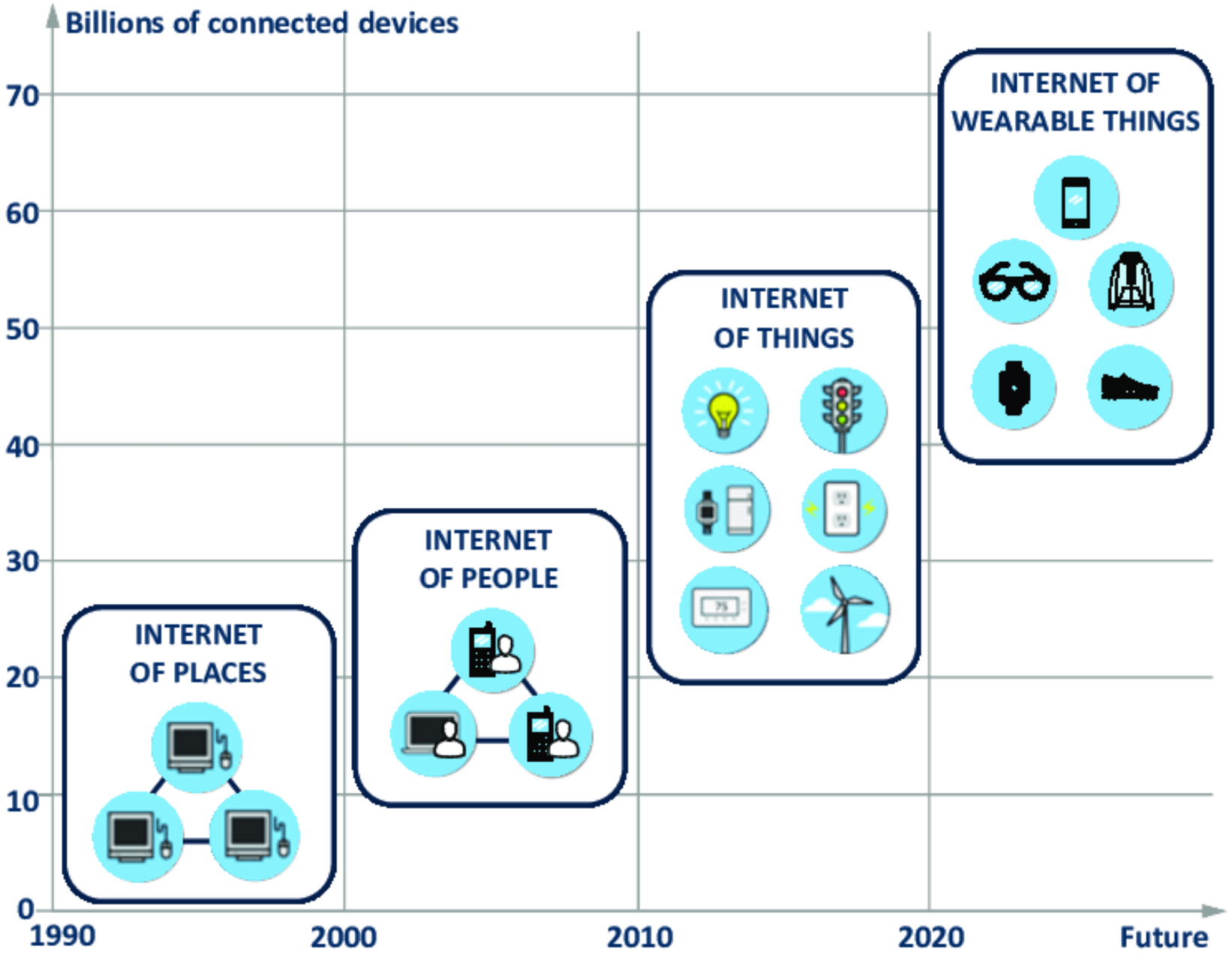
مرکزیت در نسخه‌های متوالی وب




Pre-Internet
Internet of content
Internet of services
Internet of people
Internet of things
"Human to human"
• Fixed and mobile telephony
• SMS
"WWW"
• e-mail
• Information
• Entertainment
• ...
"Web 2.0"
• e-productivity
• e-commerce
• ...
"Social media"
• Skype
• Facebook
• YouTube
• ...
"Machine to machine"
• Identification, tracking, monitoring, metering, ...
• Automation, actuation, payment, ...
• ...
+ smart networks
+ smart IT platforms and services
+ smart phones and applications
+ smart devices, objects, data
+ smart Data and ambient context

THE NEXT STEP IN INTERNET EVOLUTION




Billions of connected devices
70
60
50
40
30
20
10
0
1990
2000
2010
2020
Future
INTERNET OF PLACES
INTERNET OF PEOPLE
INTERNET OF THINGS
INTERNET OF WEARABLE THINGS

WEB EVOLUTION

Web 1.0
Eindimensional

Nachrichten werden klassisch, statisch per Post, Email oder Telefon gesendet.

Talent Datenbank

Online – One-Way

STATISCHES RECRUITING

Web of Content

1991

Web 2.0
Partizipativ

Kommunikation über Social Media, interaktiv über mehrere Kanäle, Bedeutung der Suchmaschinen steigt.

Talent Pipelines
Jobboards
Überangebot

Dynamisch & Interaktiv

PROAKTIVES RECRUITING

Web of Communication

2003

Web 3.0
Semantisch

Aggregation von Information in individuellen Newsfeeds und Steuerung von Suchmaschinen über SEO und Sourcing

Mobile rules the world

Algorithmen beeinflussen die Kommunikation

COLLABORATIVES RECRUITING

Web of Context

2010

Web 4.0
Symbiotisch

Intelligente maßgeschneiderte Infrastruktur – eingesetzt als

Personal Assistent

Talent Pool/ Netzwerke

Algorithmen werden zu Kommunikationspartnern

SOURCING & RECRUITING

Web of Things

2014

Web 5.0
Sensitiv

Informations-Aggregation: Ein persönlicher Newsfeed – mobil

Algorithmen beeinflussen die Kommunikation – Menschen versuchen diesen immer mehr auszuweichen:

War of Content

Algorithmen werden zu Kommunikationspartnern

CLOUD

Web of Thoughts

2020

فضای سایبر

مورد مطالعاتی: تطور وب

۳

آینده‌شناسی وب

آینده‌شناسی وب

بر مبنای روی‌کرد رسانه‌ای به وب

trendne | MEDIA EVOLUTION

MEDIA	MODUS	INVOLVEMENT
1.0	LEAN BACK	

WEB OF CONTENT
ATTENTION

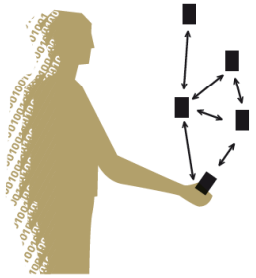
MEDIA	MODUS	INVOLVEMENT
2.0	MOVE FORWARD	

WEB OF COMMUNICATION
EMPOWERMENT

MEDIA	MODUS	INVOLVEMENT
3.0	JUMP IN	...TEMPORARY...

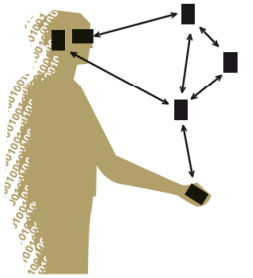
WEB OF CONTEXT
IMMERSION

MEDIA	MODUS	INVOLVEMENT
4.0	ALWAYS ON	...PERMANENT...



WEB OF THINGS
CONNECTIVITY

MEDIA	MODUS	INVOLVEMENT
5.0	PLUG IN	...IMPLANTED...



WEB OF THOUGHTS
EXTENSION

آینده‌شناسی وب

وب توجه به محتوا

MEDIA	MODUS	INVOLVEMENT
1.0	LEAN BACK	

INTERNET
TV
PRINT
OUTDOOR
E-MAIL
SEARCH
RADIO

WEB OF CONTENT
ATTENTION

آینده‌شناسی وب

وب توانمندی ارتباطات

MEDIA	MODUS	INVOLVEMENT
2.0	MOVE FORWARD	

WEB OF COMMUNICATION
EMPOWERMENT

- WEB 2.0
- UGC/VIDEOS
- WEBLOG
- INTERACTIVE OOH
- INSTANT MESSAGING
- CROWDSOURCING
- PODCAST
- SOCIAL NETWORKS
- WIKI
- VIRALS
- SOCIAL COMMERCE
- AUCTIONS
- WIDGETS

آینده‌شناسی وب

وب غوطه‌وری در مضمون

MEDIA	MODUS	INVOLVEMENT
3.0	JUMP IN	...TEMPORARY...

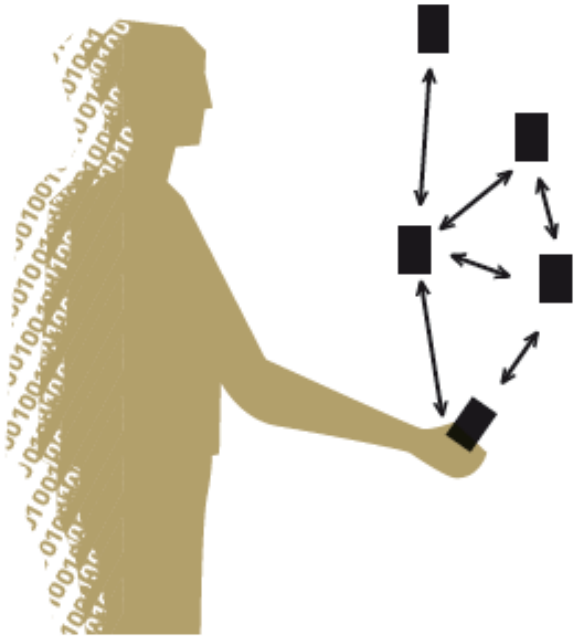
WEB OF CONTEXT IMMERSION

- WEB 3D
- CINEMATIC GAMES
- SEMANTIC WEB
- HOLO ENTERTAINMENT
- 3D CHAT
- SMART SEARCH
- HOLO TV & GAMING
- VIRTUAL WORLDS
- SMART AV EXPLORATION
- MMORPG
- VIRTUAL SHOPPING
- SMART ADVERTISING
- CONSOLE
- GAMING
- GESTURE CONTROL

آینده‌شناسی وب

وب اتصال اشیا

MEDIA	MODUS	INVOLVEMENT
4.0	ALWAYS ON	...PERMANENT...



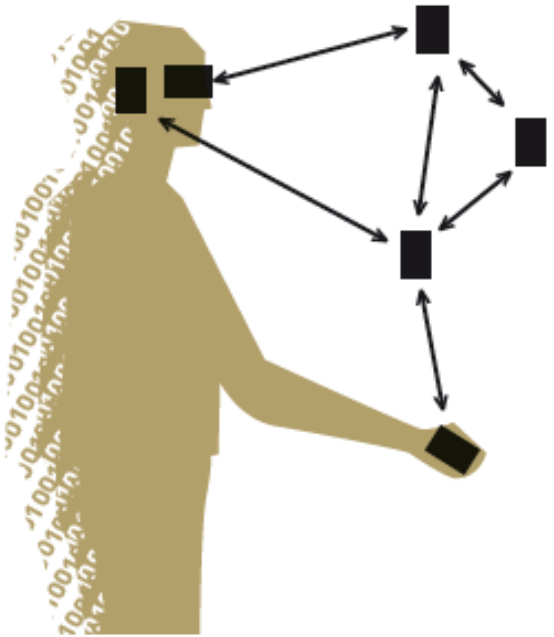
WEB OF THINGS
CONNECTIVITY

- OUTERNET
- AUGMENTED REALITY
- PRINT PLUS
- OUTDOOR INWORLD
- HYPERLOCALITY
- GEOSPATIAL WEB
- CONNECTED SPACE
- AUGMENTED GOOGLES
- AI AGENTS
- ULTRA LOCAL NETWORKS
- CLOUD COMPUTING
- VOICE PROCESSING
- WEARABLE TECHNOLOGY
- MOBILE COMMUNITY
- TACTILE INTERFACE
- FACE RECOGNITION
- OBJECT RECOGNITION
- SHY TECH

آینده‌شناسی وب

وب گسترش افکار

MEDIA	MODUS	INVOLVEMENT
5.0	PLUG IN	...IMPLANTED...

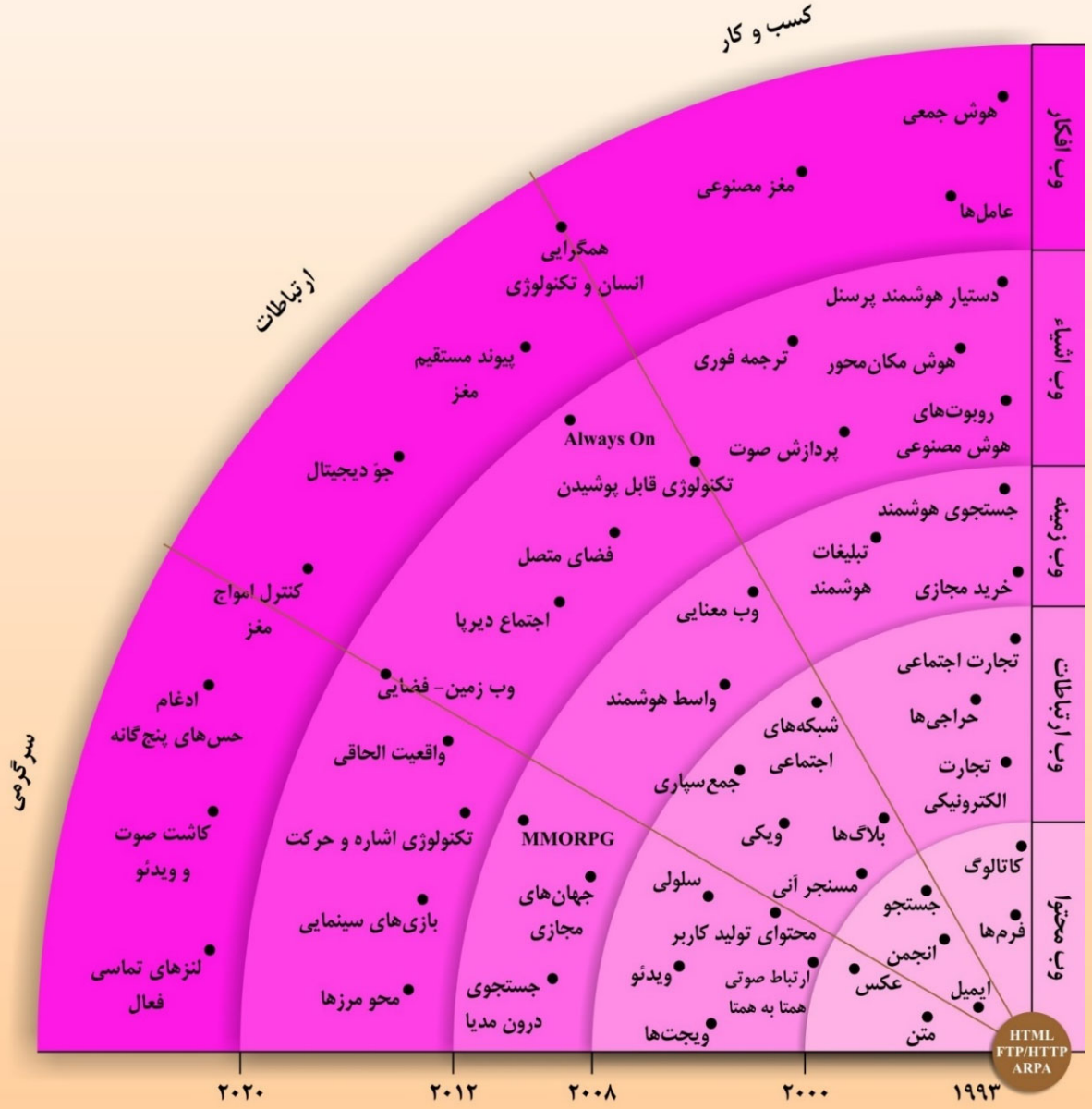


WEB OF THOUGHTS EXTENSION

BRAIN COMPUTER INTERFACE
TOTAL IMMERSION
ACTIVE CONTACT LENSE
AUGMENTED VISION
TELEPATHY
NEURO WEB INTERFACES
5 SENSE IMMERSION
CLAYTRONICS
ARTIFICIAL BRAIN
REAL WORLD AVATARS
NEUROBOTS
NATURAL LANGUAGE PROCESSING
NEURO ENHANCEMENT
EYECHIP
IMPLANTS
HUMAN TECHNOLOGY CONVERGENCE
FULLBODY PROSTHESIS
VOICELESS COMMUNICATION
BRAINWAVE CONTROL
HUMAN 2.0

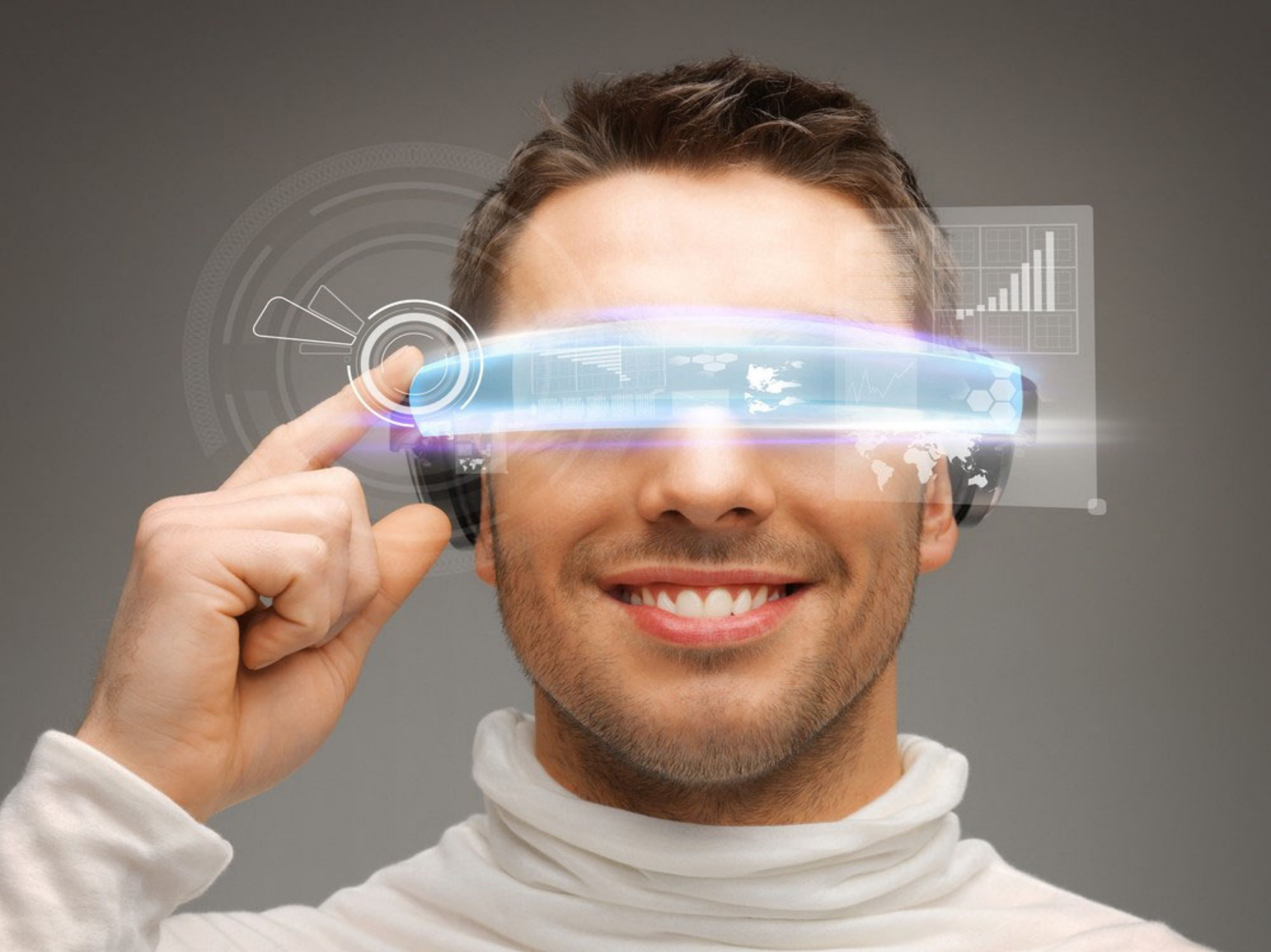
بسط وب

کسب و کار، ارتباطات و سرگرمی




iNEMO®

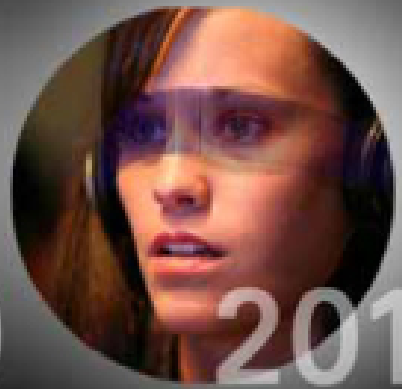
KINECT SPORTS



VIRTUAL THINK TANK

BVDW

The internet explodes into the real world ... starting to leave our PCs...



2005 2010 2015 2020

...and becomes increasingly mobile, ubiquitous and intuitive.

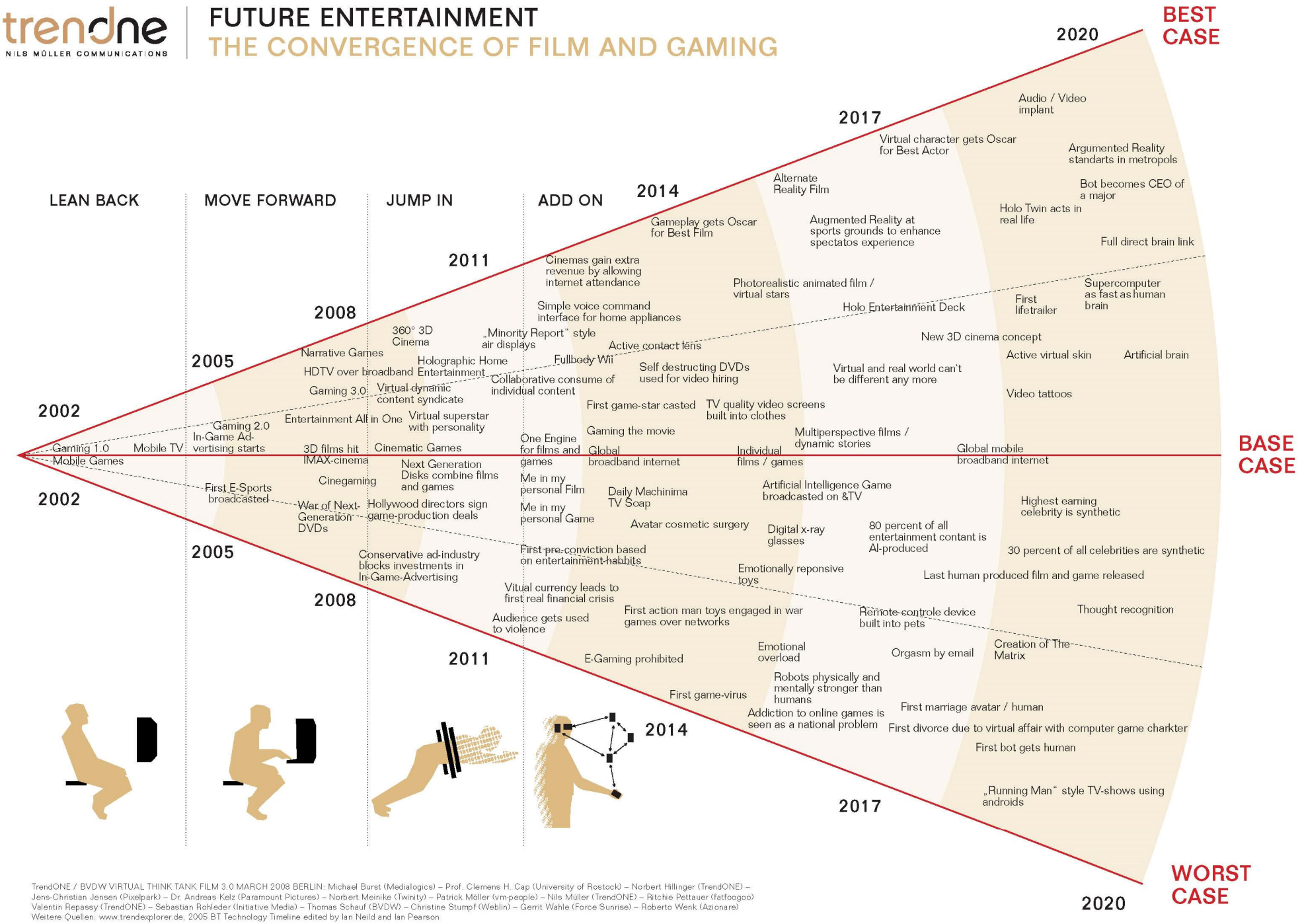
TECHNOLOGY. The internet will become more mobile, augmented and eventually completely immersive.

MARKETING. Marketing will turn from persuasion-marketing, to transparency marketing and will one day be more of a perfect information source, than just an advertising tool.

DAILY LIFE. Information nowadays is controlled by the active self-management of the user. As devices and content become more intelligent, input and output will become increasingly intuitive.

trendone
NILS MÜLLER COMMUNICATIONS

FUTURE ENTERTAINMENT
THE CONVERGENCE OF FILM AND GAMING



TrendONE / BVDW VIRTUAL THINK TANK FILM 3.0 MARCH 2008 BERLIN: Michael Burst (Medialogics) – Prof. Clemens H. Cap (University of Rostock) – Norbert Hillinger (TrendONE) – Jens-Christian Jensen (Pixelpark) – Dr. Andreas Kelz (Paramount Pictures) – Norbert Meinike (Twinity) – Patrick Möller (vm-people) – Nils Müller (TrendONE) – Ritchie Pettauer (fatfoogoo) Valentin Repassy (TrendONE) – Sebastian Rohleder (Initiative Media) – Thomas Schauf (BVDW) – Christine Stumpf (Weblin) – Gerrit Wahle (Force Sunrise) – Roberto Wenk (Azionare)
Weitere Quellen: www.trendexplorer.de, 2005 BT Technology Timeline edited by Ian Neild and Ian Pearson

TREND UNIVERSE

Powered by TREND ONE

ABOUT OUR MEGA-TREND MAP

TRENDONE takes an in-depth look at the latest innovations. Using our permanent 360-degree micro-trend research method, we identify the overriding change phenomena based on all the available evidence.

Mega-trends offer an insight into which developments will have a lasting influence on society. As dynamic change phenomena, they are also subject to change themselves. This is why we at TRENDONE regularly check the relevance of the mega-trends.

With 17 mega-trends and 109 macro-trends, the Trend Universe features the most relevant change phenomena. This overview of the trends makes the complex and highly dynamic changes visible and easier to understand.

You can see real-world examples and industry analyses of all the trends in our trendexplorer →

MAINSTREAM ADOPTION OF THE MACRO-TRENDS

As a specific manifestation of a mega-trend, each macro-trend can be rated with a degree of maturity. Depending on factors like technological development, research status and societal acceptance, the macro-trends need different lengths of time for mainstream adoption. This assessment can vary greatly according to the industry and mainly serves here to offer a general insight.

0–4
These macro-trends have a very high degree of maturity, their influence can already be felt and they offer direct potential for action.

4–8
Companies should already prepare right now for the macro-trends in this category, as their early effects can already be detected. Mainstream adoption usually requires a bit more time.

8–10+
Although these macro-trends still have a low degree of maturity, their developments should be followed attentively and continuously.

Which trends should you and your organisation pay particular attention to? → Find out with our Trend Manager →

SIZE OF THE MEGA-TRENDS

As a long-term sign of change, each mega-trend emerges in the form of medium-term macro-trends. The size of the mega-trends presented here is measured based on the number of related macro-trends.

CLASSIFICATION OF THE MEGA-TRENDS

No mega-trend stands by itself or is independent of other developments. The mega-trends are not isolated, but are always mutually dependent. Some mega-trends are driven mainly by technological developments and progress, while others are more influenced by changes in society.

T TECHNOLOGICAL ORIENTATION
The mega-trends shown on the left of the map are mainly driven by technological progress.

S SOCIAL ORIENTATION
The mega-trends shown on the right of the map are mainly driven by social change phenomena and societal developments.

Which technological and social trends are important for your industry? → Find out more in our trendexplorer →

DISCLAIMER

The assessments on the degree of maturity are based on the qualitative viewpoints of our trend analysts. The degree of maturity can vary significantly with regard to a specific industry and context. To gain an optimum assessment of the macro-trend for your industry and your specific context, we recommend you to develop this degree of maturity with us as part of a customised Trend Radar.

FROM TREND UNIVERSE TO TREND RADAR

The Trend Universe shows an overview of all the trends. But which trends are relevant to your organisation? The answer to that is given by your individual Trend Radar.

A Trend Radar displays individually rated trends. At least two evaluation criteria are required to do this. The first one – the degree of maturity – is here in this Trend Universe.

THE COMPANY

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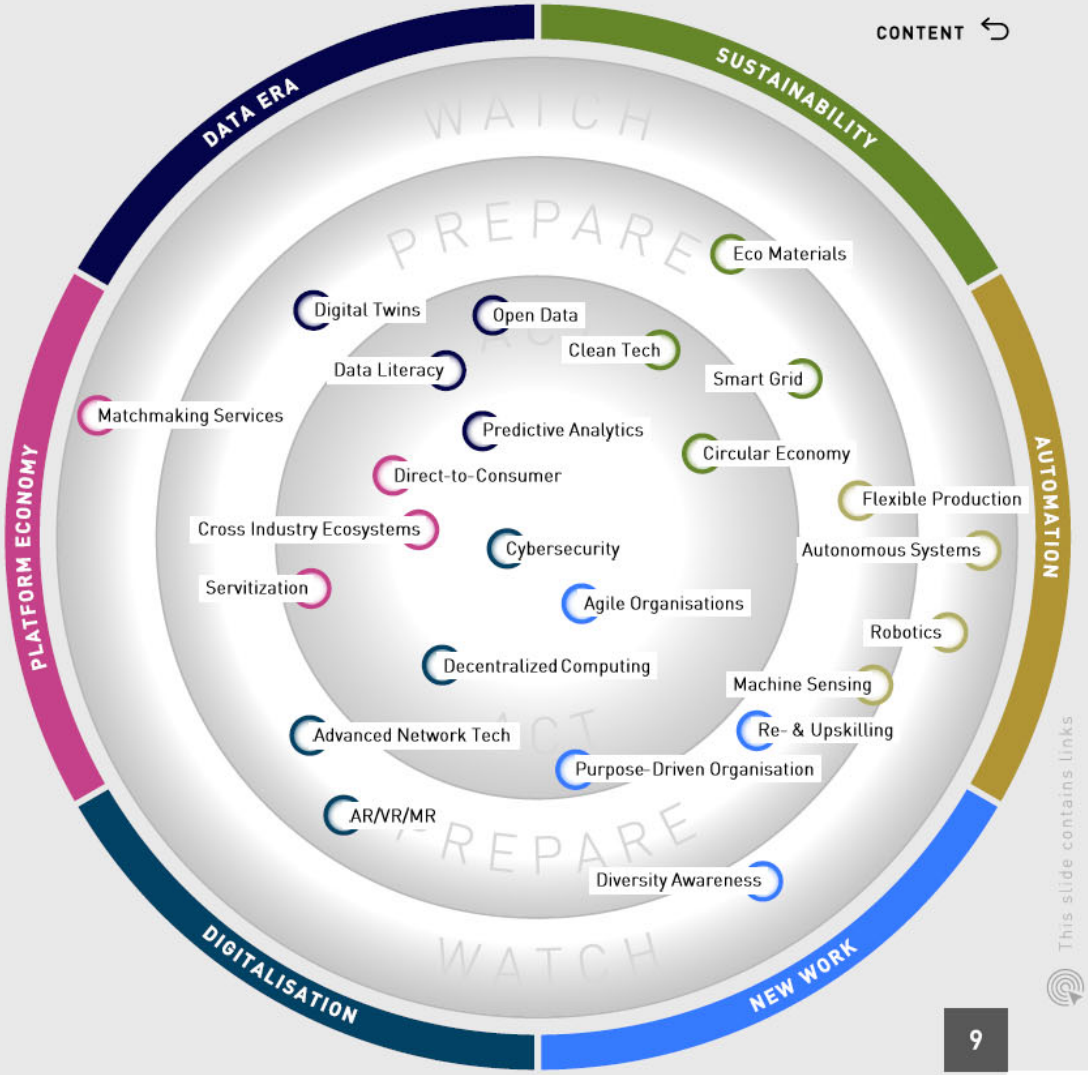
E-MAIL. info@trendone.com
WEB. www.trendone.com

TREND RADAR

AN OVERVIEW OF 24 MACRO-TRENDS

TREND RADAR OVERVIEW

- The most important trends for the mid-sized sector were evaluated according to their influence on the respective company and an assessment was given regarding their mainstream adoption. For the respondents, all 12 "Act" trends have a timescale of under 4 years in combination with a powerful influence on the company. They represent the topics that require action to be taken by the mid-sized sector in the D-A-CH region.
- The top 3 rated mega-trends:
  1. Digitalisation
  2. Data Era
  3. New Work
- The top 3 rated macro-trends:
  1. Cybersecurity
  2. Agile Organisations
  3. Predictive Analytics
- 3 out of 4 trends in the Platform Economy were highly prioritised by the respondents.
- Of all 4 sustainability trends, Circular Economy is rated as being the most influential.
- At the time of the survey (July 2021), automation trends show comparatively little need for action to be taken.



CREATED BY TRENDONE GMBH IN COOPERATION WITH THE BDI

trendone

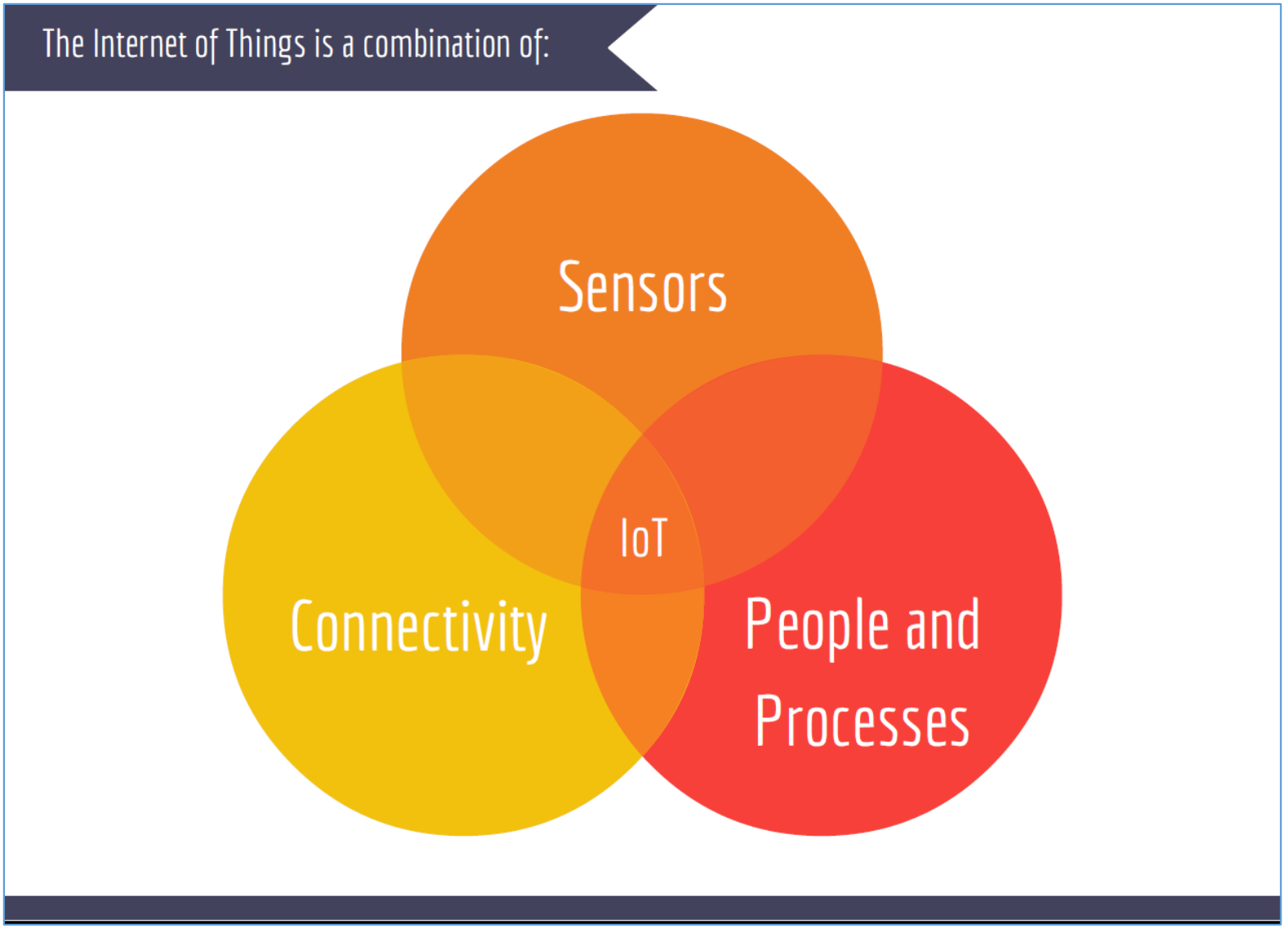
مورد مطالعاتی: تطور وب

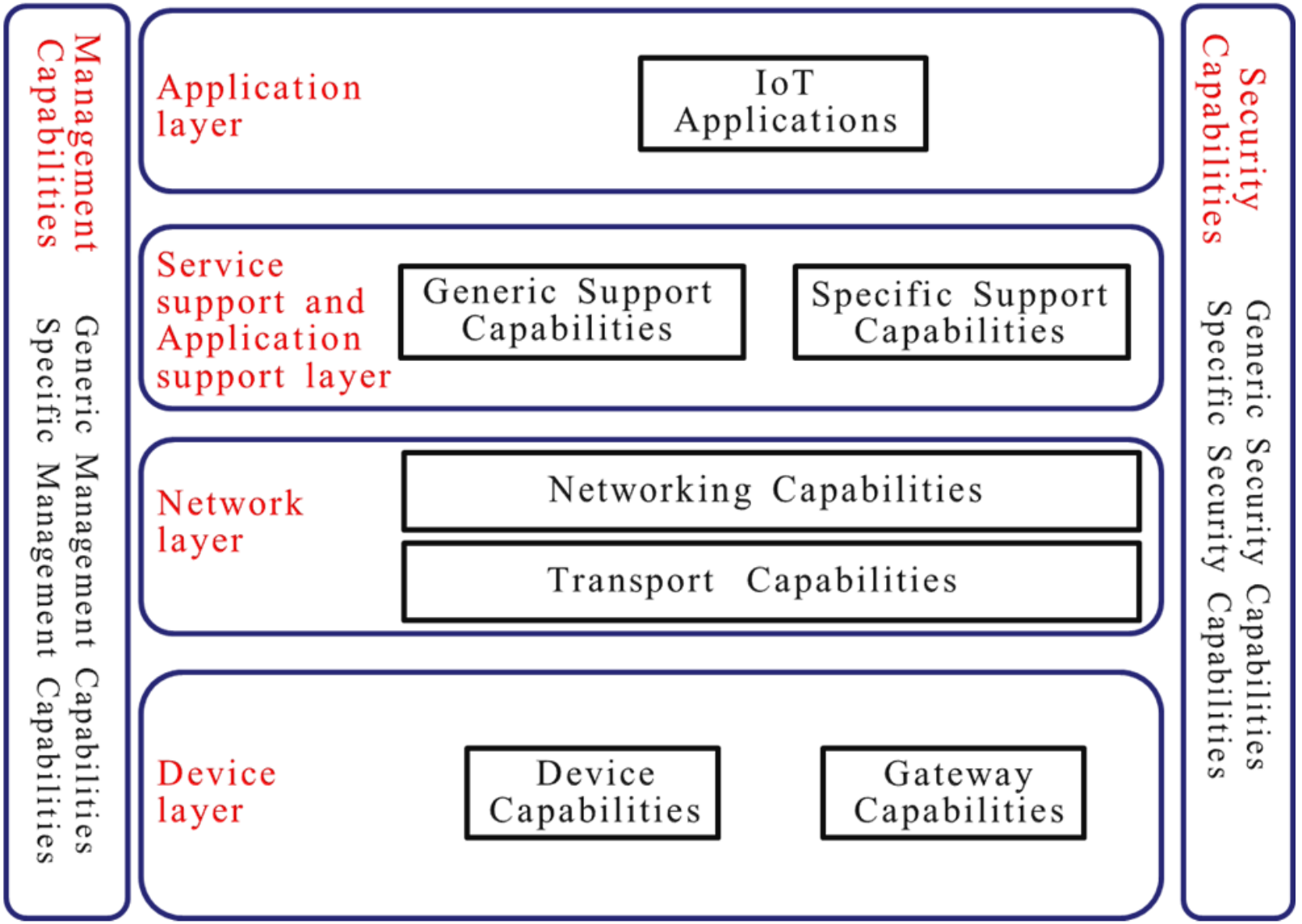
۴

اینترنت اشیا

اینترنت اشیا

INTERNET OF THINGS




Application layer
IoT Applications
Service support and Application support layer
Generic Support Capabilities
Specific Support Capabilities
Network layer
Networking Capabilities
Transport Capabilities
Device layer
Device Capabilities
Gateway Capabilities
Management Capabilities
Generic Management Capabilities
Specific Management Capabilities
Security Capabilities
Generic Security Capabilities
Specific Security Capabilities

Levels

7 **Collaboration & Processes**
(Involving People & Business Processes)

6 **Application**
(Reporting, Analytics, Control)

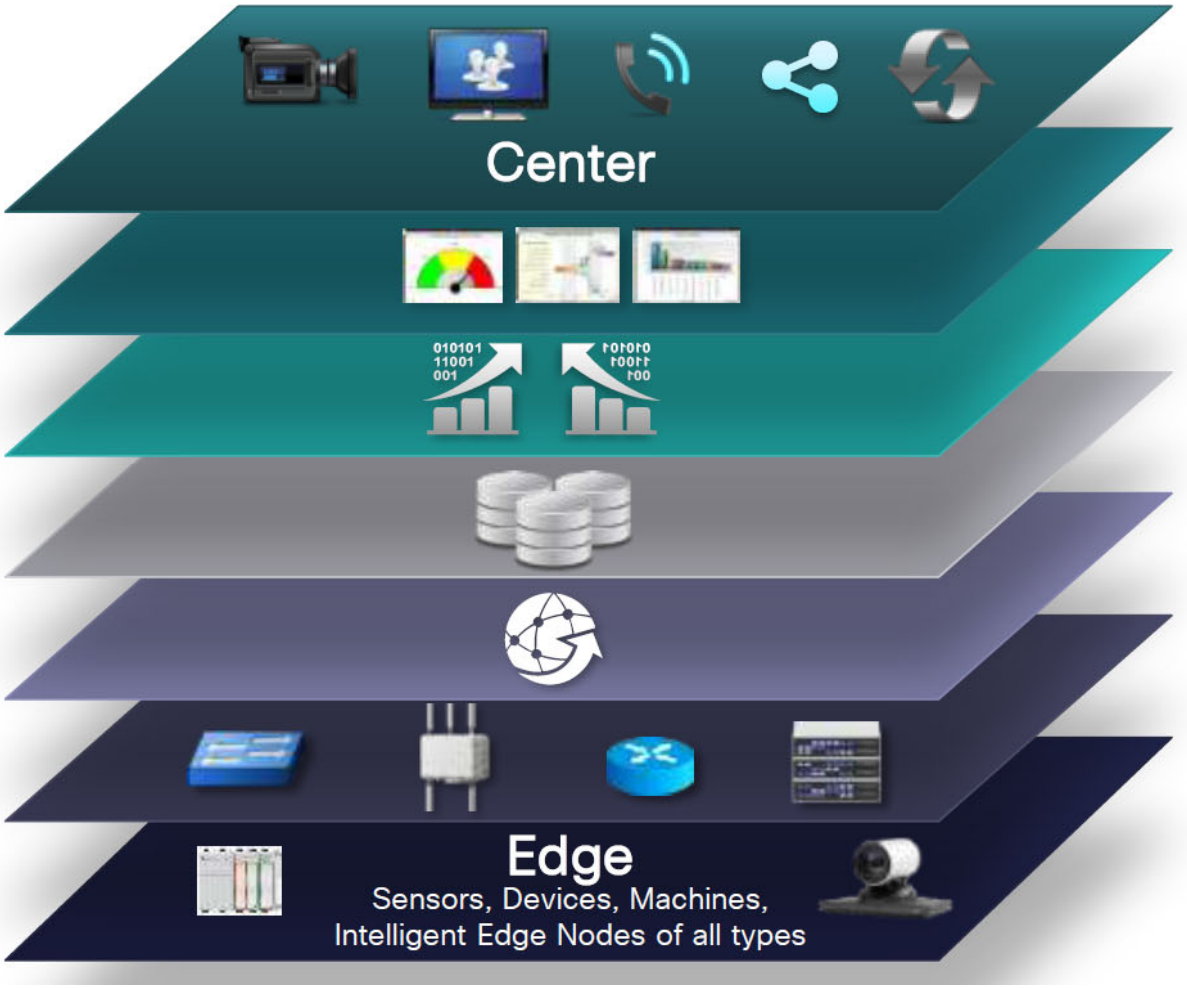
5 **Data Abstraction**
(Aggregation & Access)

4 **Data Accumulation**
(Storage)

3 **Edge Computing**
(Data Element Analysis & Transformation)

2 **Connectivity**
(Communication & Processing Units)

1 **Physical Devices & Controllers**
(The "Things" in IoT)



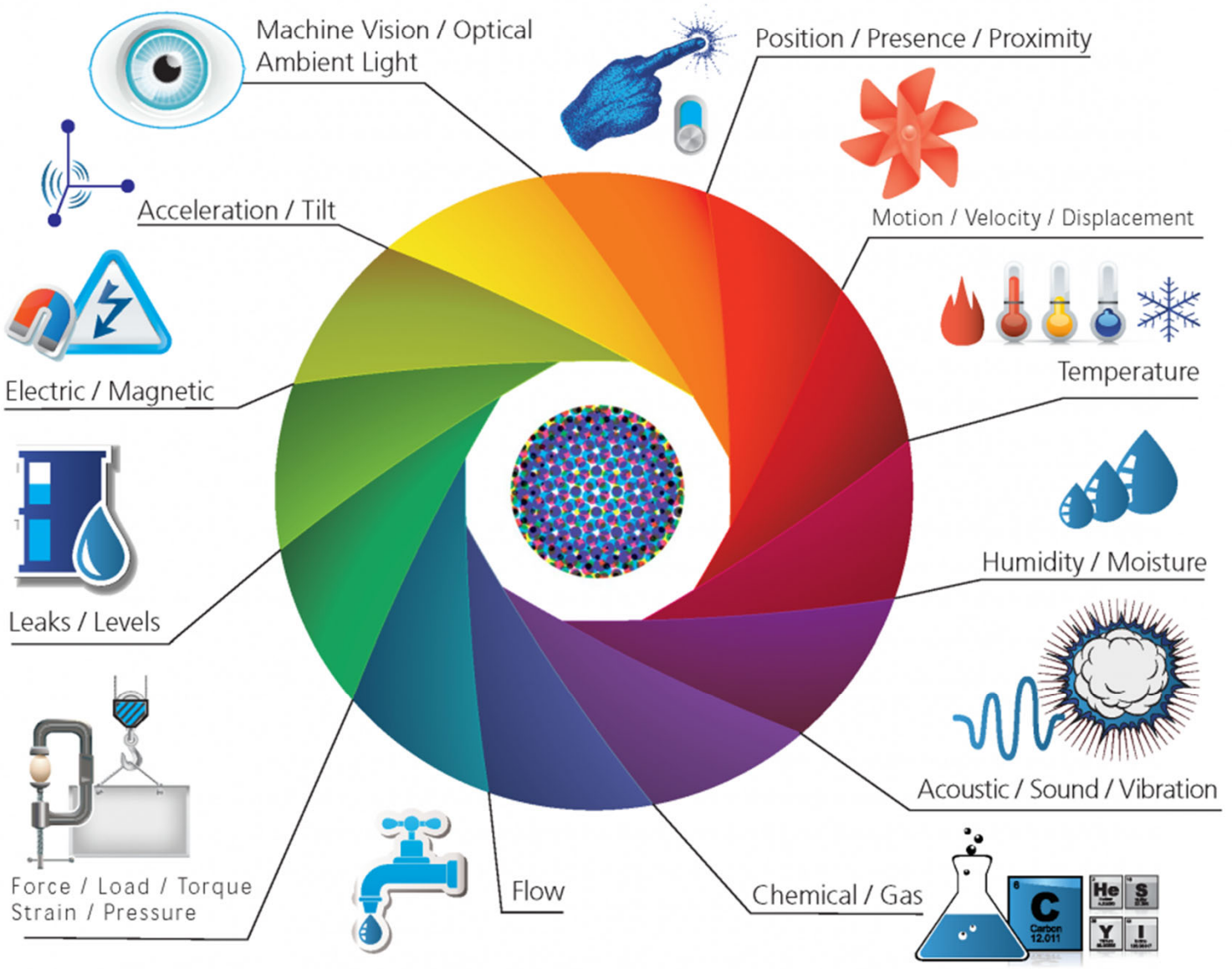
What exactly is the "INTERNET of THINGS"?

Smart Systems and the Internet of Things are driven by a combination of:

1. ***SENSORS*** & ACTUATORS
2. ***CONNECTIVITY***
3. ***PEOPLE*** & ***PROCESSES***

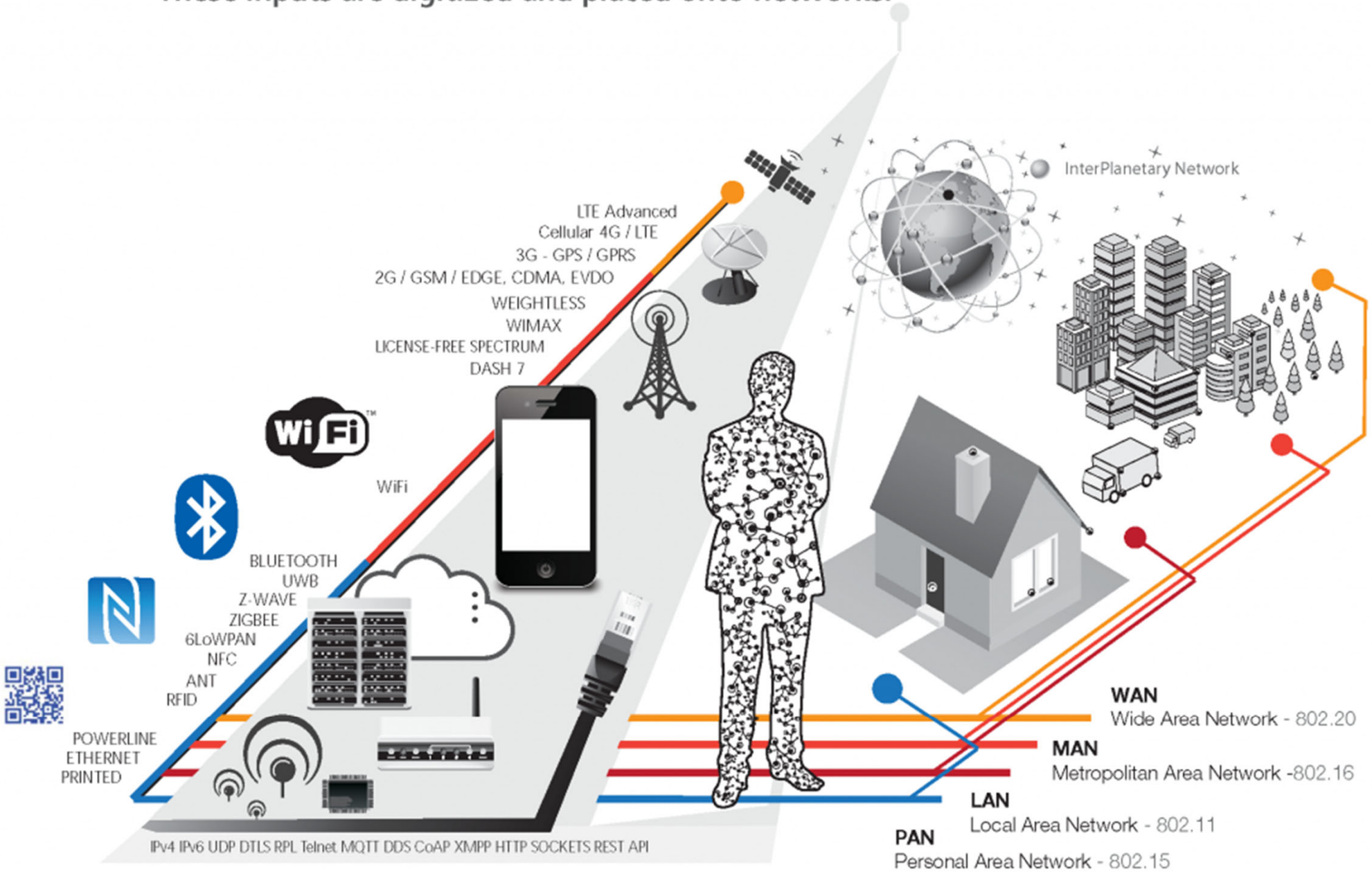
1 SENSORS & *ACTUATORS*

We are giving our world a digital nervous system. Location data using GPS sensors. Eyes and ears using cameras and microphones, along with sensory organs that can measure everything from temperature to pressure changes.



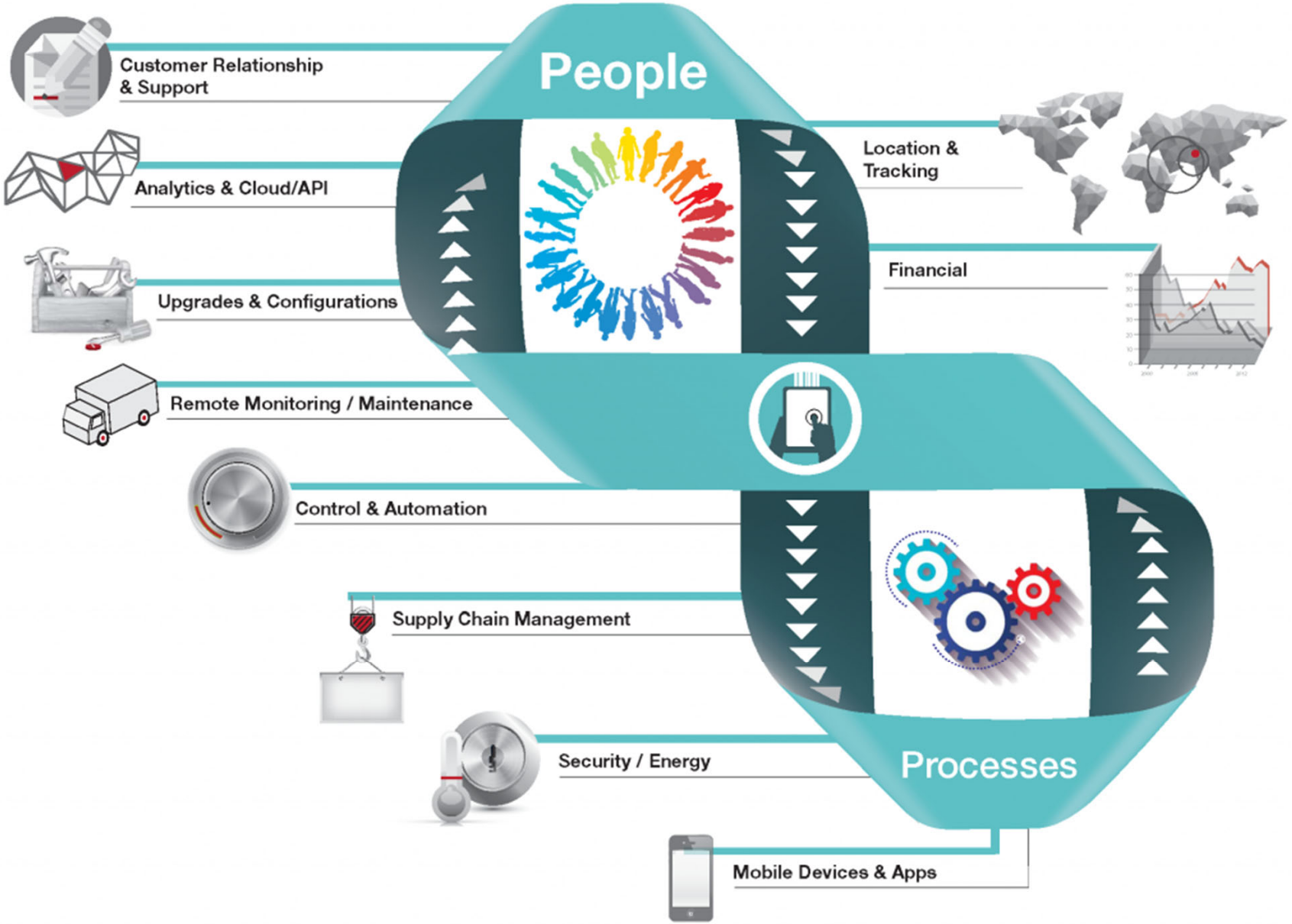
2 CONNECTIVITY

These inputs are digitized and placed onto networks.



3 PEOPLE & *PROCESSES*

These networked inputs can then be combined into bi-directional systems that integrate data, people, processes and systems for better decision making.



The interactions between these *SENSORS + CONNECTIVITY + PEOPLE + PROCESSES* entities are creating new types of smart applications and services.

Starting with popular connected devices already on the market

SMART THERMOSTATS

nest

Save resources and money on your heating bills by adapting to your usage patterns and turning the temperature down when you're away from home.

CONNECTED CARS

CAR 2GO

Tracked and rented using a smartphone. Car2Go also handles billing, parking and insurance automatically.

ACTIVITY TRACKERS

BASIS

Continuously capture heart rate patterns, activity levels, calorie expenditure and skin temperature on your wrist 24/7.

SMART OUTLETS

belkin

Remotely turn any device or appliance on or off. Track a device's energy usage and receive personalized notifications from your smartphone.

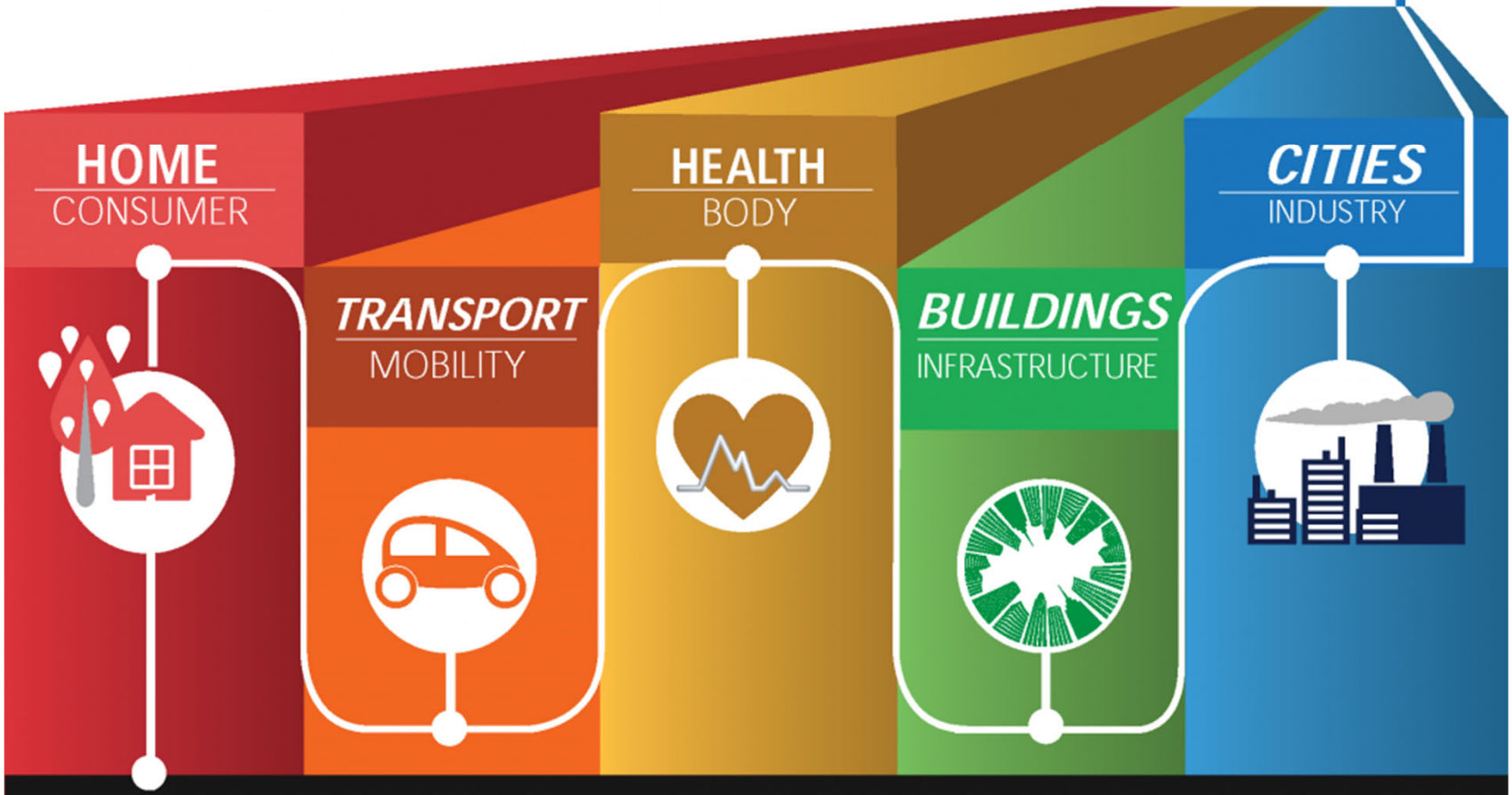
PARKING SENSORS

STREETLINE
CONNECTING THE REAL WORLD

Using embedded street sensors, users can identify real-time availability of parking spaces on their phone. City officials can manage and price their resources based on actual use.

And quickly advancing

TO DIVERSE APPLICATIONS



Light bulbs
Security
Pet Feeding
Irrigation Controller
Smoke Alarm
Refrigerator
Infotainment
Washer / Dryer
Stove
Energy Monitoring

Traffic routing
Telematics
Package Monitoring
Smart Parking
Insurance Adjustments
Supply Chain
Shipping
Public Transport
Airlines
Trains

Patient Care
Elderly Monitoring
Remote Diagnostic
Equipment Monitoring
Hospital Hygiene
Bio Wearables
Food sensors

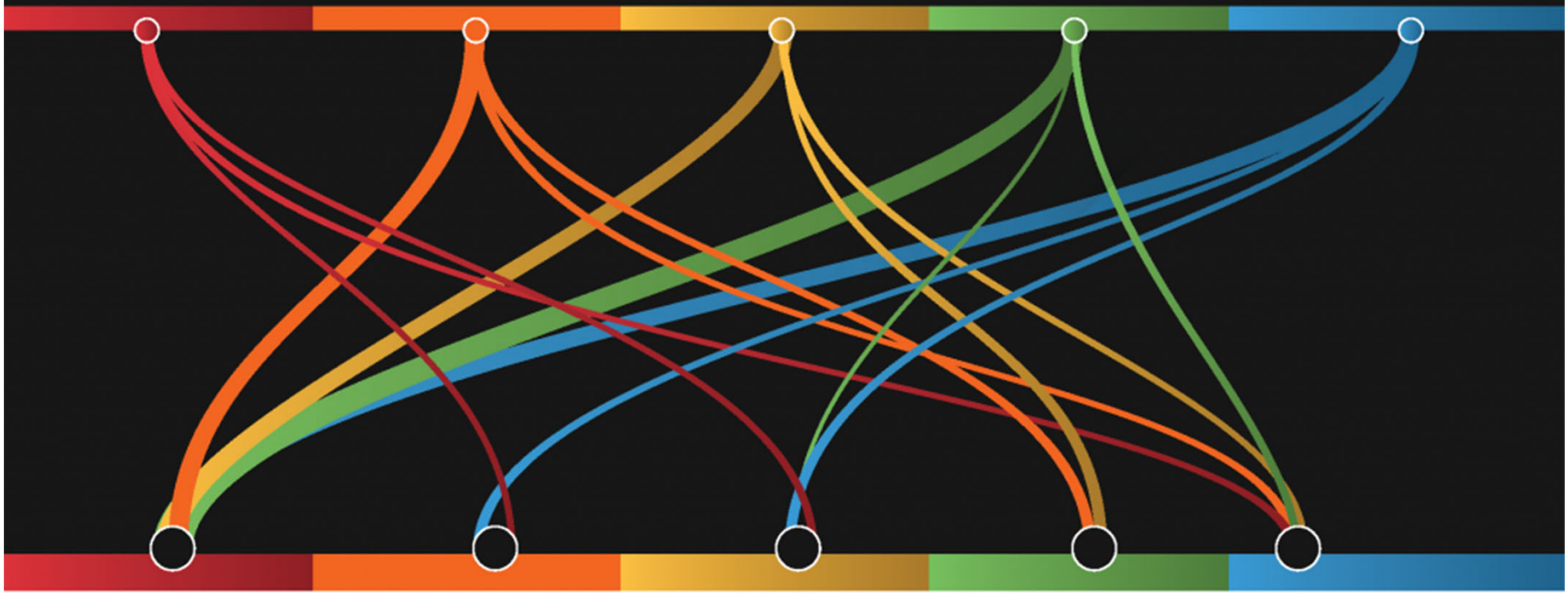
HVAC
Security
Lighting
Electrical
Transit
Emergency Alerts
Structural Integrity
Occupancy
Energy Credits

Electrical Distribution
Maintenance
Surveillance
Signage
Utilities / Smart Grid
Emergency Services
Waste Management

Things get interesting when these connected devices and services start creating

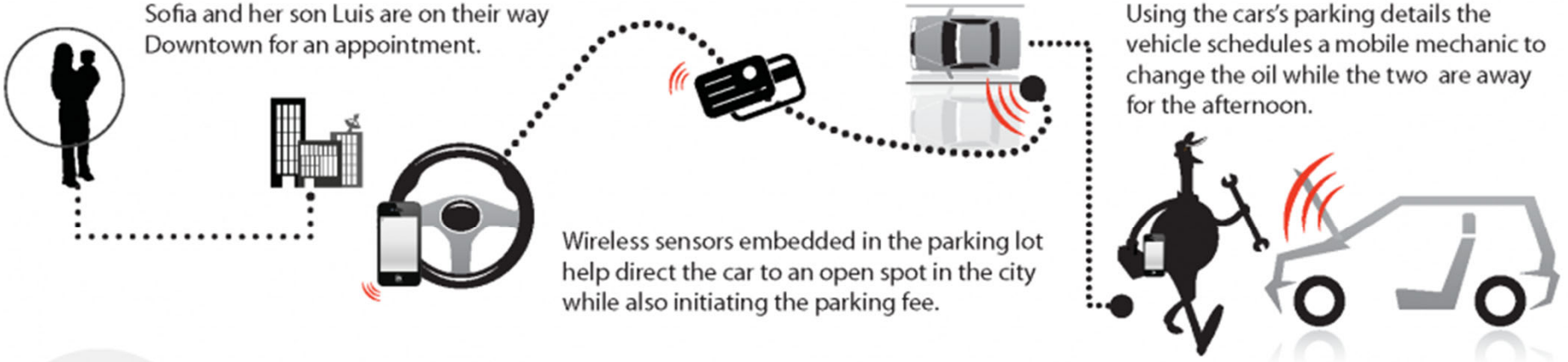
COMPOUND APPLICATIONS

within their own verticals and across industries:



FOR EXAMPLE

TRANSPORTATION + SMART CITIES



Sofia and her son Luis are on their way Downtown for an appointment.

Wireless sensors embedded in the parking lot help direct the car to an open spot in the city while also initiating the parking fee.

Using the cars's parking details the vehicle schedules a mobile mechanic to change the oil while the two are away for the afternoon.

In Downtown San Francisco 20-30% of all traffic congestion is caused by people hunting for a parking spot.

- San Francisco Municipal Transportation Agency (SFMTA)

HEALTHCARE + SMART HOME

Aging uncle Earl is still living isolated at his home and you are concerned about his safety.

Wireless sensors throughout his house help measure healthy activity levels, sleeping patterns and medication schedule.

Alerts are automatically sent to health care services and authorized family members if any abnormal activity is detected.

40 million adults age 65 and over will be living alone in the U.S, Canada and Europe.

- U.S. Department of Health and Human Services: Administration for Community Living (ACL)

SMART BUILDINGS + MOBILITY

Anna was being pressured to reduce her company's expenses for their new corporate office.

After speaking with experts she decided to install sensors to automate energy usage according to building occupancy, people flow, temperature, and other ambient conditions -- Improving the buildings overall efficiency.

Energy used by commercial and industrial buildings in the US creates nearly 50% of our national emissions of greenhouse gases.

- United States Environmental Protection Agency

Inevitably these integrations become more tightly coupled across time, location & services.

REAL-TIME SERVICE NETWORKS

- Appliance Monitoring
- Predictive Maintenance
- Service Technician / CRM
- Waste Management / Recycling

R Hotel Denver,
Industrial Washer #GHS40-2608

Location: ID: *FC-RM #00243*
Manufacturer: *Appliance Park Louisville, KY ID: #45205343*
Materials: *FC / SUS*
Sensor: *Vibration*
Connectivity: *Wireless LAN*

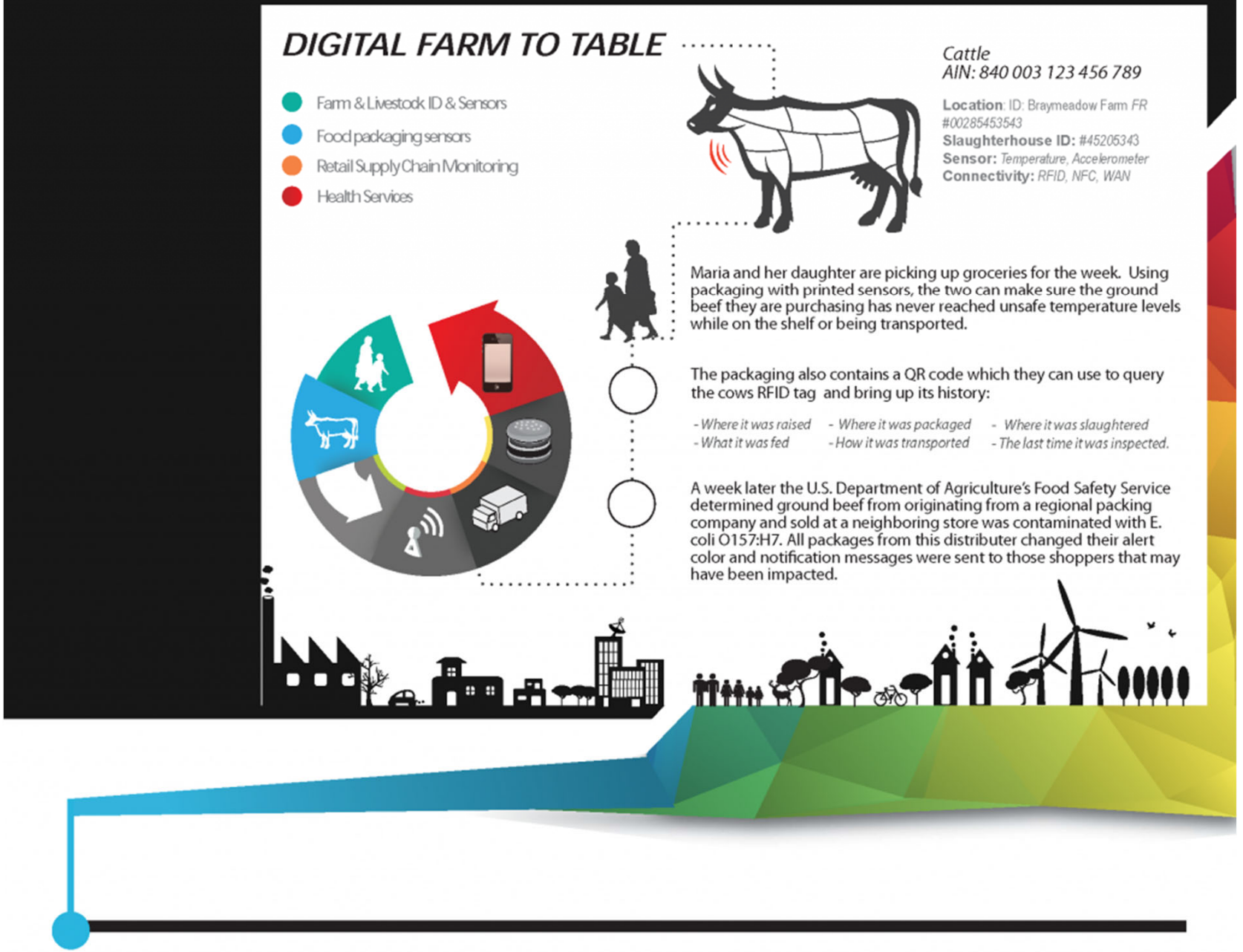
Connor, the Lead Maintenance Manager at the R Hotel in Denver receives a sensor notification that the pump body O-ring #6 on washing machine #230243 is starting to fail in the housekeeping laundry room.

On his mobile, Connor prompts the machine to order a new part. This action triggers a bidding opportunity for local service technicians within the product's authorized maintenance network.

The request lays out:
- *Pricing parameters*
- *Timing requirements*
- *Machine history*
- *Part specs*
- *Predictive sensor measurements & alerts*

Tom from IA Appliances bids on the service request and receives a notification a few moments later that his bid was accepted.

Within 1.5 hours, a service technician from IA Appliances is on site (Using a temporary facility access code for the wireless door lock) to replace the water pump. Connor sends a brief note on the service quality and IA Appliances releases a bid request for the part's raw materials to local recycling centers.



How large is the IoT Market?

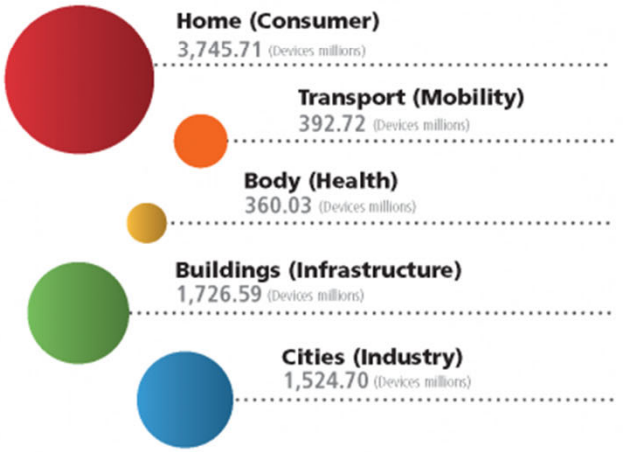
In the not-too-distant future, hundreds of millions, then billions, of individuals and businesses with billions, then trillions, of smart, communicating devices will stretch the boundaries of current systems. Creating the potential to change the way we work, learn, entertain and innovate.

Connected Devices

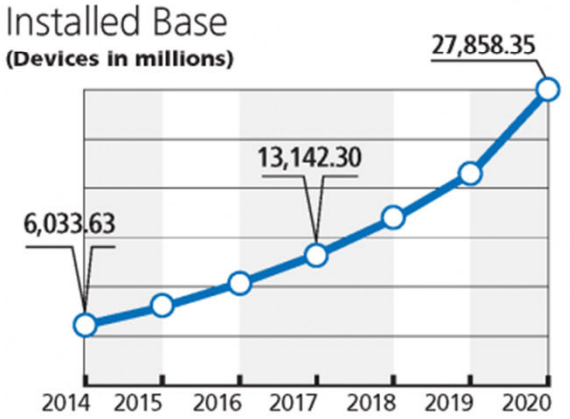
In 2014 nearly **2 billion** connected devices will be shipped

This number will grow to nearly **8 billion** devices for the year 2020

**Not including mobile phones*

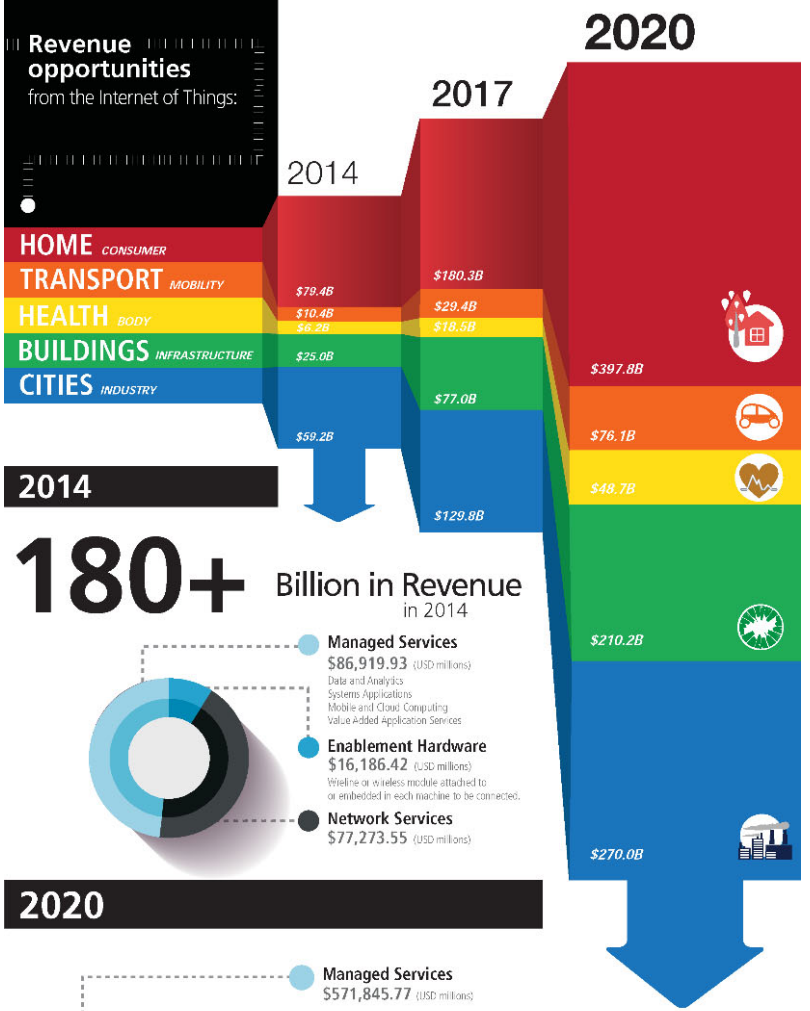


Business Impact



The implications of these trends are enormous. Vertically defined, stand-alone products and application markets will increasingly become a part of larger **networked "horizontal" systems**.

Revenue opportunities from the Internet of Things:

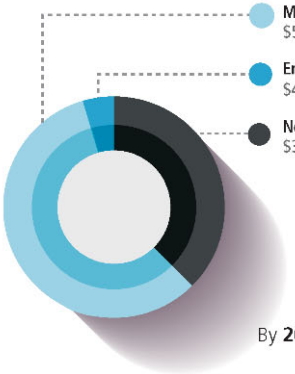


2014

180+ Billion in Revenue in 2014

- **Managed Services** $86,919.93 (USD millions)
  Data and Analytics
  Systems Applications
  Mobile and Cloud Computing
  Value Added Application Services
- **Enablement Hardware** $16,186.42 (USD millions)
  Wireline or wireless module attached to or embedded in each machine to be connected.
- **Network Services** $77,273.55 (USD millions)

2020



- **Managed Services** $571,845.77 (USD millions)
- **Enablement Hardware** $43,782.24 (USD millions)
- **Network Services** $387,453.46 (USD millions)

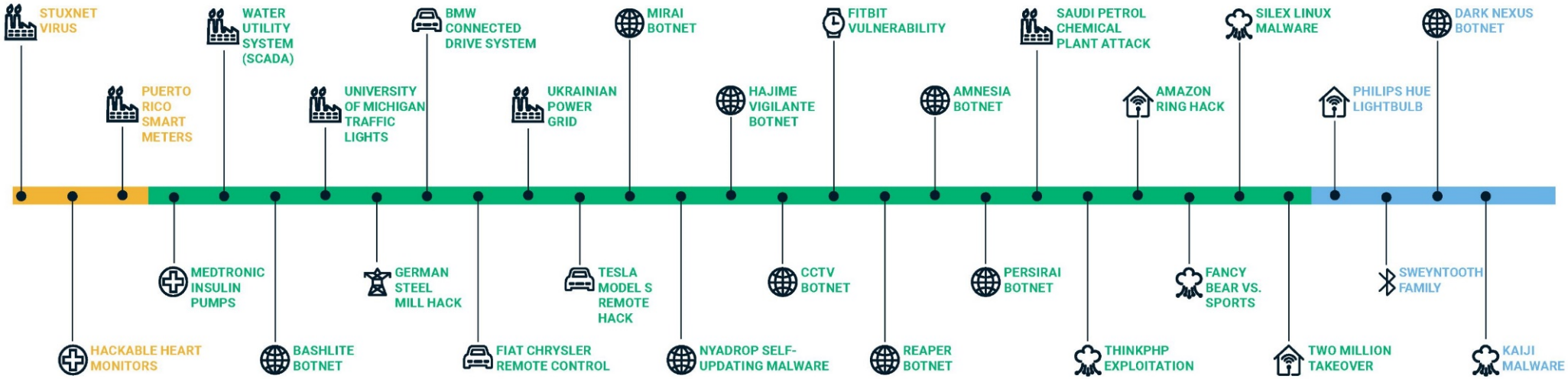
$1

By **2020** this opportunity will grow to more than

>$1 Trillion

Evolution of IoT Attacks: *An Interactive Infographic*

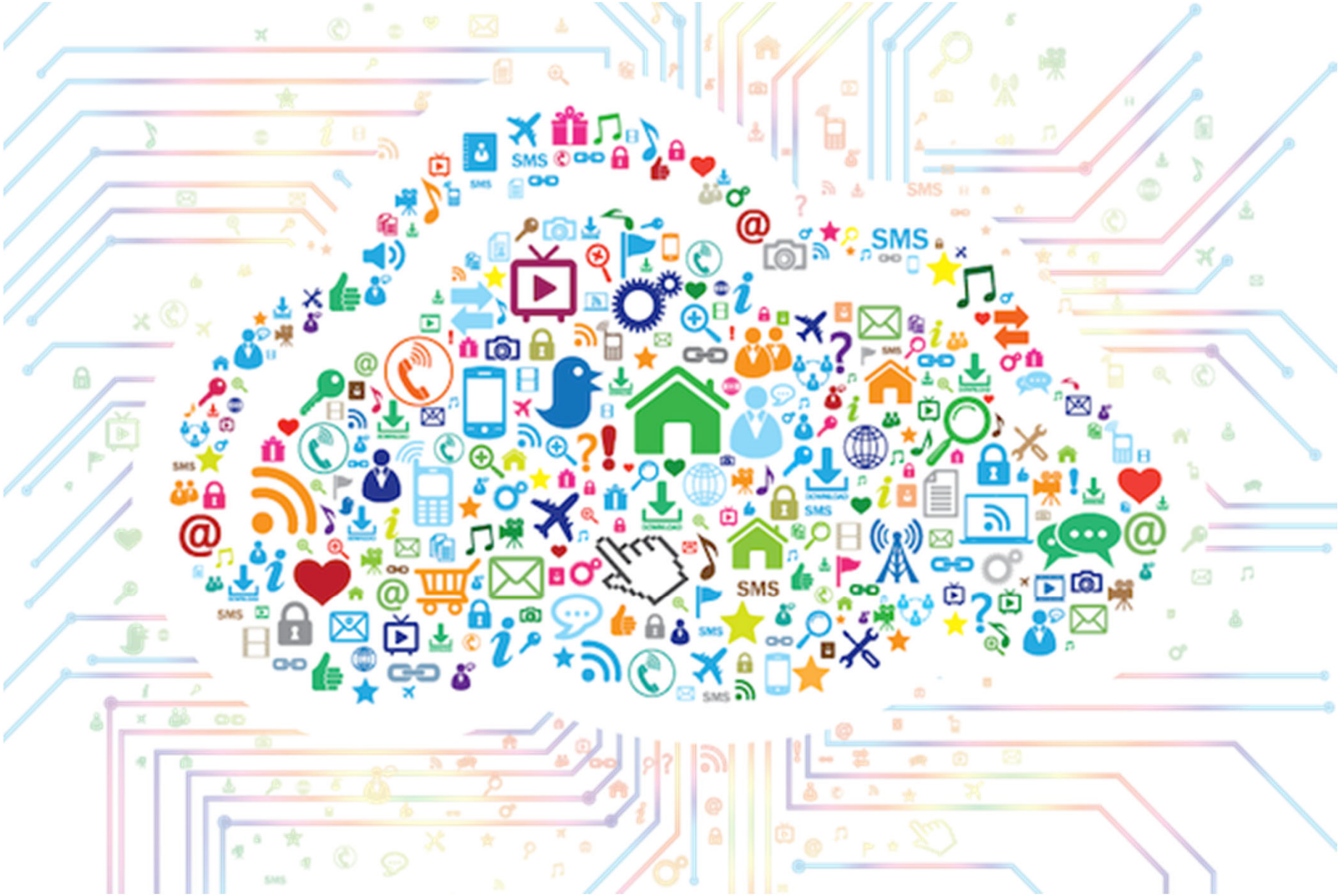
SECTIGO



THE AGE OF EXPLORATION | 2005 - 2009

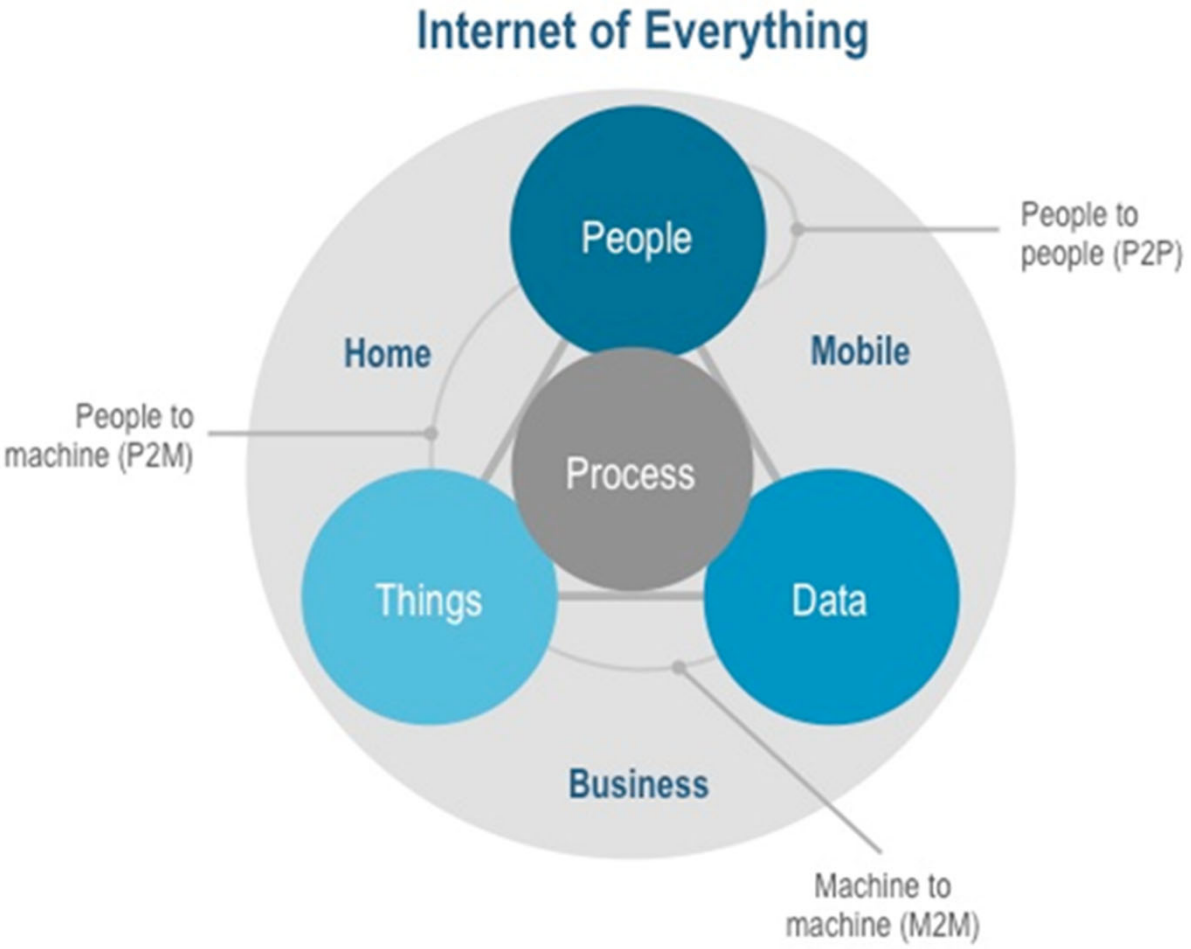
THE AGE OF EXPLOITATION | 2011 - 2019

THE AGE OF PROTECTION | 2020


SMS
SMS
SMS
SMS

اینترنت همه‌چیز

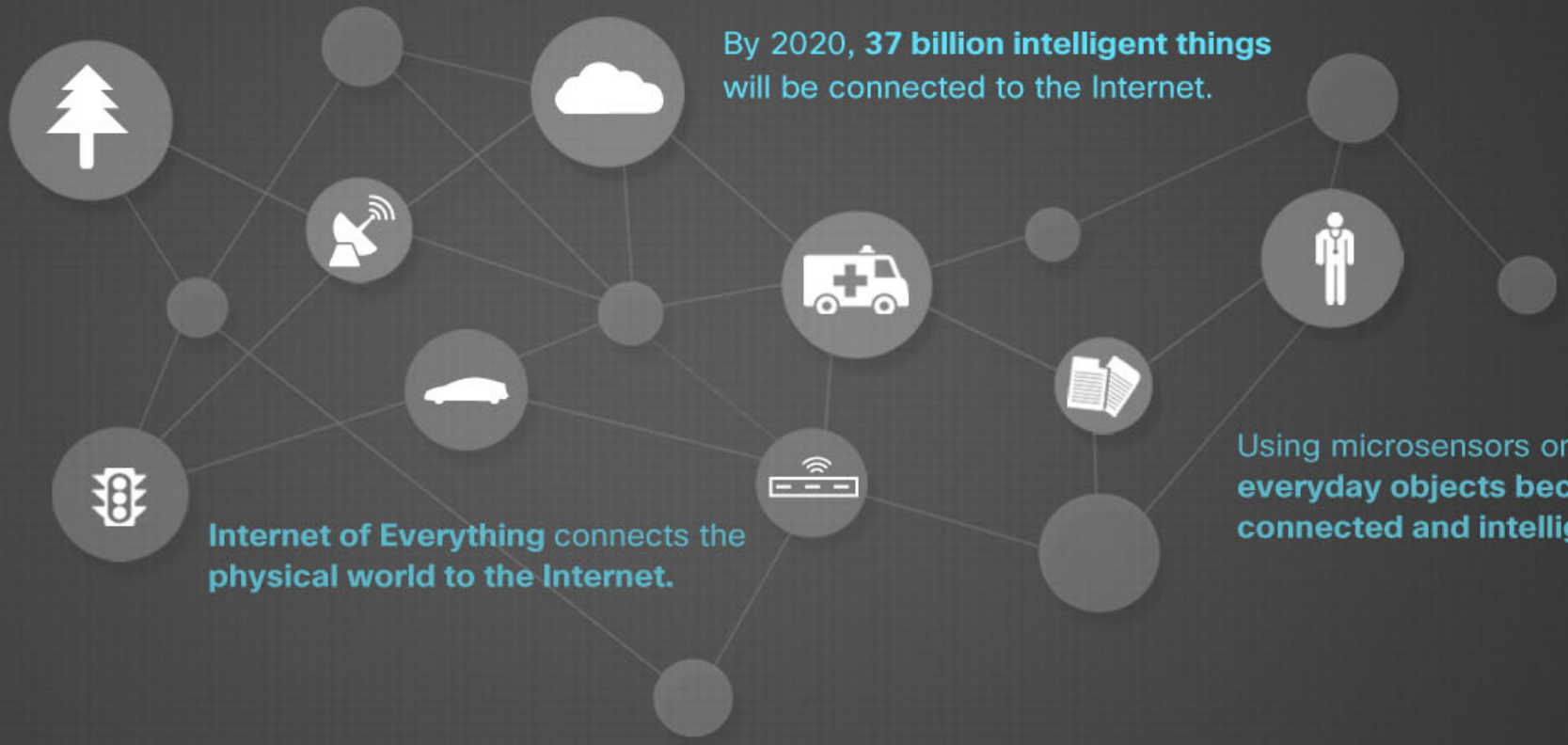
INTERNET OF EVERYTHINGS




People
Connecting People in More Relevant, Valuable Ways
Process
Delivering the Right Information to the Right Person (or Machine) at the Right Time
IoE
Data
Leveraging Data into More Useful Information for Decision Making
010101
11001
001
Things
Physical Devices and Objects Connected to the Internet and Each Other for Intelligent Decision Making

Today, more than **99% of things** in the physical world **are still not connected to the Internet.**

But a phenomenon called “The Internet of Everything” will wake up **everything you can imagine.**



By 2020, **37 billion intelligent things** will be connected to the Internet.

Internet of Everything connects the **physical world to the Internet.**

Using microsensors on the network, **everyday objects become connected and intelligent.**

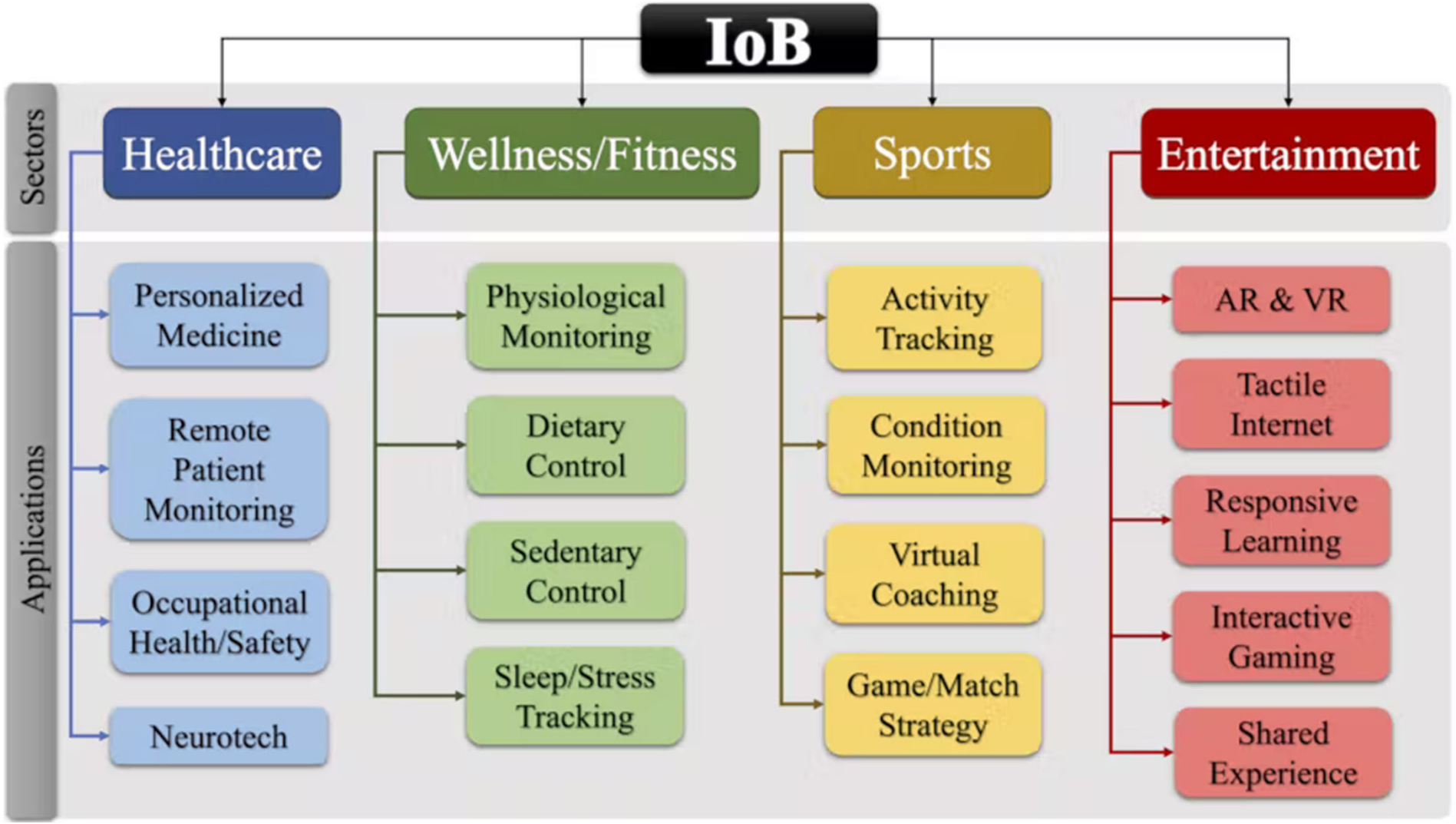
The Internet of EVERYTHING

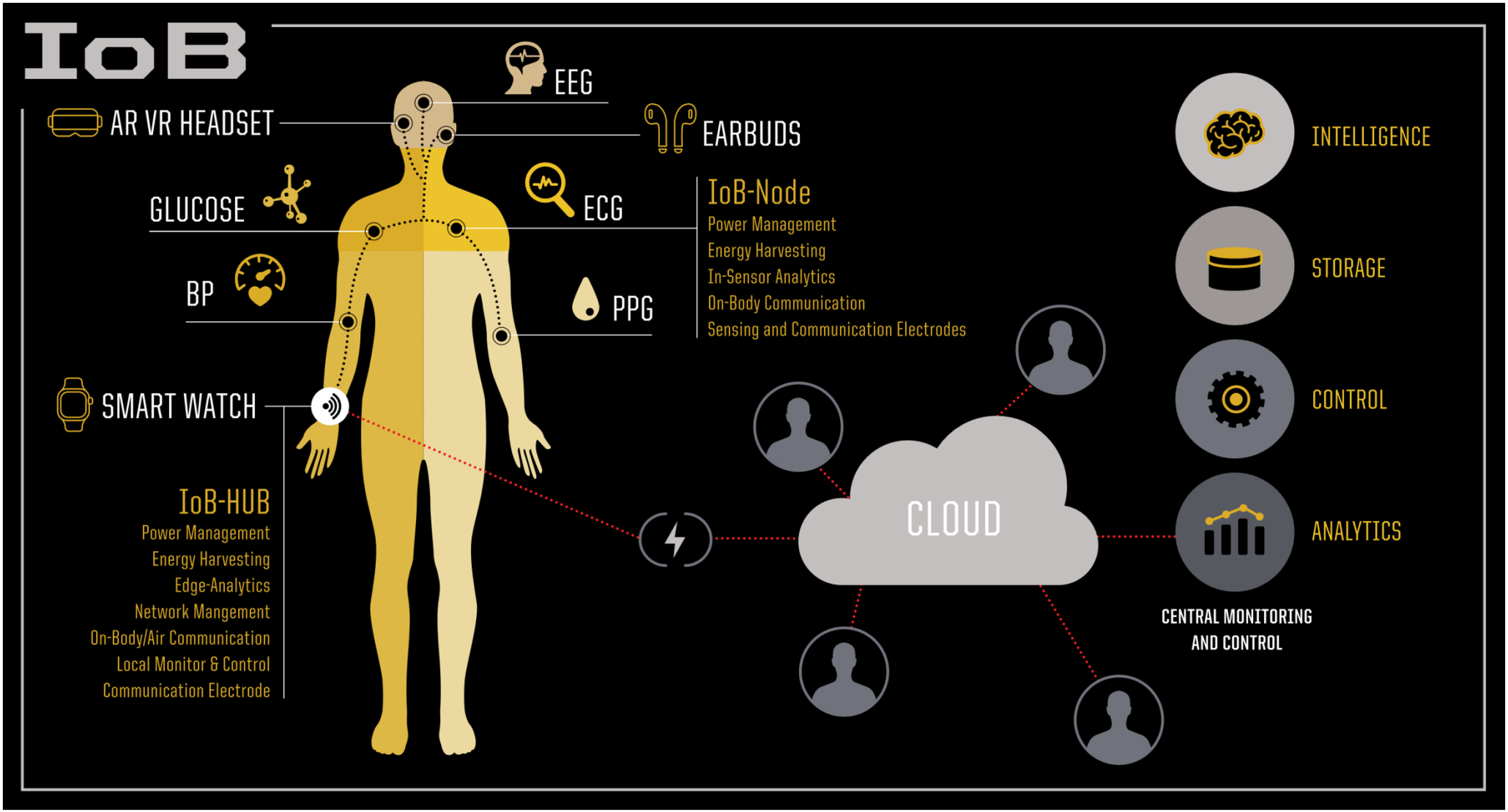
#InternetofEverything
#IoE

CISCO

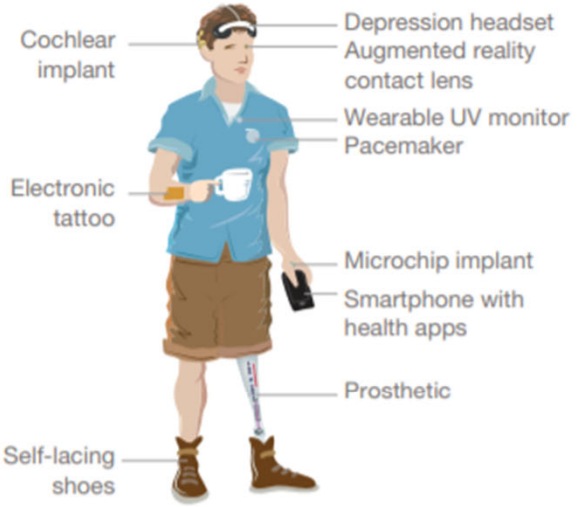
اینترنت بدن‌ها

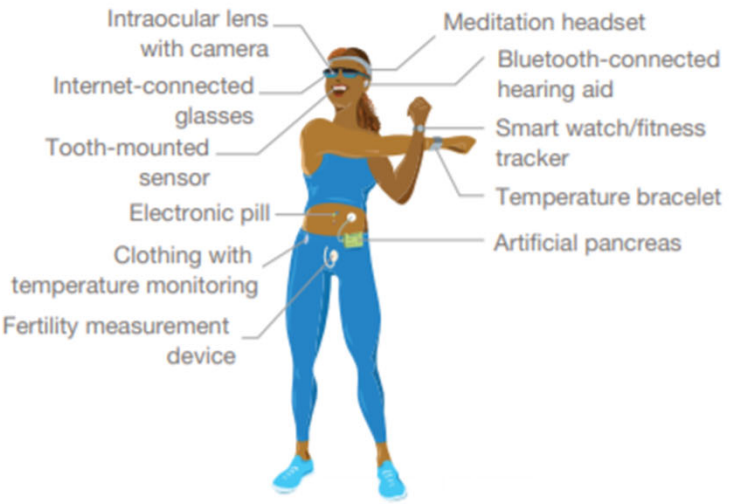
INTERNET OF BODIES

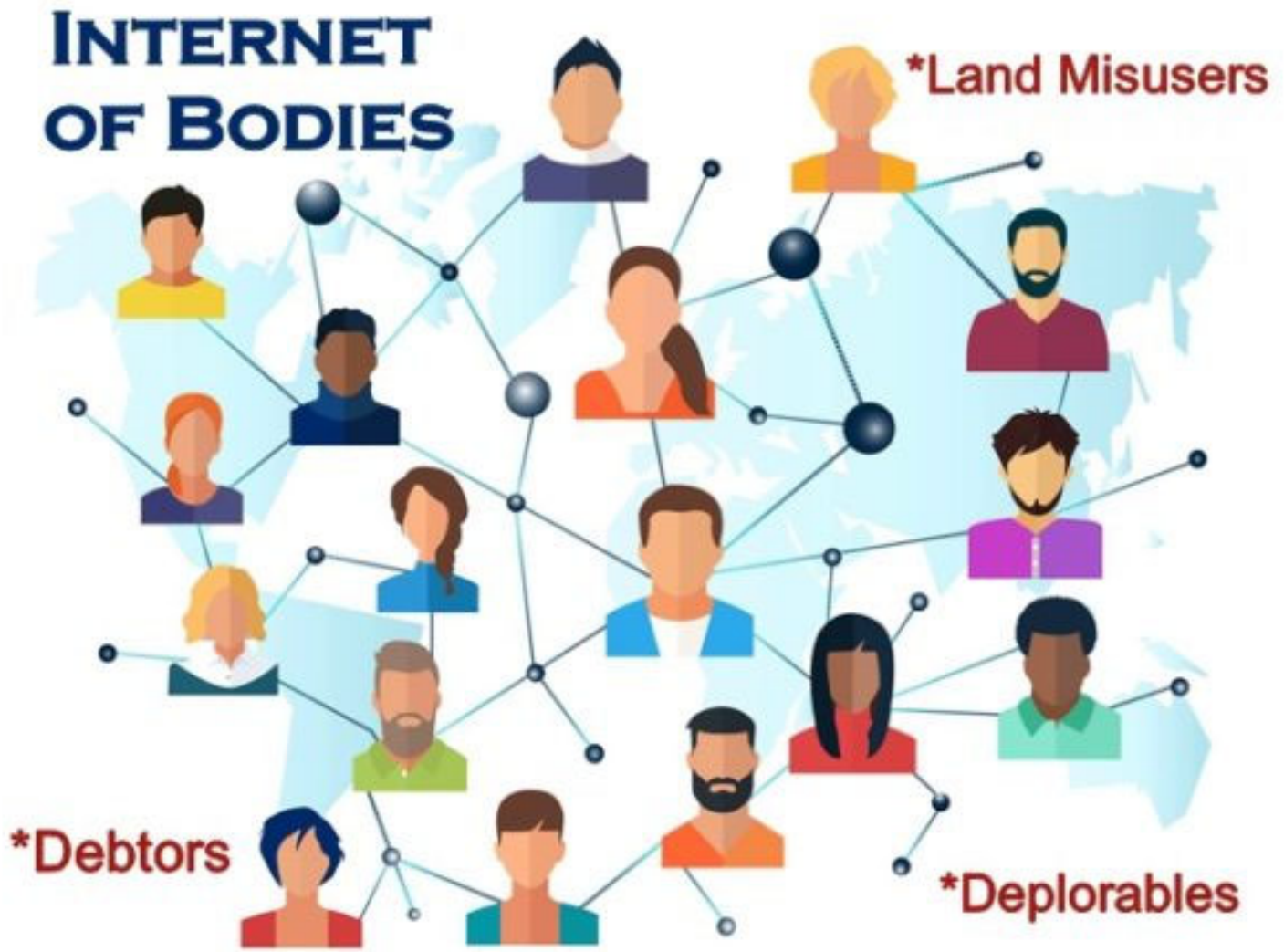



IoB
EEG
AR VR HEADSET
EARBUDS
GLUCOSE
ECG
IoB-Node
Power Management
Energy Harvesting
In-Sensor Analytics
On-Body Communication
Sensing and Communication Electrodes
BP
PPG
SMART WATCH
IoB-HUB
Power Management
Energy Harvesting
Edge-Analytics
Network Mangement
On-Body/Air Communication
Local Monitor & Control
Communication Electrode
CLOUD
INTELLIGENCE
STORAGE
CONTROL
ANALYTICS
CENTRAL MONITORING
AND CONTROL

IoB Examples






INTERNET
OF BODIES
*Land Misusers
*Debtors
*Deplorables

IoB Risks: Unexpected Access, Vulnerabilities, and Consequences

Who Might Gain Access?	What Are Potential Vulnerabilities?	What Are Possible Consequences?
• Criminals • Hackers (e.g., security researchers, hobbyists, malicious attackers) • Data brokers • Data fusion centers • Employers • Schools • Health-care providers • Insurance companies • Manufacturers • Criminal justice system • Governments	• Bodily dependence on device for health or functional purposes • Sensitive data collection, possession, or dissemination • Internet connectivity • Regulatory gaps • Hardware • Software	• Death or physical harm from malfunction or hacking • Global and national security challenges • Data breach • Passive collection or sharing of data without informed consent • Misuse or unexpected uses of data • Personal identification • Increased health disparities • Coercion to accept devices • Infringement on body autonomy

مورد مطالعاتی: تطور وب

۵

وب
استراتژیک

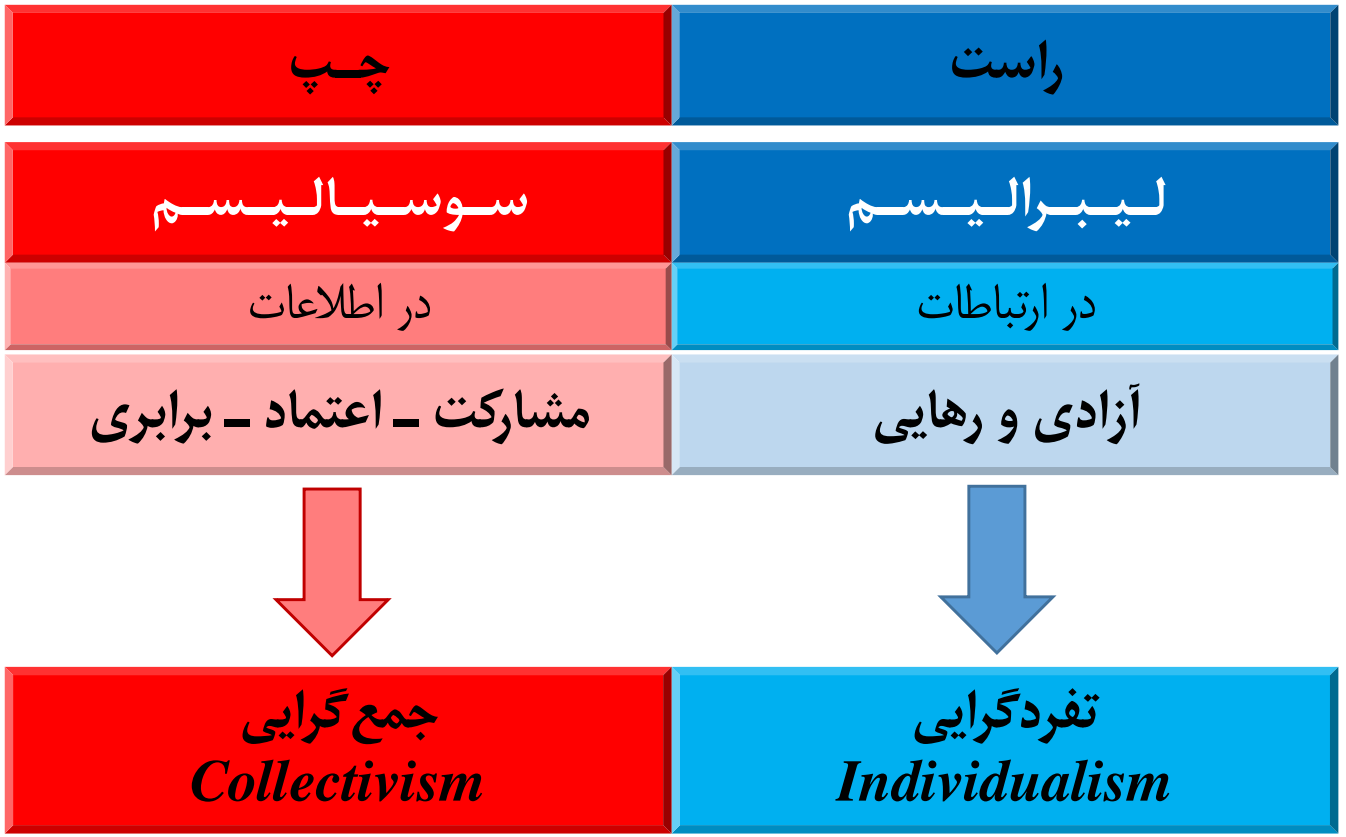
وب استراتژیک

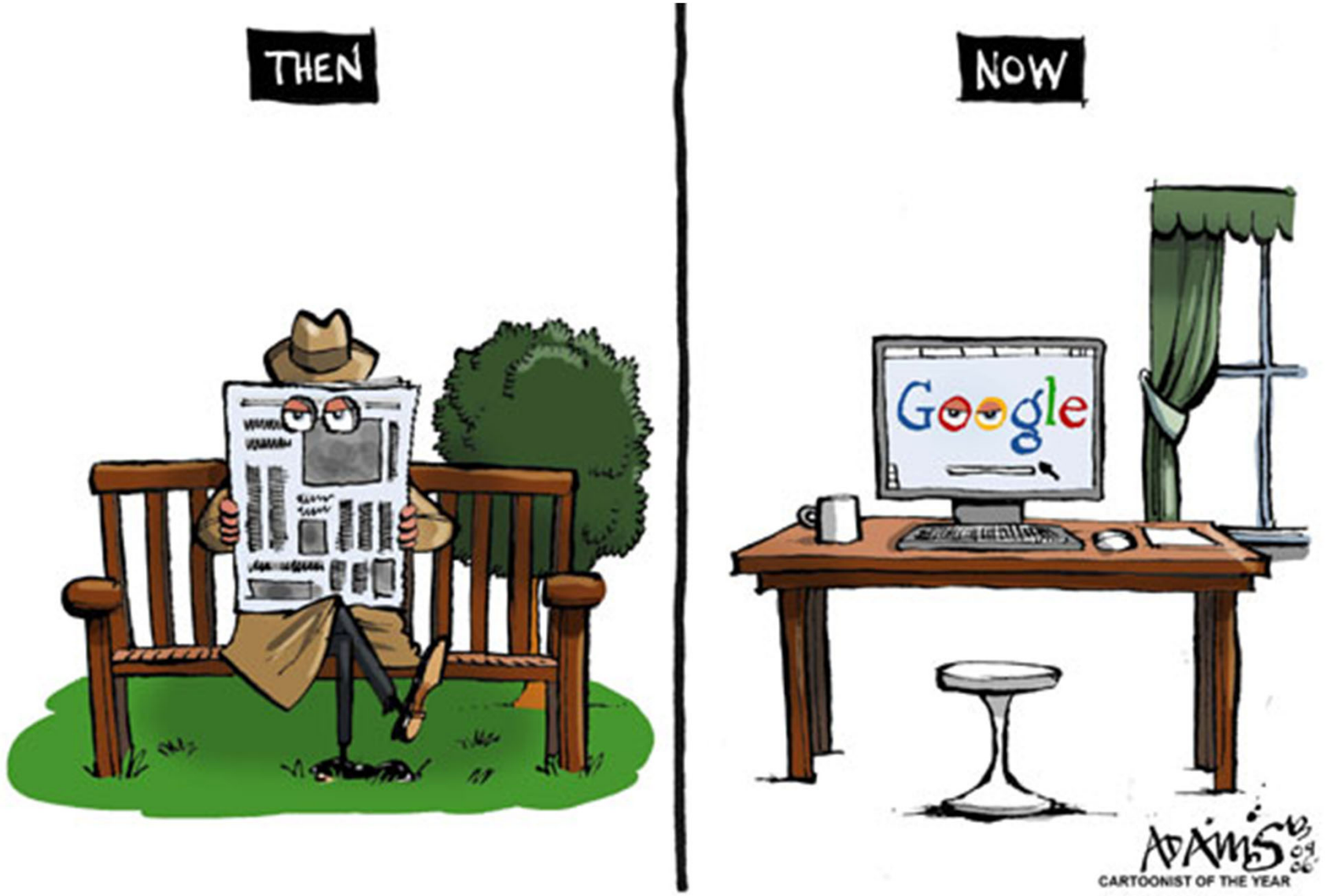
وب استراتژیک

بخشی از وب که بر بقاء و بسط تمدن مؤثر است.

وب استراتژیک

تلفیق ایدئولوژی‌های: لیبرالیسم ارتباطی ـ سوسیالیسم اطلاعاتی




THEN
NOW
Google
ADAMS
CARTOONIST OF THE YEAR

فضای سایبر

مورد مطالعاتی: تطور وب

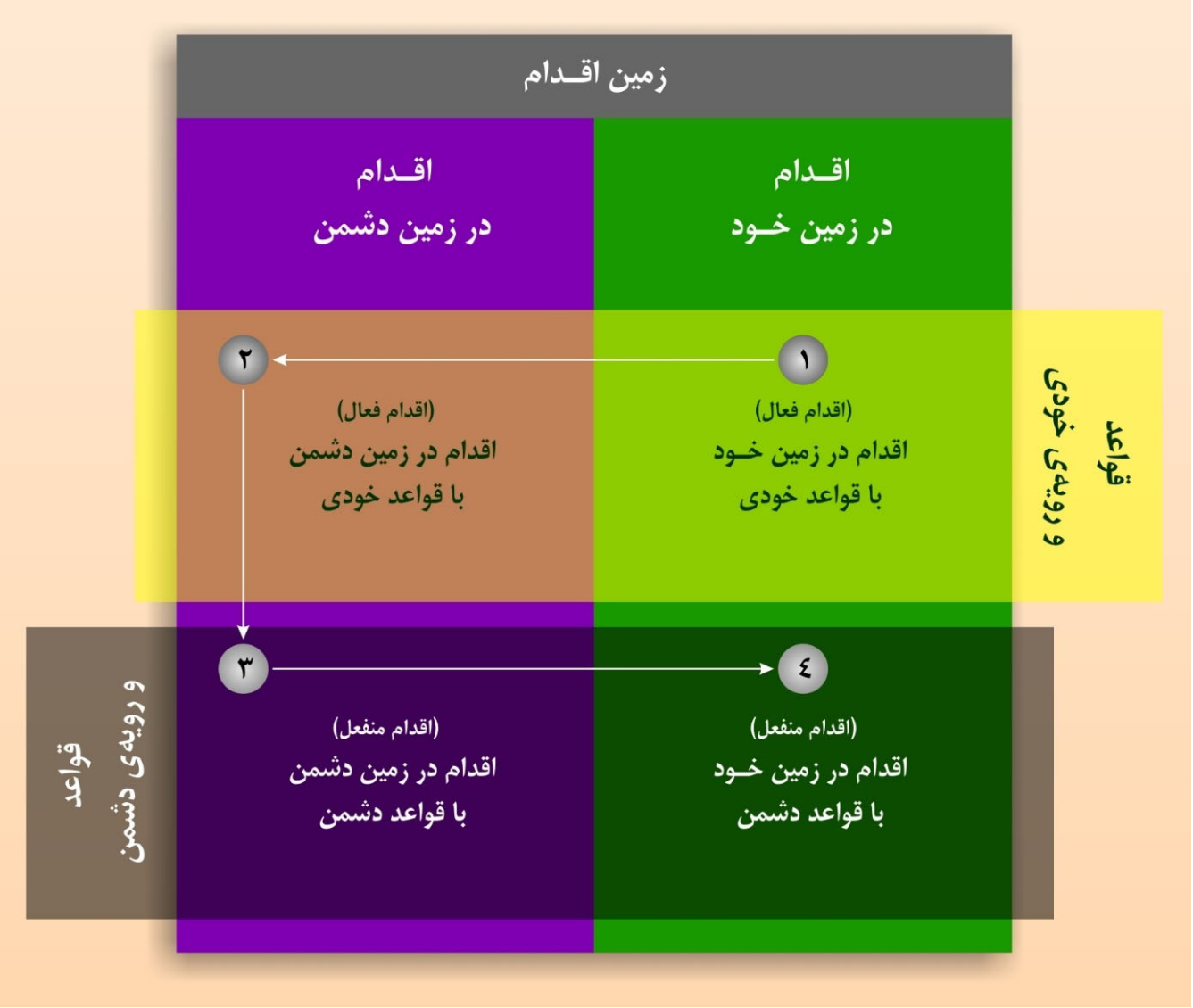
۶

استراتژی اقدام در وب

زمین اقدام

اقدام متقارن و اقدام نامتقارن

از دید «خودی»



استراتژی اقدام در وب

اقدام‌های متقارن و نامتقارن

سطح اقدام		تقارن اقدام	
		اقدام نامتقارن	اقدام متقارن
استراتژیکی		اقدام نامتقارن استراتژیکی	اقدام متقارن استراتژیکی
عملیاتی		اقدام نامتقارن عملیاتی	اقدام متقارن عملیاتی
تاکتیکی		اقدام نامتقارن تاکتیکی	اقدام متقارن تاکتیکی
تکنیکی		اقدام نامتقارن تکنیکی	اقدام متقارن تکنیکی

استراتژی اقدام در وب

اقدام‌های متقارن و نامتقارن، مثبت و منفی

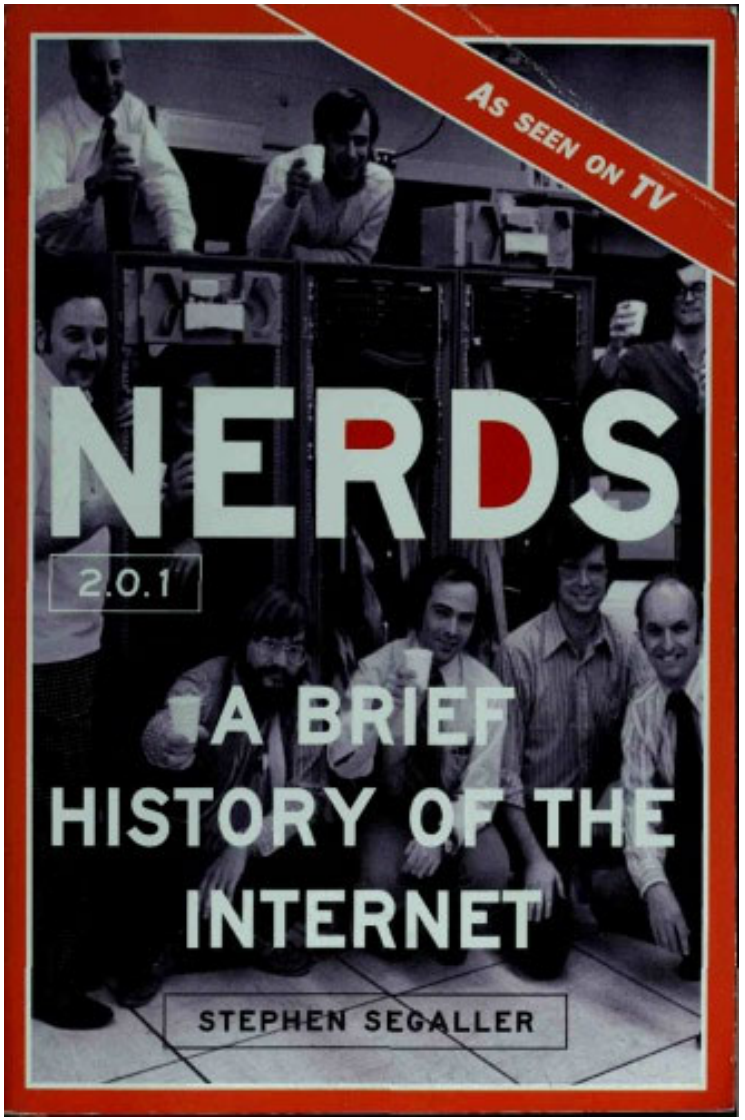
سطح اقدام		تقارن اقدام			
		اقدام نامتقارن		اقدام متقارن	
		مثبت +	منفی −	مثبت +	منفی −
سطح اقدام	استراتژیکی	۱	۲	۳	۴
	عملیاتی	۵	۶	۷	۸
	تاکتیکی	۹	۱۰	۱۱	۱۲
	تکنیکی	۱۳	۱۴	۱۵	۱۶

مورد مطالعاتی: تطور وب

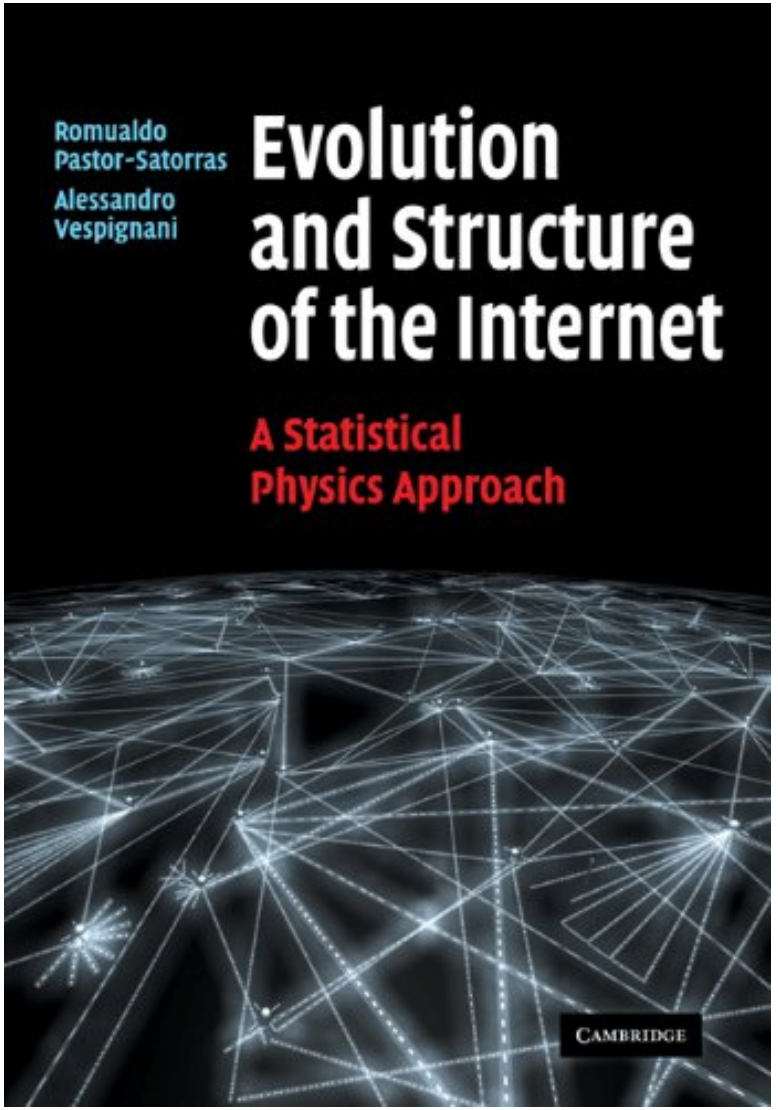
۷

منابع و مراجع

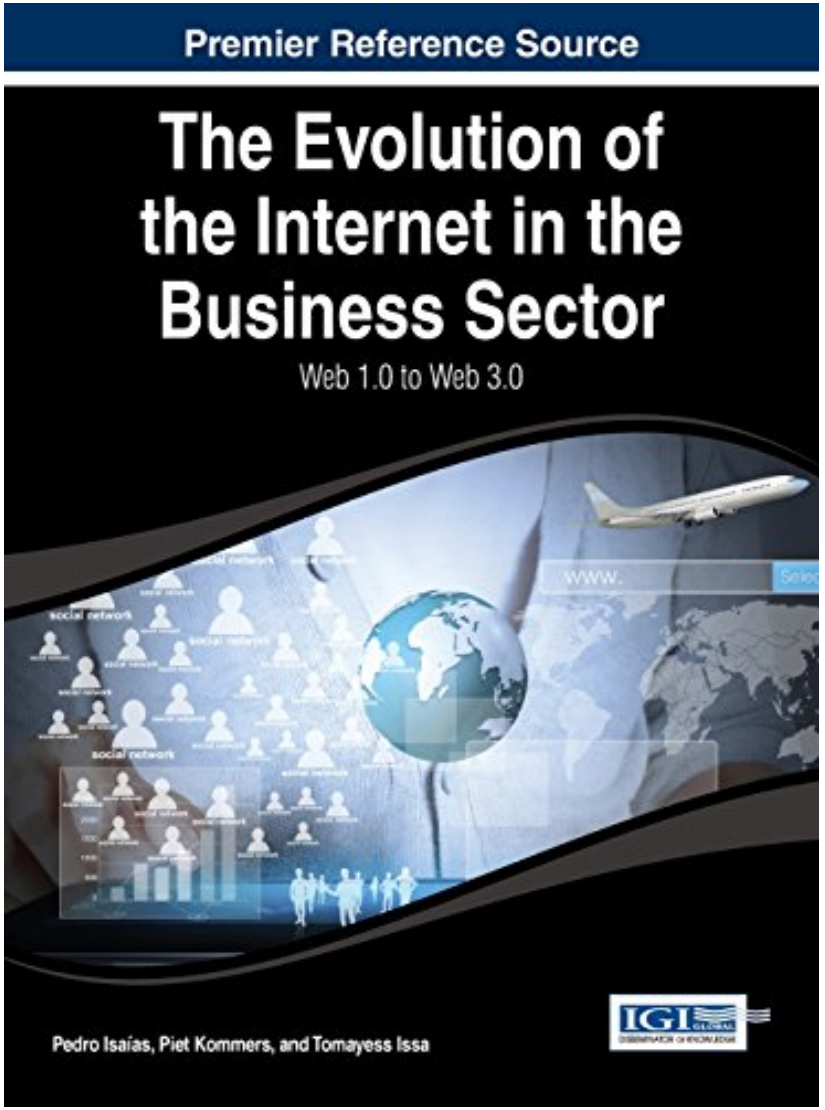
کتاب مرجع


AS SEEN ON TV
NERDS
2.0.1
A BRIEF HISTORY OF THE INTERNET
STEPHEN SEGALLER

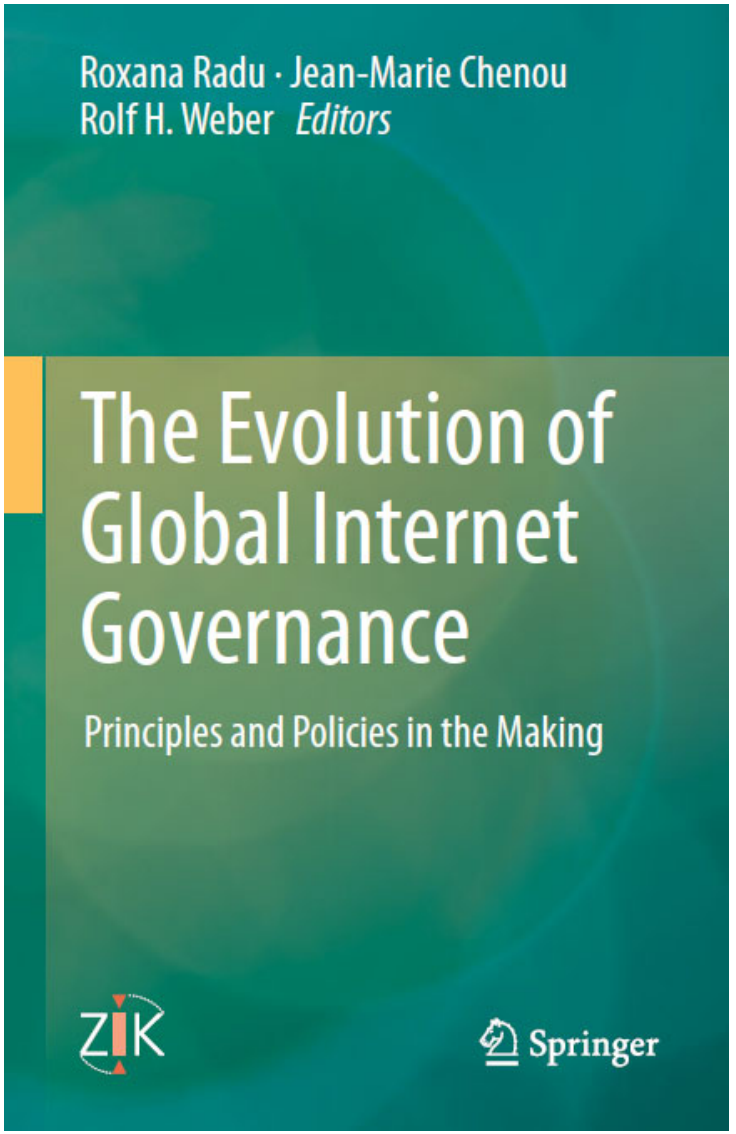
کتاب مرجع


Romualdo
Pastor-Satorras
Alessandro
Vespignani
Evolution
and Structure
of the Internet
A Statistical
Physics Approach
CAMBRIDGE

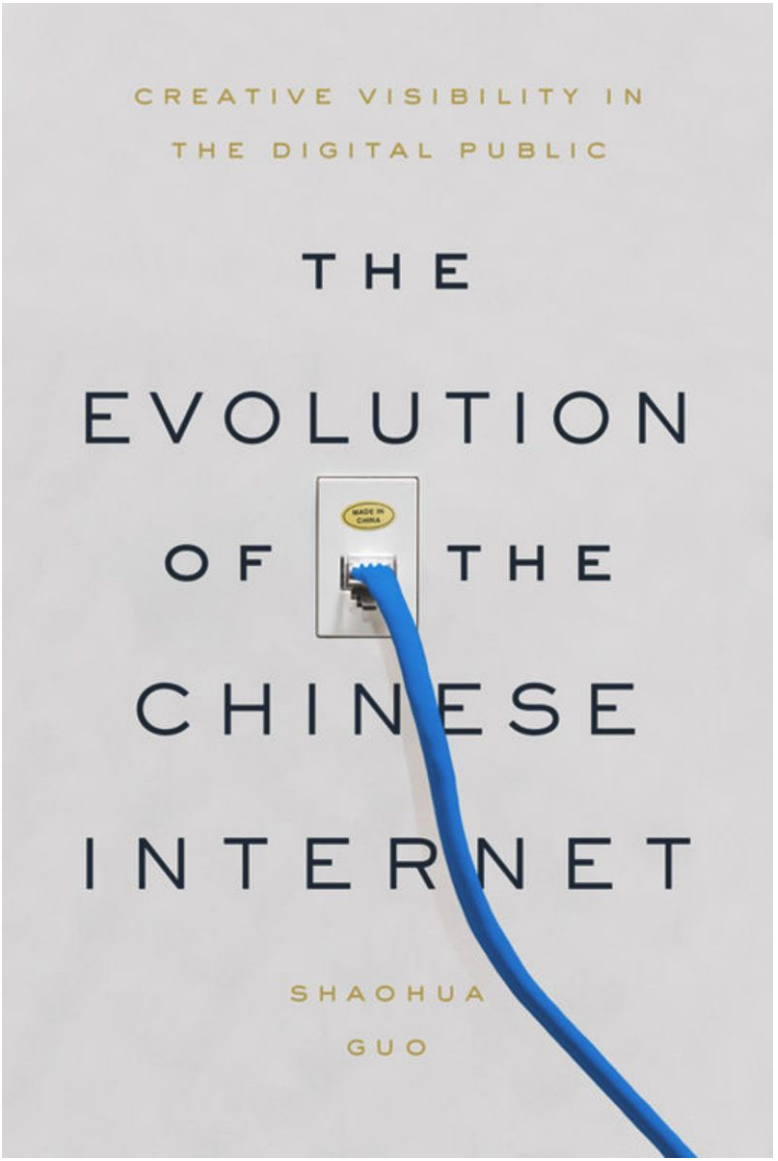
کتاب مرجع


Premier Reference Source
The Evolution of the Internet in the Business Sector
Web 1.0 to Web 3.0
Pedro Isaías, Piet Kommers, and Tomayess Issa
IGI

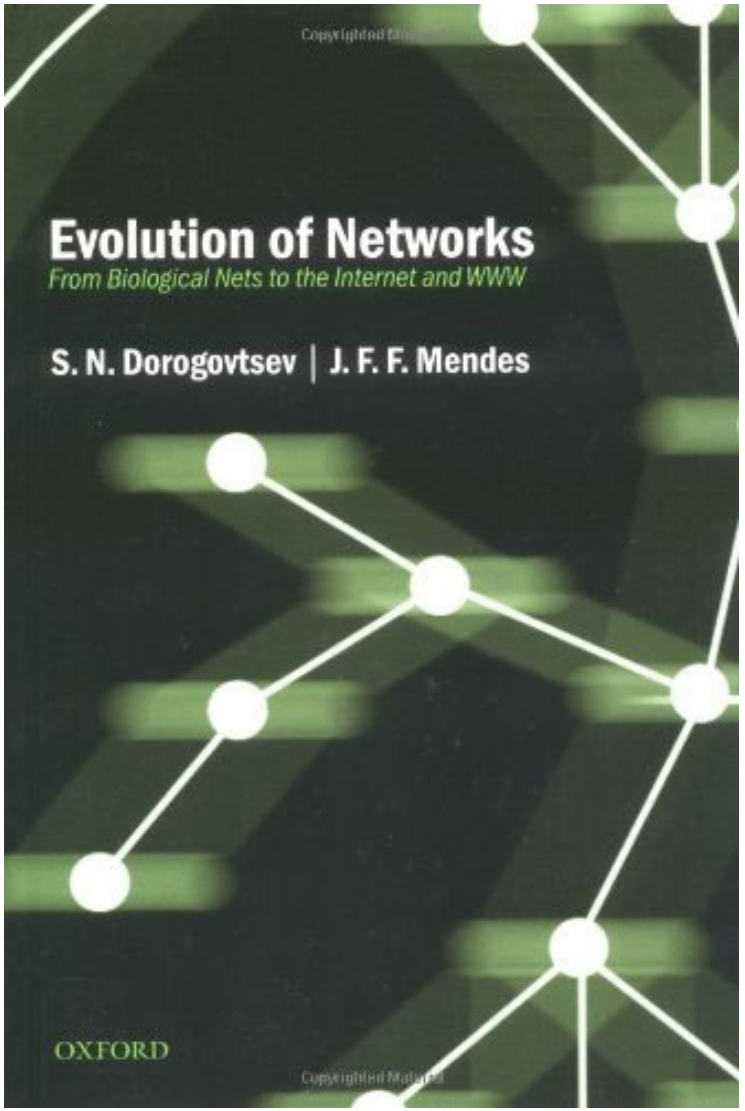
کتاب مرجع


Roxana Radu · Jean-Marie Chenou
Rolf H. Weber Editors
The Evolution of Global Internet Governance
Principles and Policies in the Making
ZIK
Springer

کتاب مرجع


CREATIVE VISIBILITY IN
THE DIGITAL PUBLIC
THE
EVOLUTION
OF THE
CHINESE
INTERNET
SHAOHUA
GUO

کتاب مرجع


Evolution of Networks
From Biological Nets to the Internet and WWW
S. N. Dorogovtsev | J. F. F. Mendes
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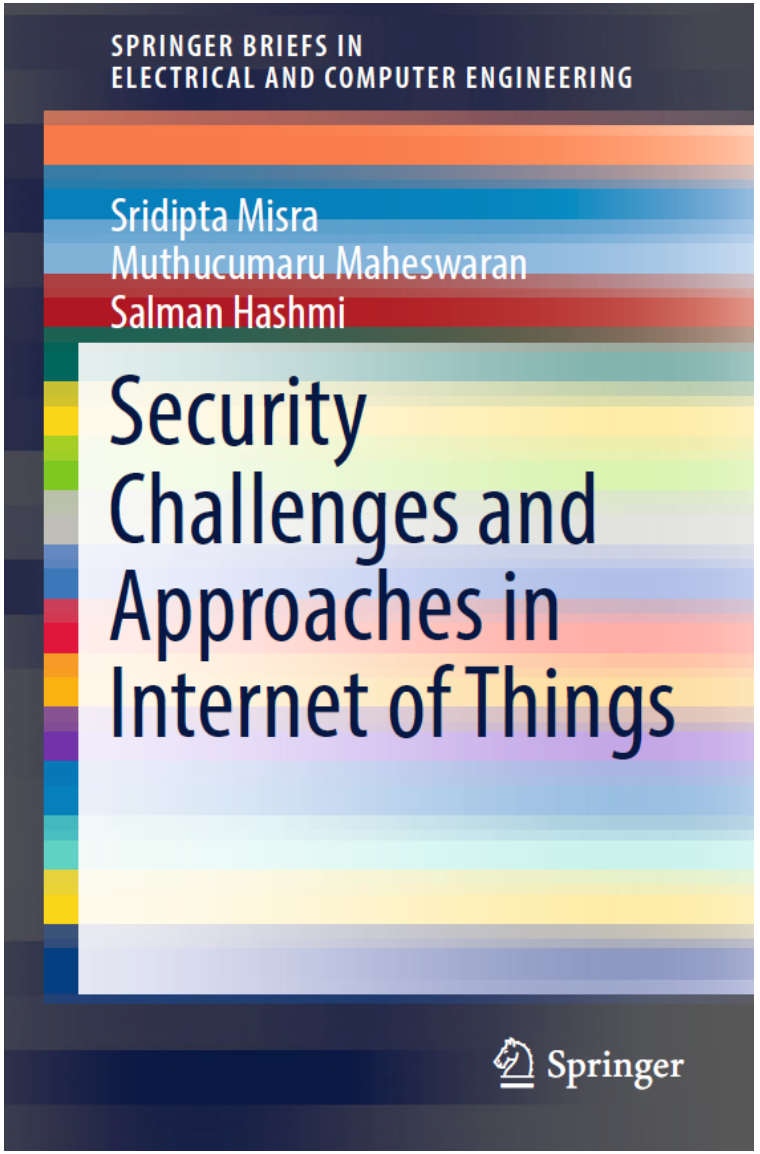
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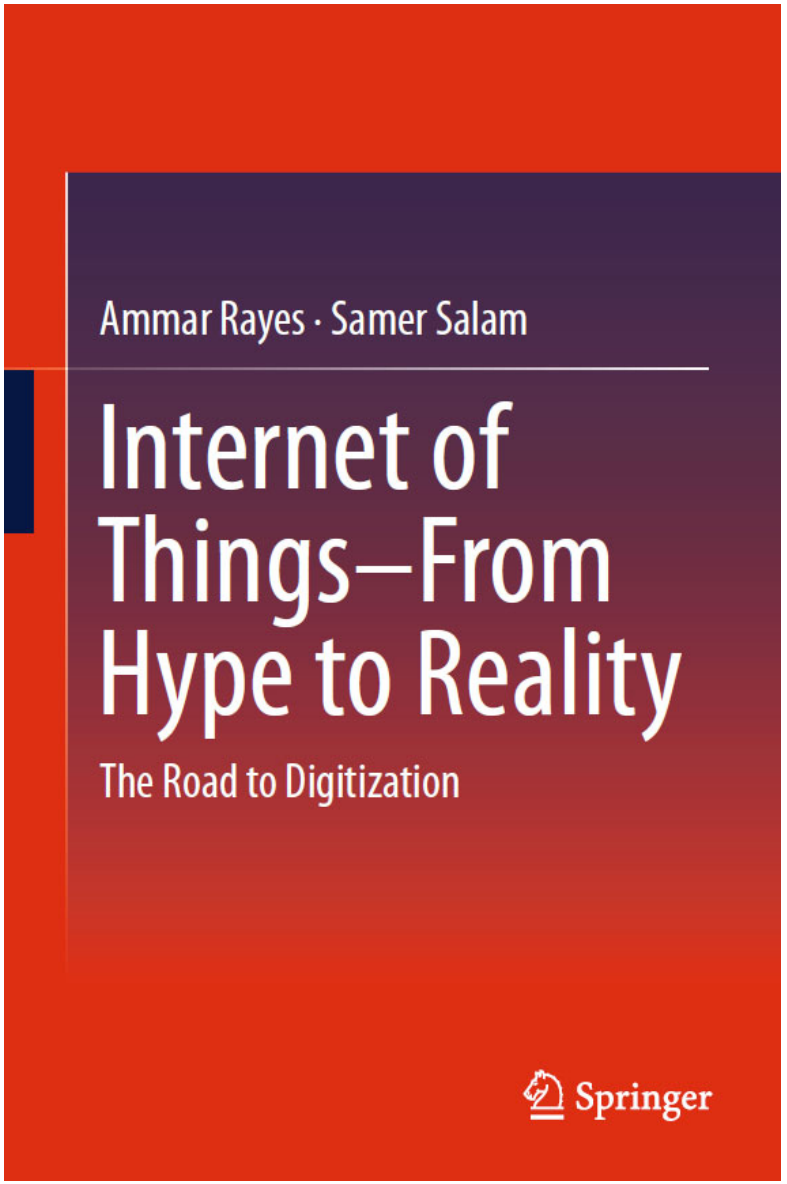
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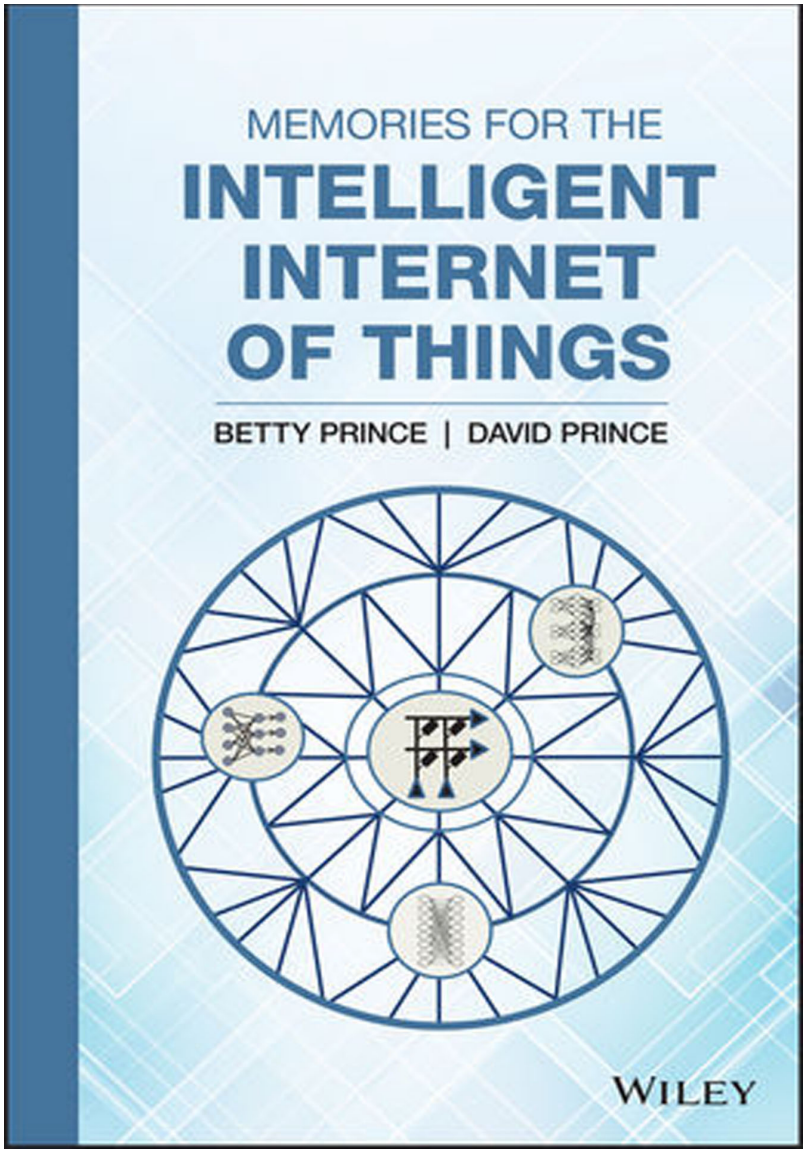
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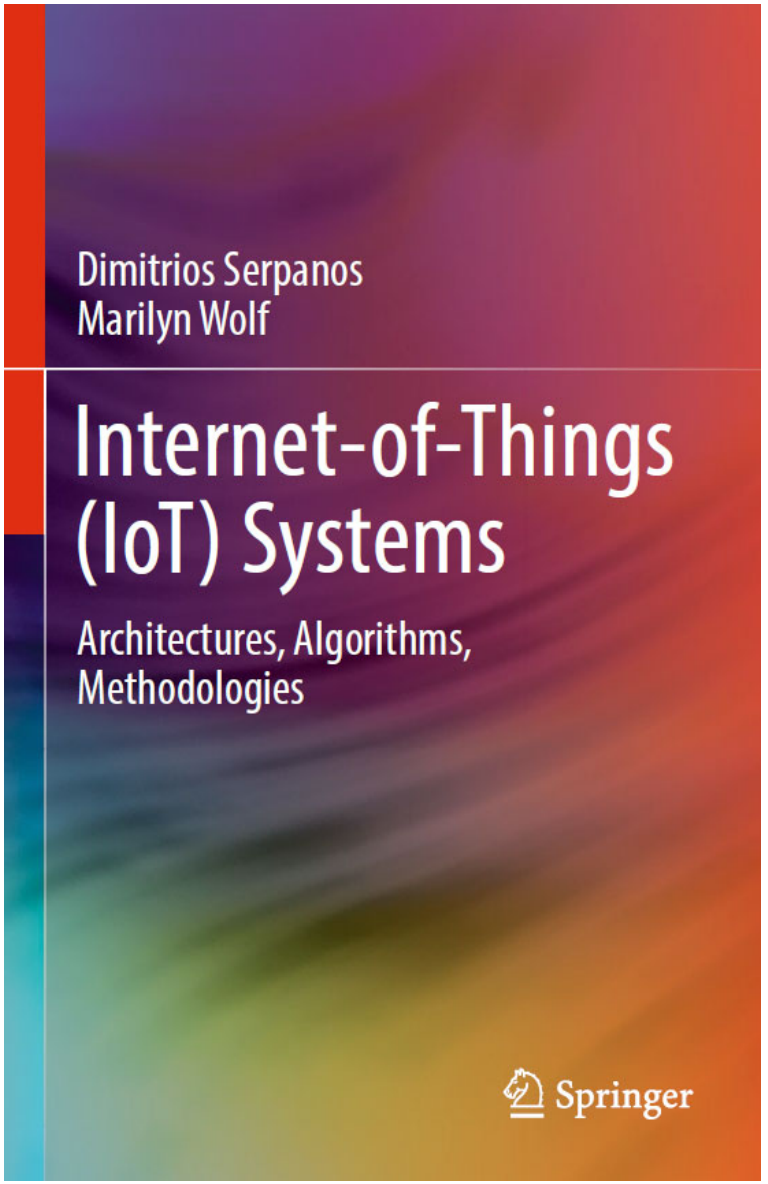
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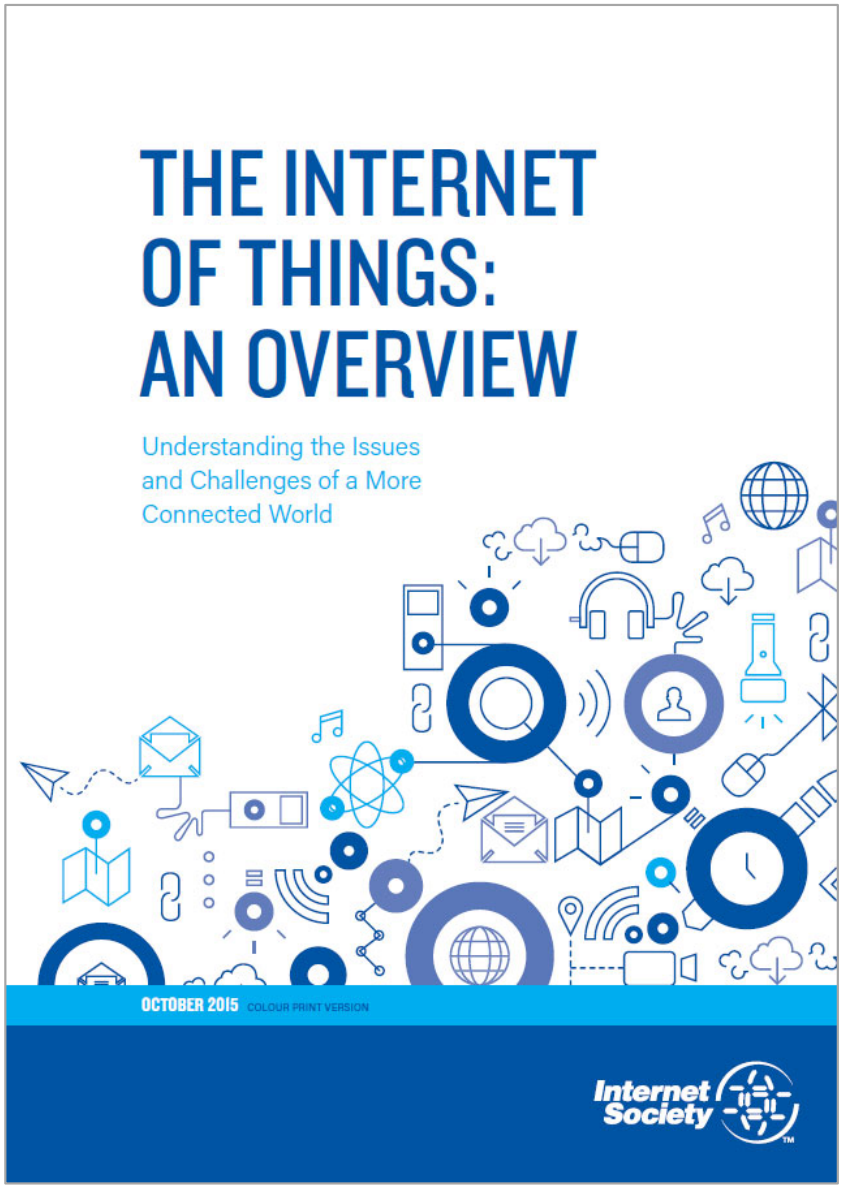
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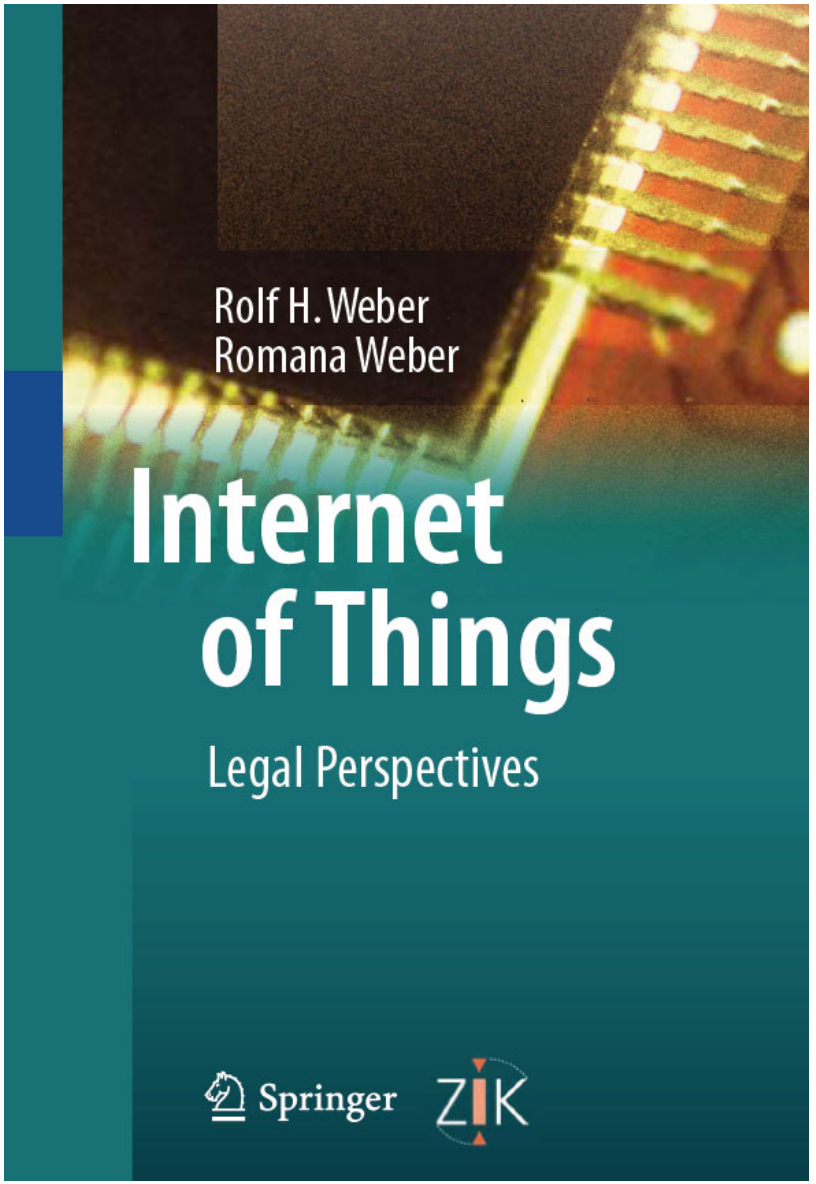
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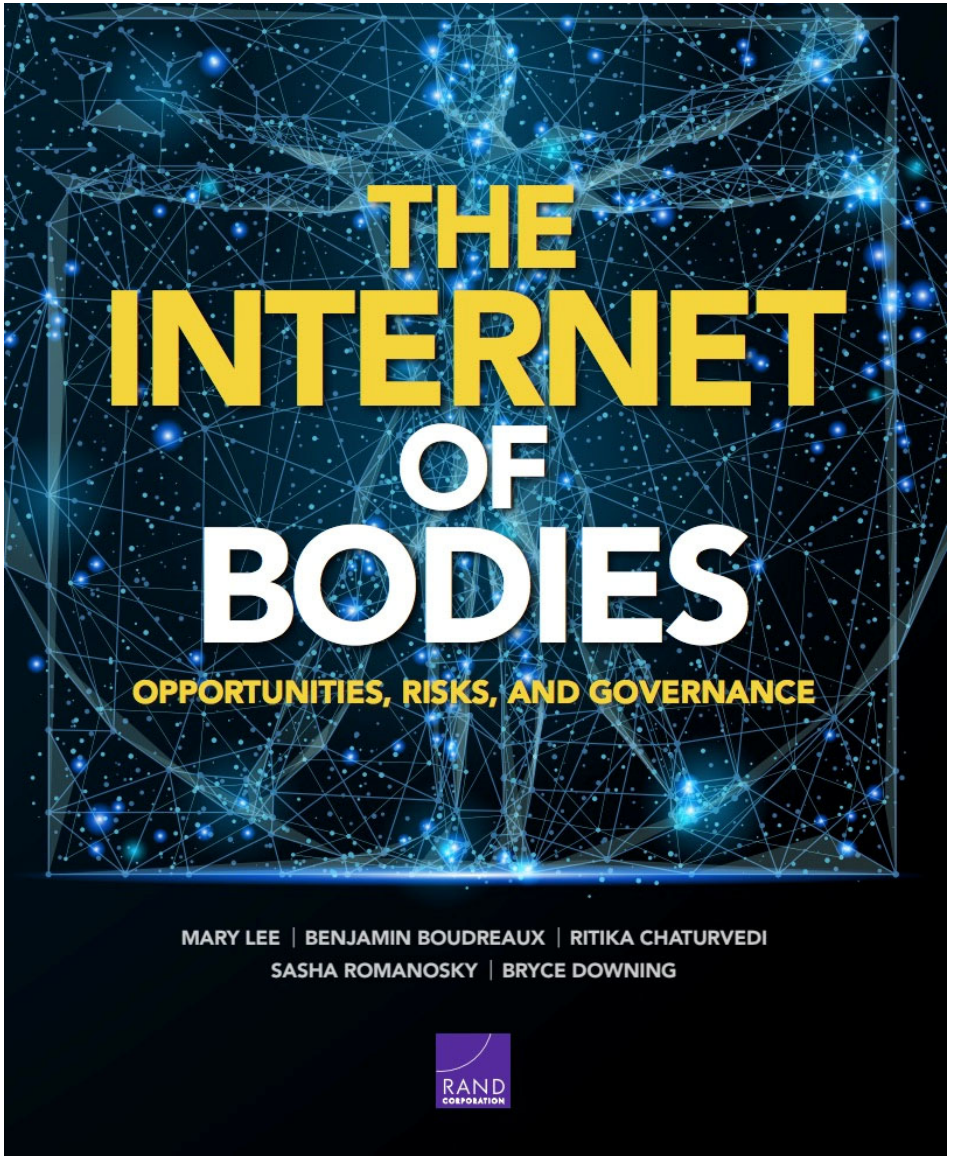
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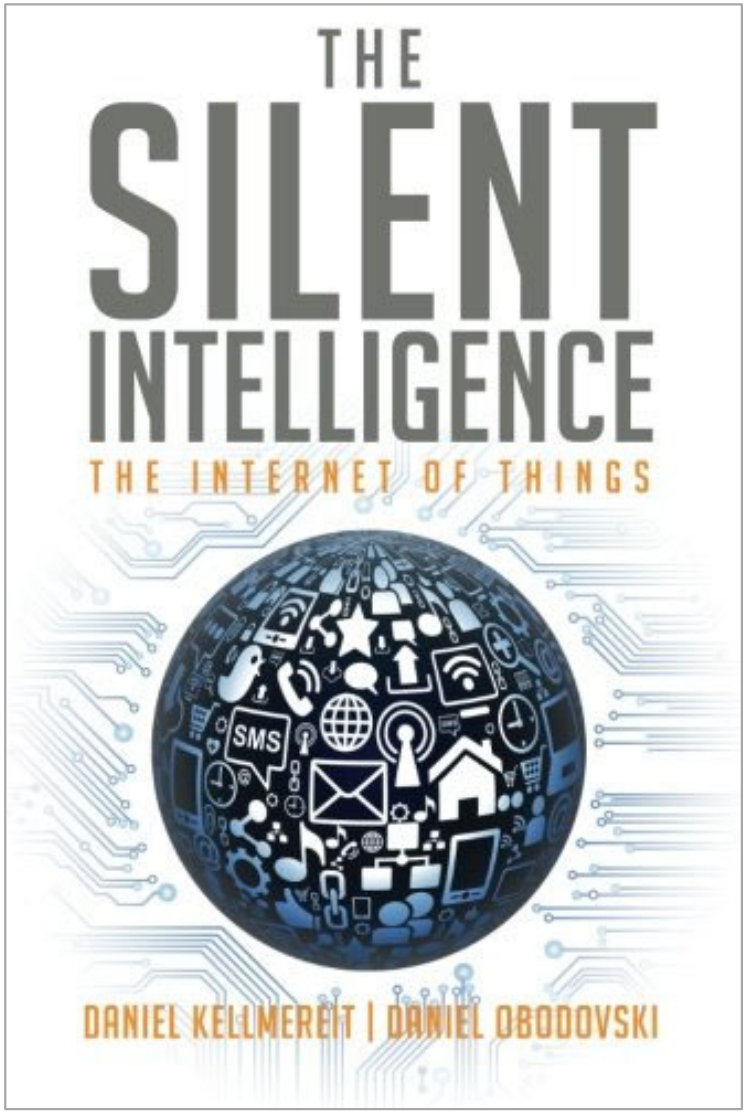
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