Connectivity, Digital Development, and the Sustainable Development Goals

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“Connectivity *is* the Revolution”

- Connectivity, based on the Internet, is the foundation for future digital development
- Internet connectivity is the “platform of platforms”
- Connectivity and the platforms it enables are critical to realizing the SDGs by 2030
- Strengthening and extending connectivity to all citizens is a critical responsibility of governments and PPPs to ensure economic success, social justice, and sustainability

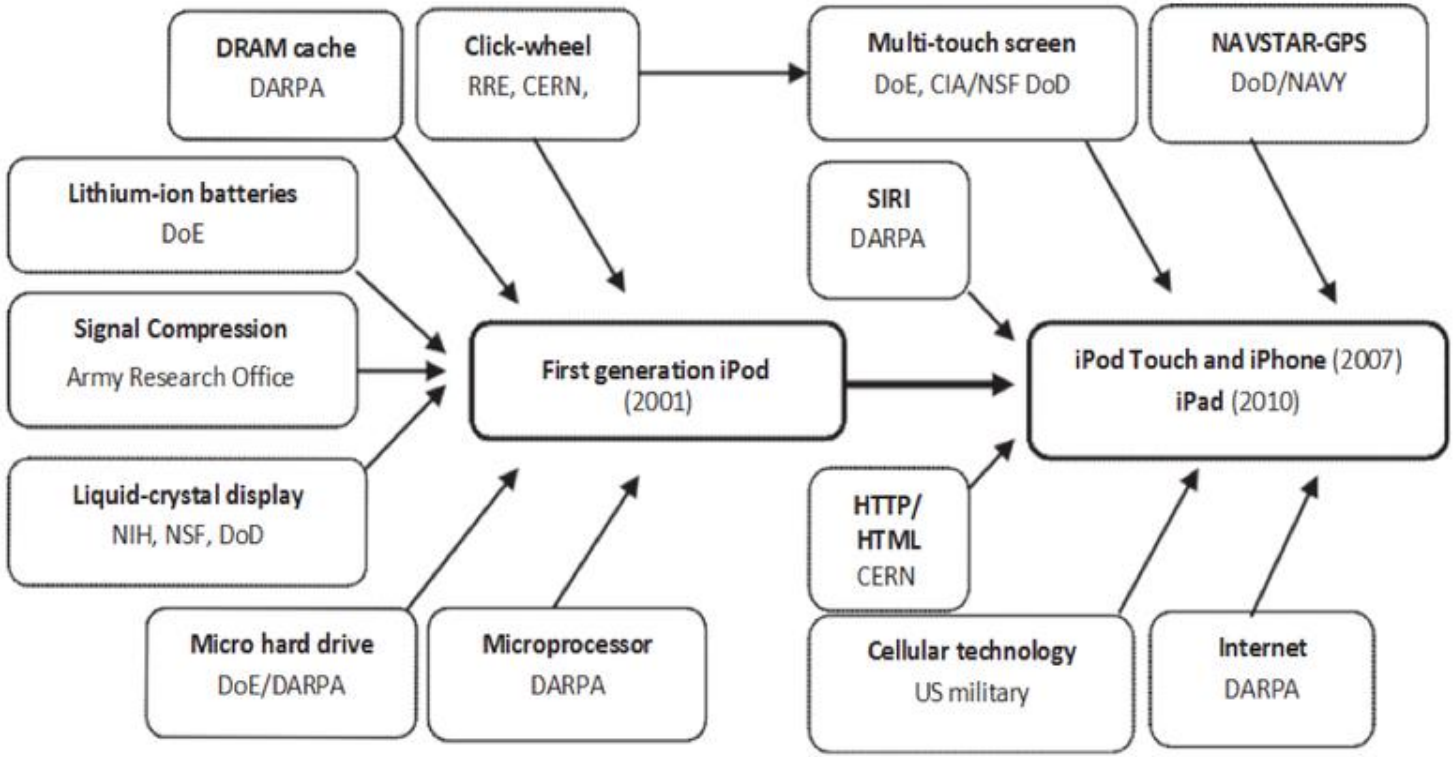
“Technology offers the promise of economic progress for billions in emerging economies at a speed that would have been unimaginable without the mobile Internet.” - McKinsey

Internet & Digital Technologies Result of Massive S&T Investment

- US (and other) government and businesses have spent hundreds of billions of dollars on R&D since 1945 on tech development
- Many key technologies, from microchips and the Internet to the GPS system and touch screen developed for defense and space
- Big corporations built on these investments, including Intel, IBM, and Microsoft and now Apple, Google, and Facebook
- Harnessing digital technologies depends on global infrastructure –especially the Internet, as well as the cloud, GPS, smartphones

Massive Government-Funded Research

What Makes the iPhone so Smart?



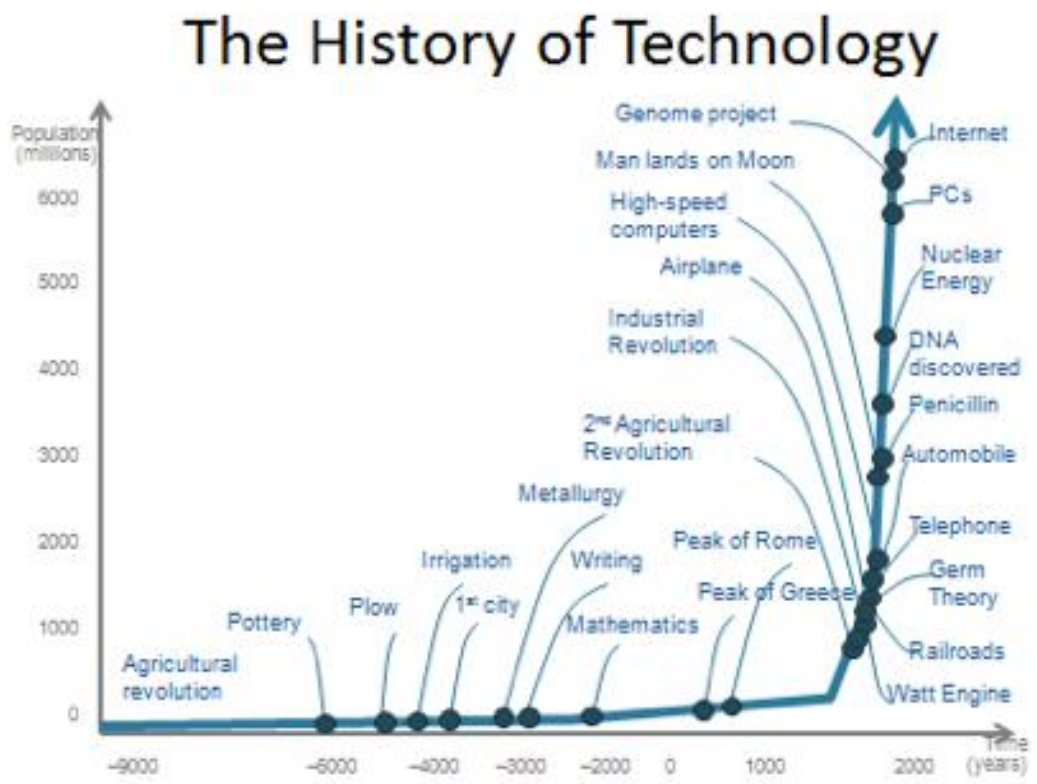
Source: The Entrepreneurial State: debunking public vs. private sector myths (Mazzucato, 2013), p109. Fig 13

Massive Investment = Exponential Increase in Capabilities and Declines in Cost

Moore's Law Still at Work after 50 Years

1. ICT
2. Artificial Intelligence
3. Robotics
4. 3D Printing
5. Synthetic Biology
6. Nano materials
7. Digital Medicine
8. Sensors & Networks

(List from Peter Diamandis)



(Everything that can be digitized is subject to Moore's Law)

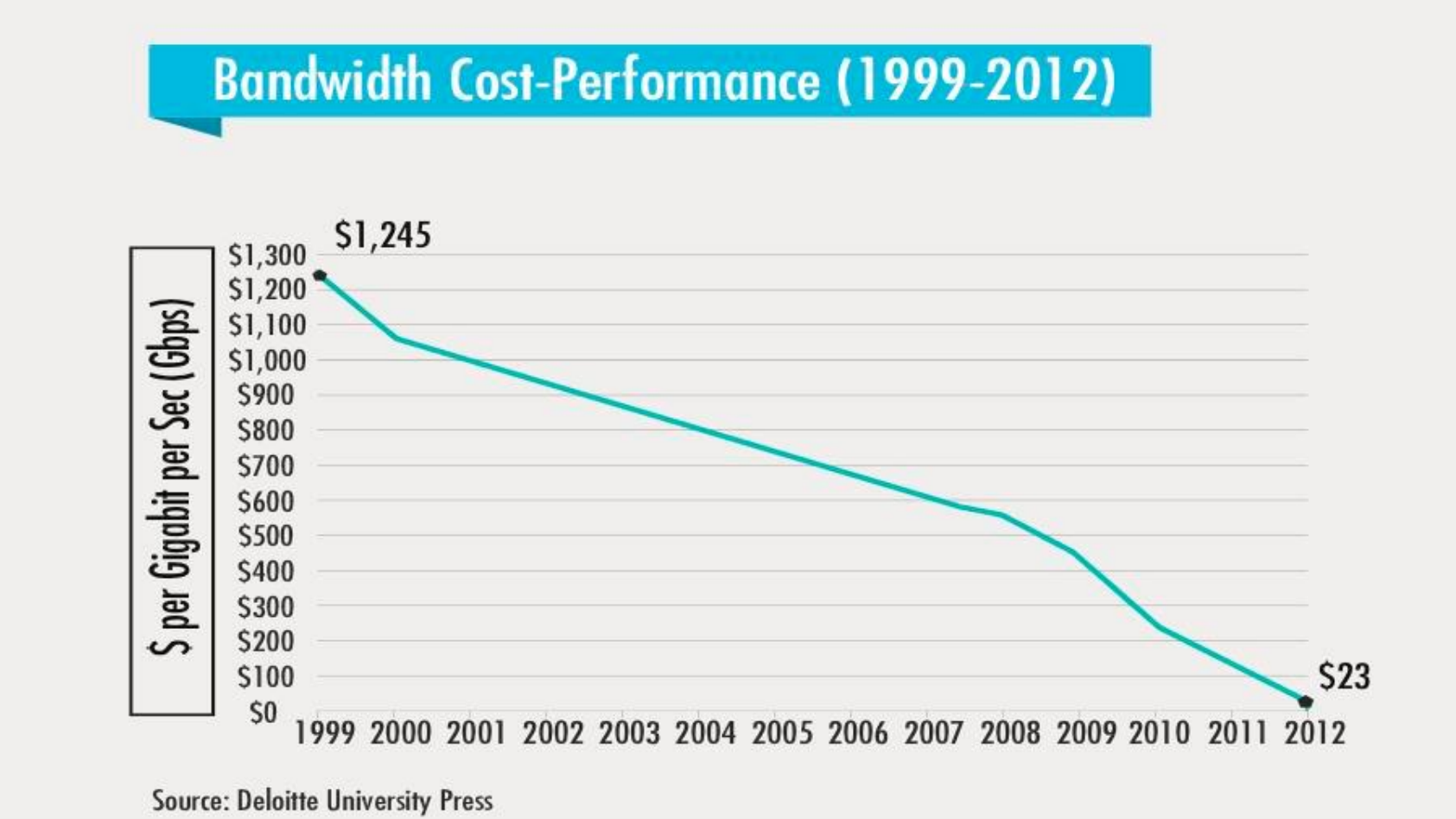
Moore's Law & Smart Phone Capabilities: From $900,000 to "Free"

>$900,000 worth of applications in a smart phone today

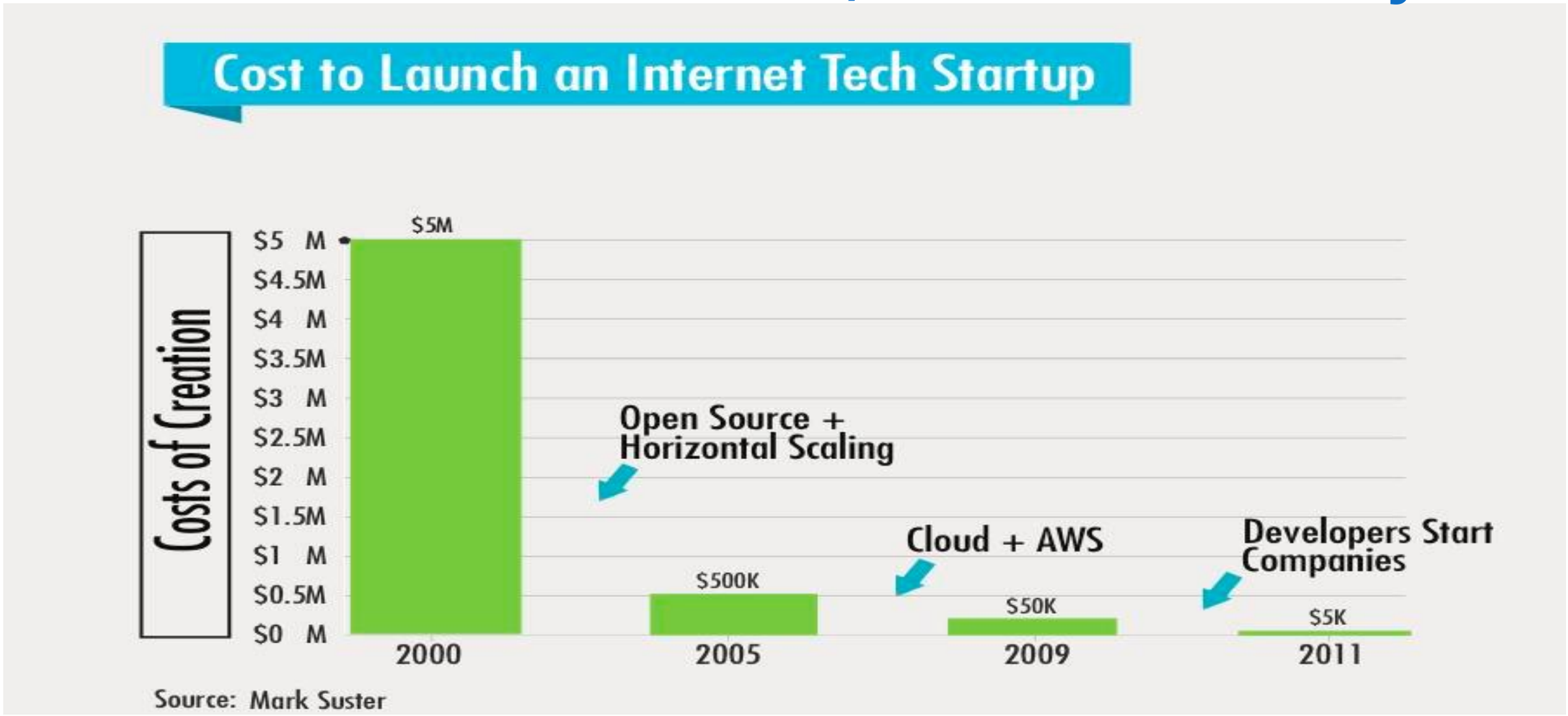
	Application	$ (2011)	Original Device Name	Year*	MSRP	2011's $
1	Video conferencing	*free*	Compression Labs VC	1982	$250,000	$586,904
2	GPS	*free*	TI NAVSTAR	1982	$119,900	$279,366
3	Digital voice recorder	*free*	SONY PCM	1978	$2,500	$8,687
4	Digital watch	*free*	Seiko 35SQ Astron	1969	$1,250	$7,716
5	5 Mpixel camera	*free*	Canon RC-701	1986	$3,000	$6,201
6	Medical library	*free*	e.g. CONSULTANT	1987	Up to $2,000	$3,988
7	Video player	*free*	Toshiba V-8000	1981	$1,245	$3,103
8	Video camera	*free*	RCA CC010	1981	$1,050	$2,617
9	Music player	*free*	Sony CDP-101 CD player	1982	$900	$2,113
10	Encyclopedia	*free*	Compton's CD Encyclopedia	1989	$750	$1,370
11	Videogame console	*free*	Atari 2600	1977	$199	$744
	Total	**free**				**$902,065**

*Year of Launch

Moore's Law at Work in Lowering Cost of Internet Connectivity



Democratization of Startup Costs - from $5 million in 2000 to $5,000 or less today



Moore's Law Creating New Platforms for Democratized Technology

- *Internet connectivity is the "Platform of Platforms"*
- Cloud computing and storage: AWS, Google, MS
- Artificial Intelligence: SIRI,Watson, Google
- Smartphone apps: More than 1.5 million iOS & Android
- Internet of Things: Trillions of sensors, billions of devices
- Robots, self-driving cars, and drones
- 3D printing: from design to manufacturing
- Zero marginal cost of digital products


BIG
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INFORMATION
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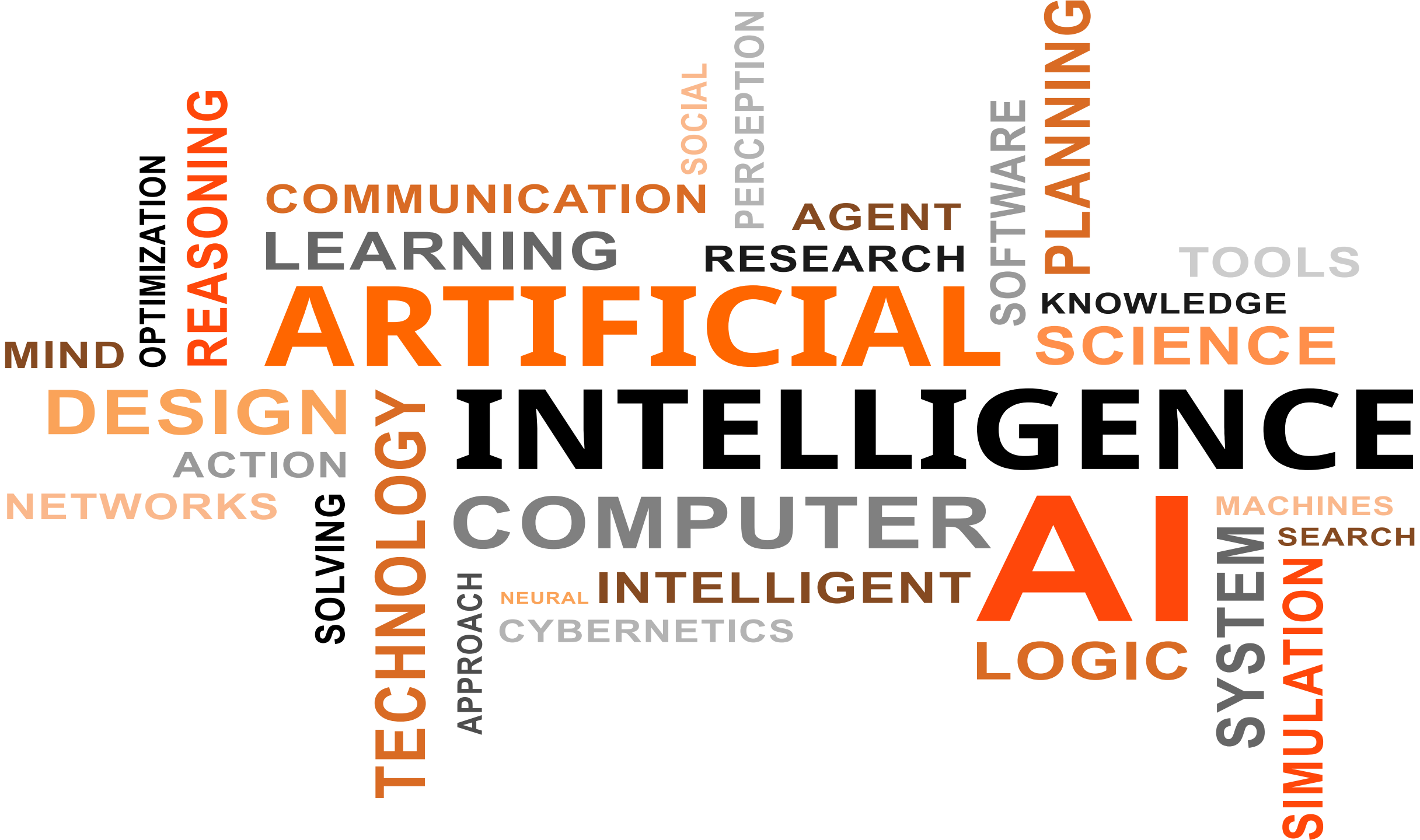
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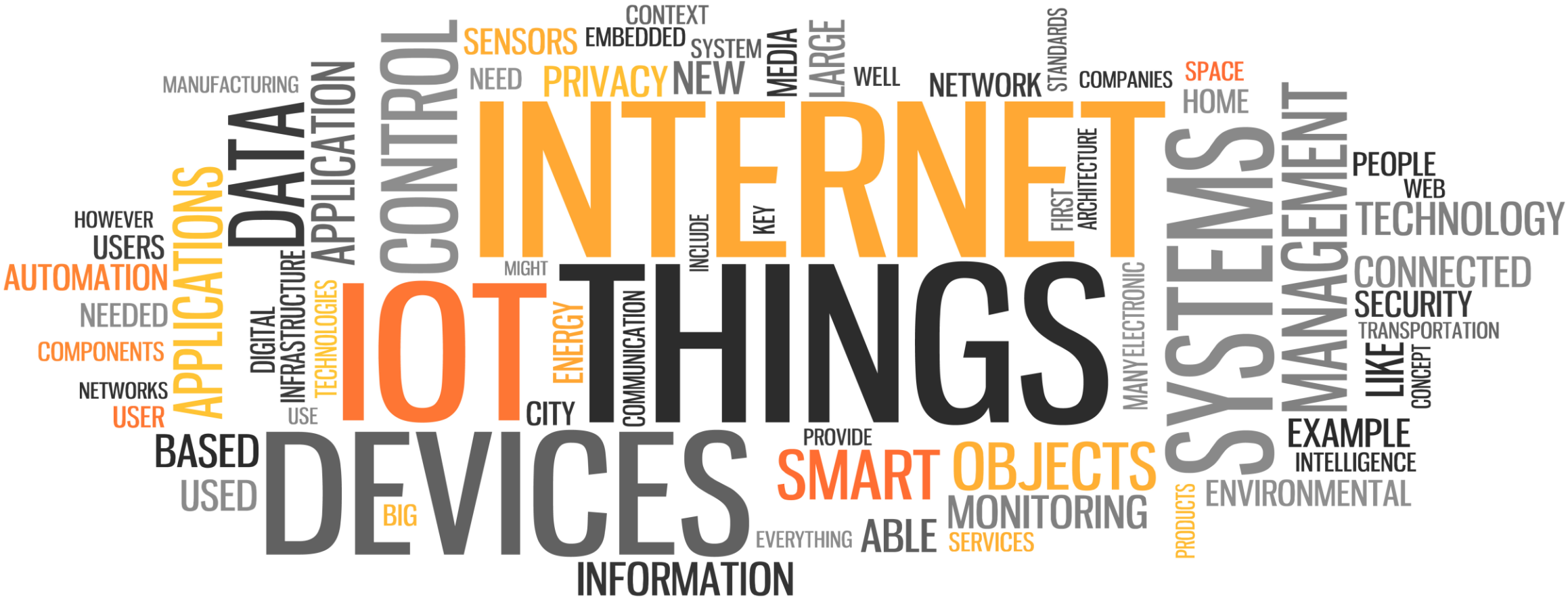
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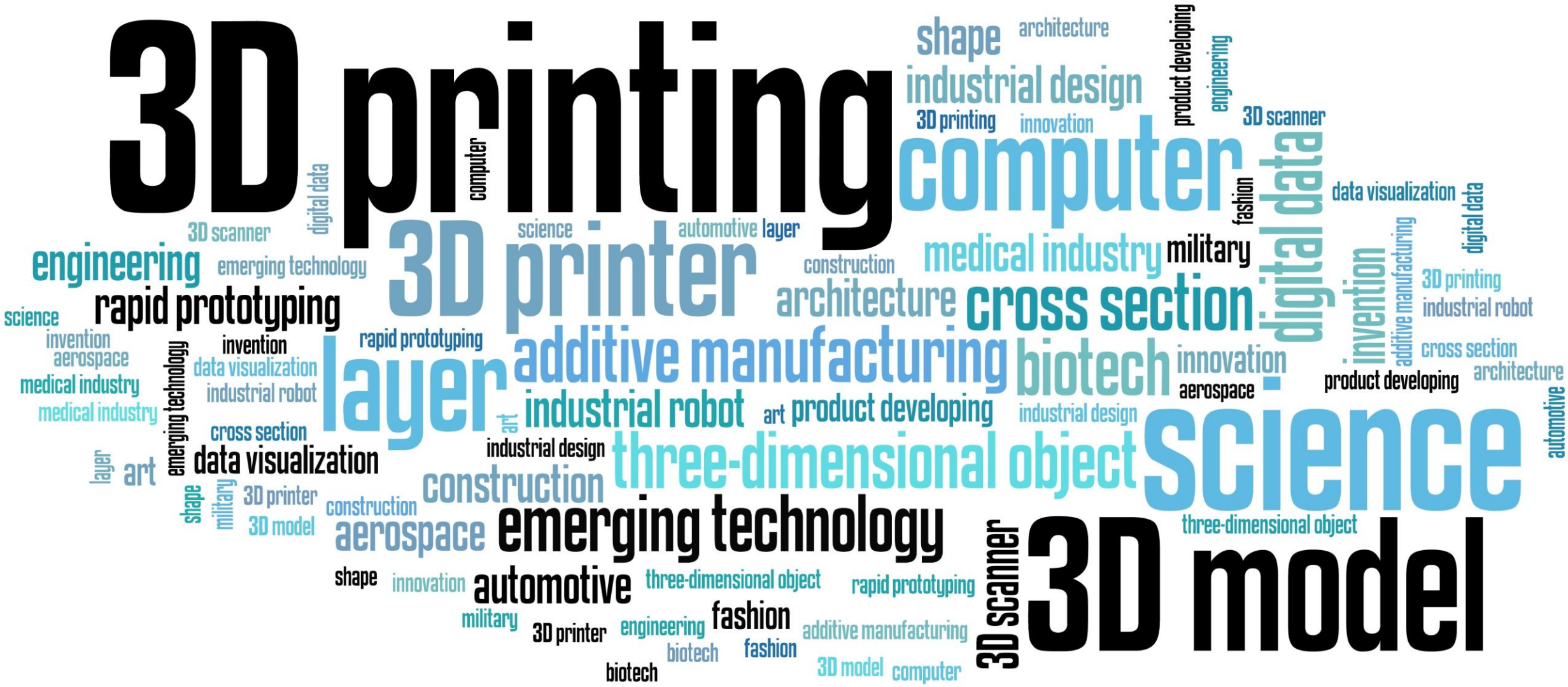
3D printing
computer
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Digital Technologies are Mutually Enabling

- Disruptive technological change accelerated by technological convergence
- Everything that can be “digitized,” will be digitized
- Smartphones made smart by GPS, the Internet, Big Data, Cloud computing and storage, Internet of Things sensors, Artificial Intelligence like Siri & Google Translate
- New Robotics built around cheap sensors, motors, GPS, AI and other exponential technologies: autonomous cars
- 3D Printing explosion built around computer-aided design, cloud computing & Storage, the Internet

Smarter Cities: Turning Big Data Into Insight

City Planning and Operations

$1 Trillion
global annual savings could be attained by optimizing public infrastructure.
Source: McKinsey

$57 Trillion
in infrastructure investments will be needed between 2013-2030.
Source: McKinsey

Transportation Analytics

50 Hours
of traffic delays per year are incurred, on average, by travelers.

30 Billion
people all over the world travel approximately 30 billion miles per year. By 2050, that figure will grow to over 150 billion miles.

Cloud is driving cities in their digital transformation.

Water Management

60%
of water allocated for domestic human use goes to urban cities.

$14 Billion
in potable water is lost every year because of leaks, theft and unbilled usage.
Source: World Bank

Open Cloud

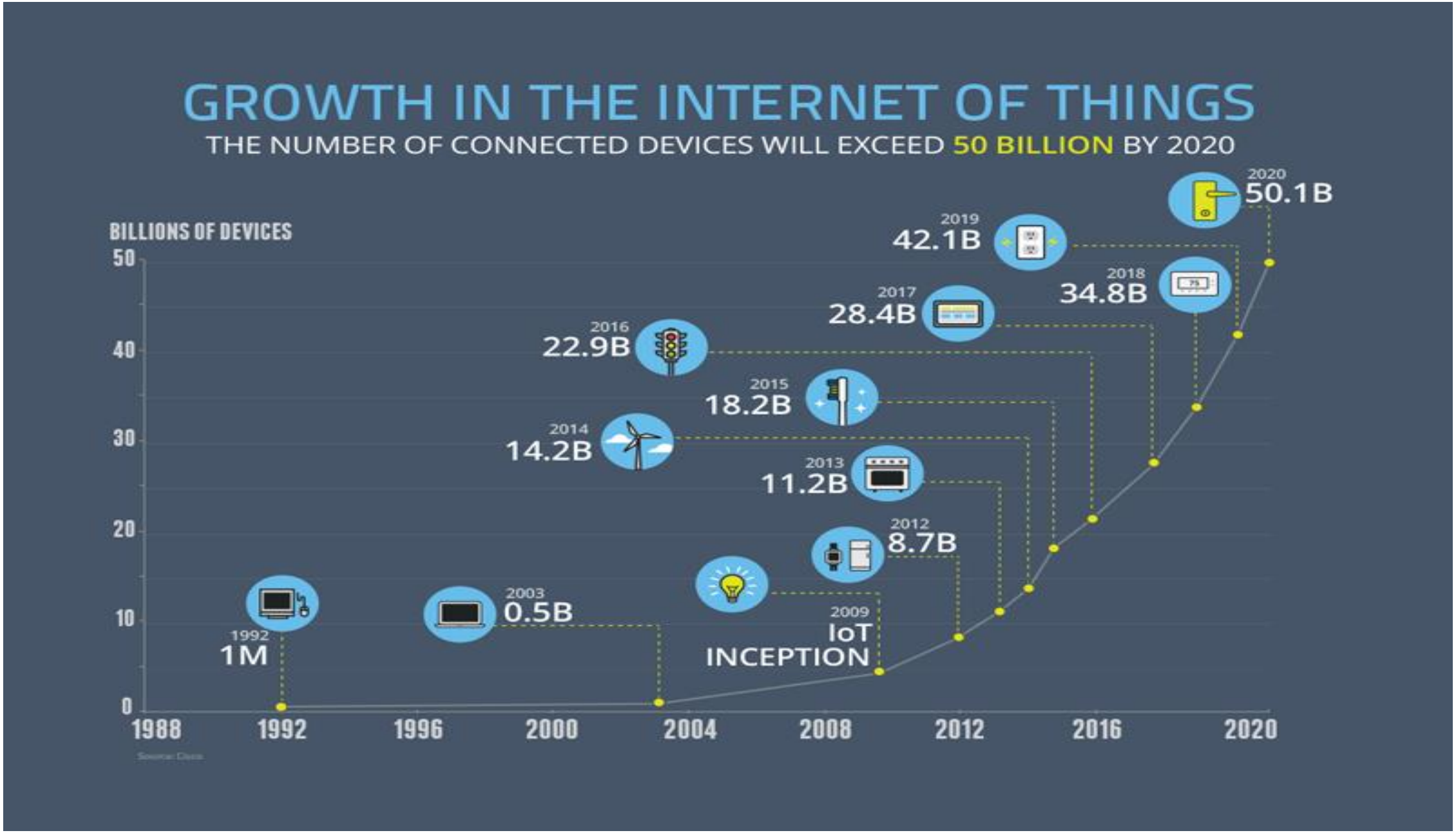
37,000
cloud experts support IBM's industry team alone.

$6 Billion
has been invested by IBM in more than a dozen acquisitions to accelerate its cloud initiatives.

IBM Intelligent Operations software is designed with cities, for cities, to provide the tools to monitor, visualize and analyze vital city services such as water and wastewater systems, transportation, infrastructure planning, permit management and emergency response.

IBM

https://www.google.com/search?hl=en&noj=1&tbm=isch&sa=1&q=big+data+images&oq=big+data&gs_l=img.1.6.0l10.15198.18039.0.22196.8.8.0.0.0.0.476.695.3j4-1.4.0....0...1c.1.64.img..4.4.692.WJy-ltF4Bxo#imgrc=SeVofxlljn63gM%3A



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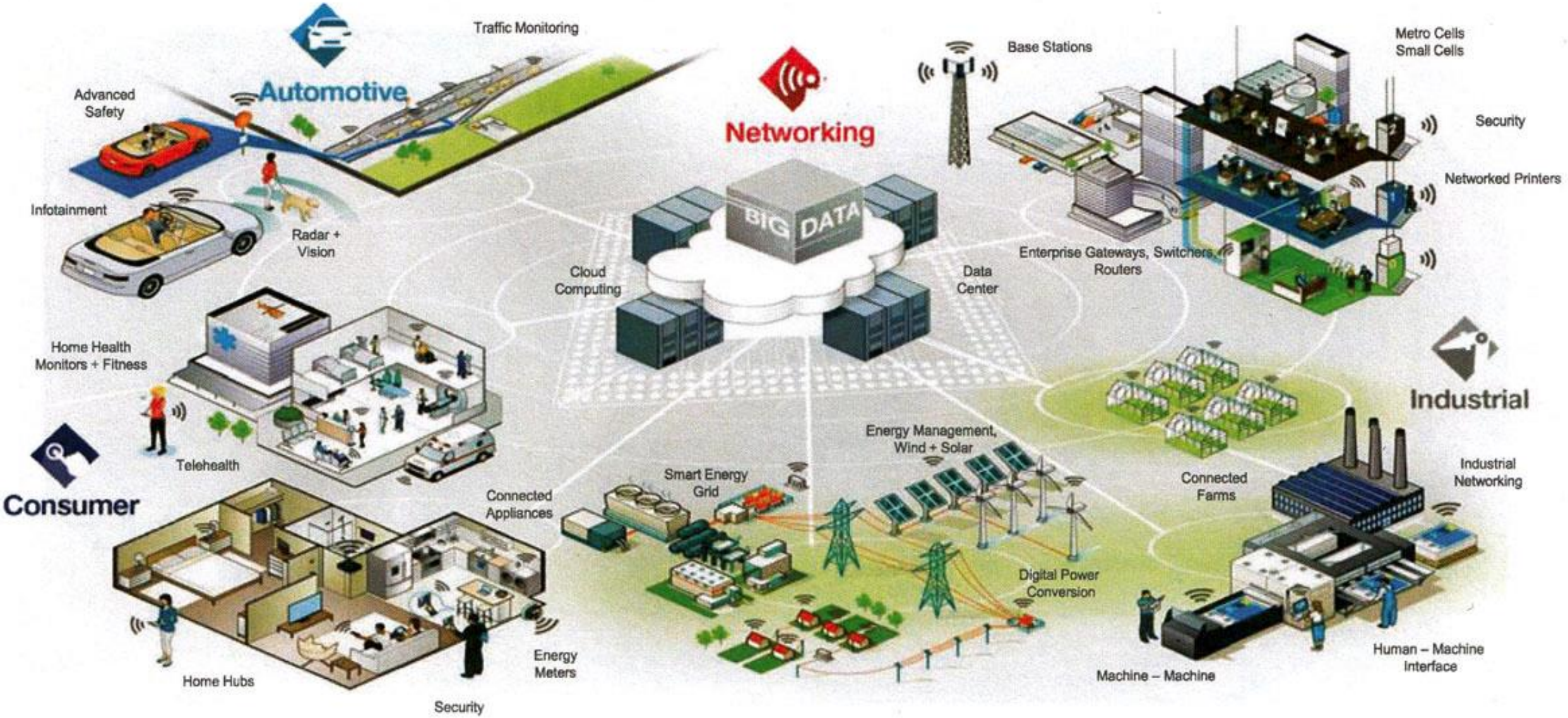
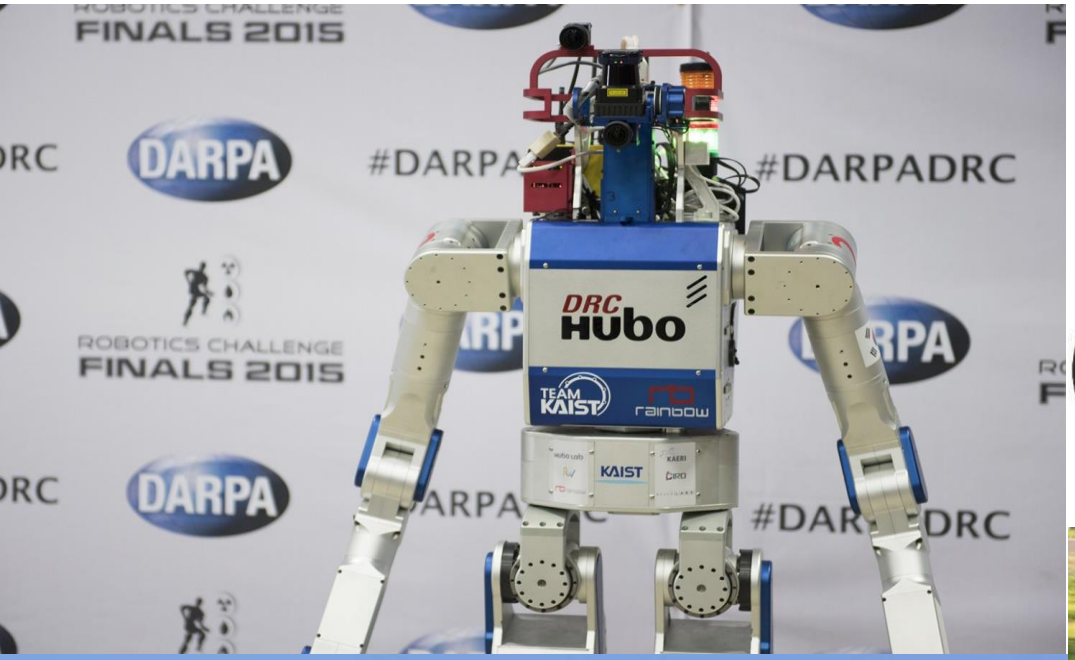
The Internet of Things

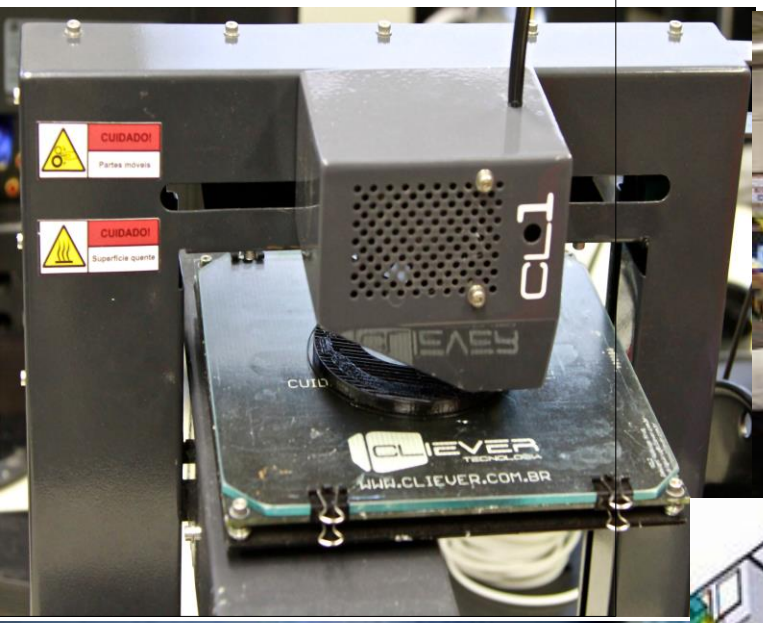


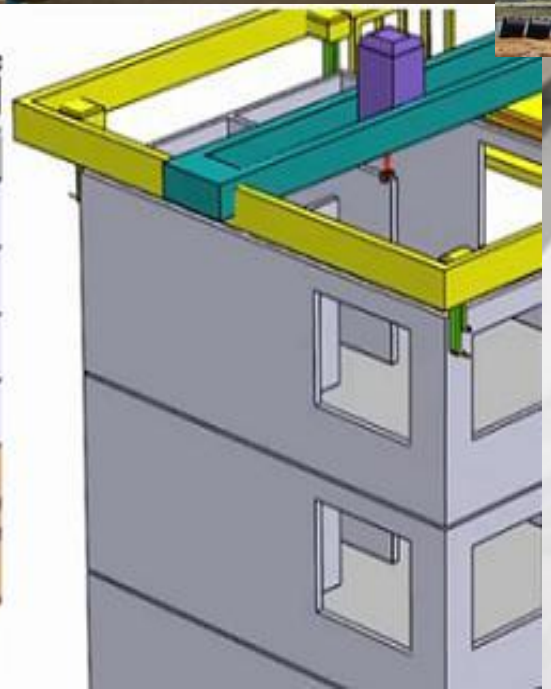
http://www.mbuguanjihia.com/wp-content/uploads/2014/08/freescale_internet_of_things_overview_1.jpg

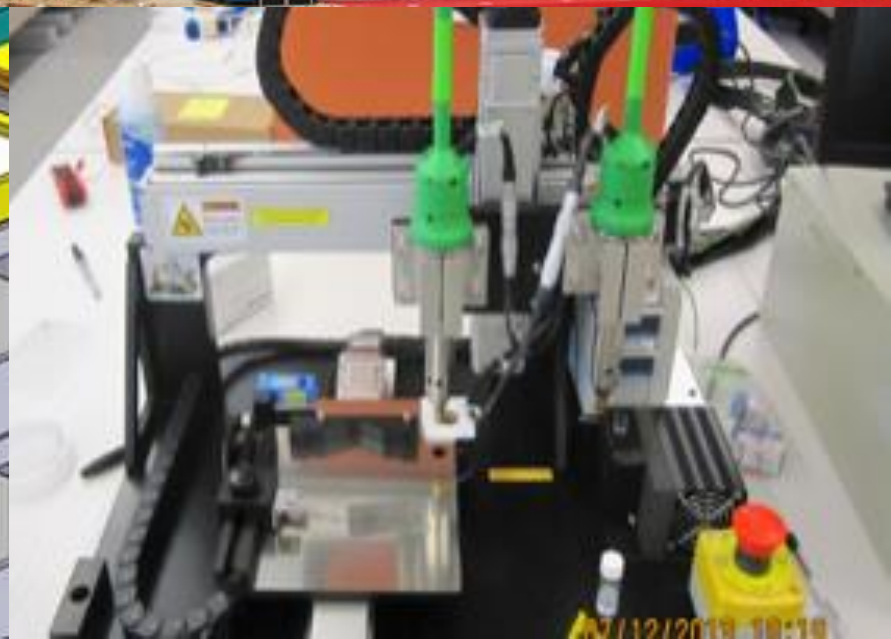
The New World of Robotics



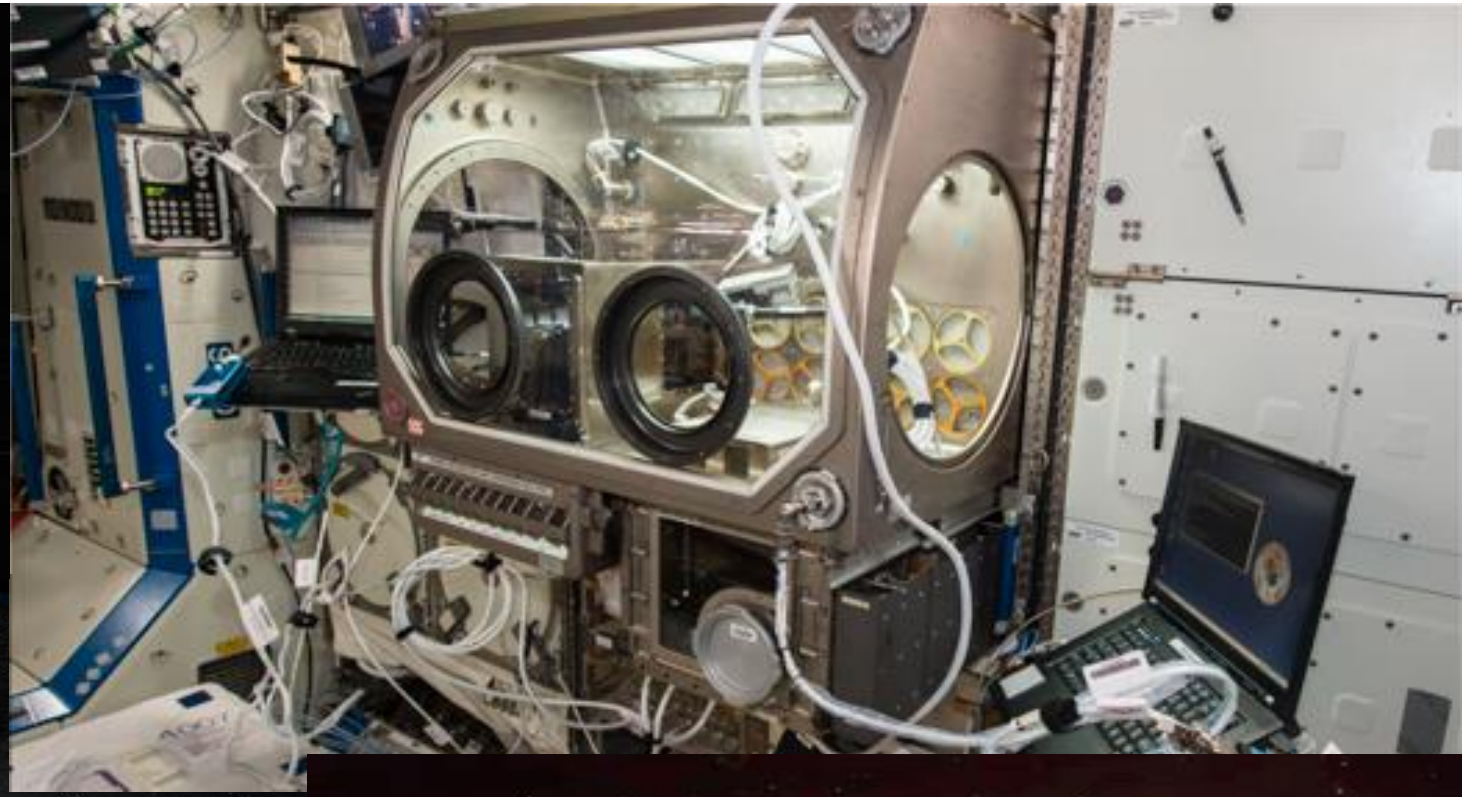
3D Printing – from DIY & Small Business to Industry & Construction



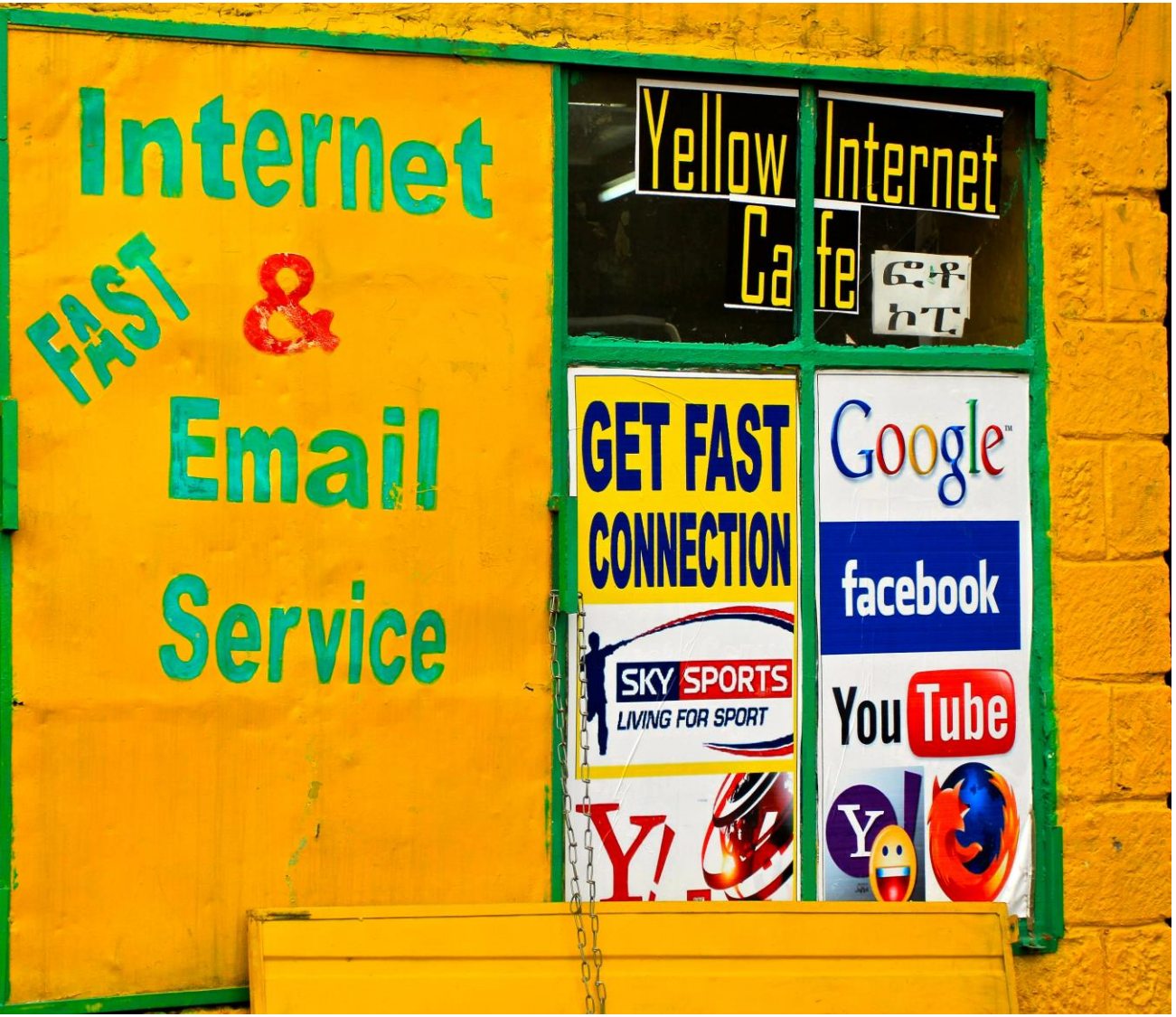




3D Printing - Even in Space



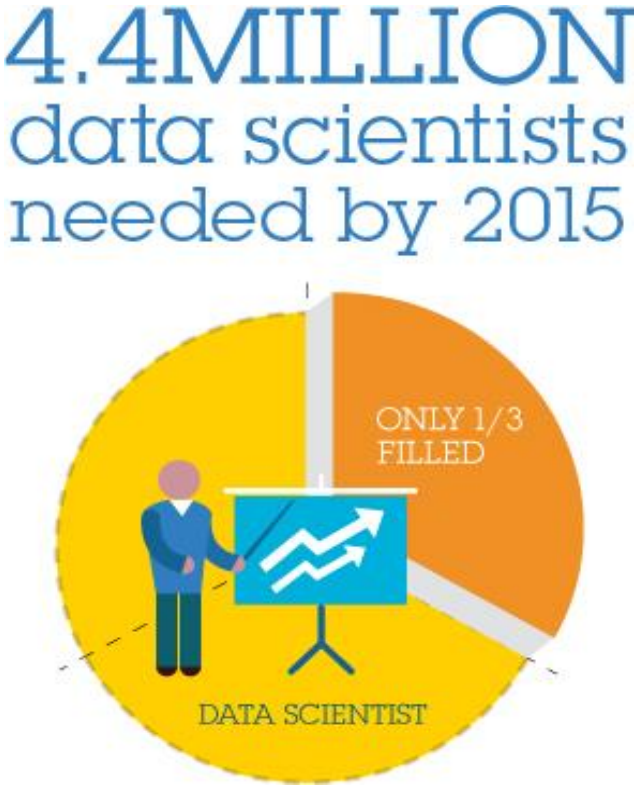
Internet Access Limited for Billions



- More than 3.4 billion connected to Internet platform, most of them with mobile devices – 46%
- Latin America just over 50% connected, Asia 35%, Africa 28%
- Facebook – 1.515 billion, 20.9%
- Digital Divide Needs to Be Eliminated: Access for all citizens necessary to mobilize all of society's talent for innovation with digital technologies
- Facebook, Google, SpaceX, Virgin Galactic - all have plans to connect "the last person" on the planet

Job Destruction, Job Creation

- Nearly half of current job categories may disappear
- Knowledge jobs as well as manual labor threatened
- Impact will vary by industry, country
- Working *with* computers and robots critical
- New industries, jobs created
- Education for new jobs critical
- Re-education and safety net for technologically unemployed



http://www.ibm.com/big-data/us/en/images/bigdata_infographic.png

Digital Technologies Critical to Achieving SDGs

Key Takeaways

- Exponential acceleration of technology will continue
- Increasing disruption is the future
- Old business models will be disrupted, societies shaken
- Sharing economy and democratization of technology provides great opportunity
- Democratized technologies have leveled the global playing field
- Unprecedented opportunity for countries to “leapfrog” in development, including with 3D printing

Some Modest Proposals

- Recognize the Internet as a ***utility***, like electricity and water
- Maintain and strengthen Internet as “platform of platforms”
- Expand affordable Internet access to 100% penetration for inclusion and access to all the best minds & innovators
- Adapt national policies to facilitate digital technology adoption
- Get serious about STE*A*M education & skills for all
- Encourage & support “bottom up” efforts like “Sustainable Innovation Zones”
- Take the long view: Engage in foresight and alternative scenario exercises to envision technological change and opportunities – More change in next 20 years than last 50

Thank You!

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Suggested Reading

- *Issue Paper on Foresight and Digital Development,* UNCSTD
- *Abundance* and *Bold*, Peter Diamandis and Steven Kotler
- *Exponential Organizations*, Salim Ismail
- *Second Machine Age*, Andrew McAfee and Erik Brynjolfsson
- *The Entrepreneurial State*, Mariana Mazzucato
- *Makers: The New Industrial Revolution*, Chris Anderson