

Overview of the Information Technology Industry: Overview

Data Activities

UPSTREAM: DATA PRODUCTION

The Promise of Data. Many experts believe data (and particularly big data) hold the key to the future because of their ability to reveal patterns and connections that significantly improve lives from secure self-driving cars to more effective pharmaceutical treatments to more reliable weather forecasts enabling farmers to get better yields or predicting drought conditions. To understand how to harmess the benefits of data, the starting point is to understand what data are, who generates data, and who collected data.

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 Data Creators. Every individual, business, and government agency anywhere generates data:
 Each second of each day, individuals generate data. On Google alone, people submit 40,000 search queries per second, which amounts to 1.2 trillion searches yearly! Each minute, 300 new hours of video show up on YouTube. That's why there are more than 1 billion gigabytes of data on Google's servers! People share more than 1 billion gigabytes of data on Facebook daily. Every minute, users send 31 million messages and view 2.7 million videos. Smart devices (for example, fitness trackers, sensors, and Amazon Echo) produce 5 quintilion uptes.

bytes of data daily

Sinal devices (to) example, intress trackers, sensols, and Anazon Echo) produce 3 quintinion bytes of data daily. Every **business** generates data (a), through its internal support functions (e.g., human resources, procurement, legal, accounting, RaD, sales and marketing) that tends to be similar across all business sectors and (b) arising from operations that are unique to its business sector (i.e., the products and services the company sells), such as healthcare (health insights, data on the effectiveness of different drug treatments, and improvements in emergency room care), banking (customer account balances, and loan delinquencies), entertainment media (the TV shows subscribers watched during peak viewing hours), retail (customer profiles and purchase histories and habits), energy and utility industries (sensors that indicate turbine and engine performance), construction (building construction sequencing, and subcontractor scheduling), and transportation (train conditions and fuel consumption). In the U.S., the federal **government** is perhaps the most prolific generator of data, including weather, employment, and economic statistics, surveillance footage of foreign troop movements, the flight paths of asteroids and comets, the amount of government student loans outstanding, and data on the incidence of disease.

and data on the incidence of disease. Data <u>Collection</u>. Although individuals, businesses and government agencies generate data for memseves (original data generation), each data generator is involved in collecting data from th other data generators, which itself is a form of data generation (secondary data generation). Fo example, a business will collect personal data from its customers in order to establish an onlin vaning a count, the government will request data from a pharmaceutical company to determine whether to grant approval for a new drug, and individuals will collect data from the government or business in order to initiate litigation.

В **MIDSTREAM: DATA STORAGE & PROCESSING**

Storage. Once generated, data will be stored until needed:

One disk sembedded in stationary and mobile computing devices (e.g., desktop and laptop computers, tablets, smartphones, digital assistants, wearables/watches, and fitness trackers); In data centers operated by government agencies and business enterprises; or in the cloud (i.e., mega-data centers operated by cloud service providers). Surprisingly, only a small percentage of newly created data (2%) is kept. Nonetheless, in line with the rapid growth of the data volume, the installed base of storage capacity is forecast to increase at a compound annual growth rate of 19.2%.

annual growth rate of 19.2%. computing (i.e., Analyzing and Processing). Over 99% of collected data never gets used nalyzed. Despite this tremendous waste of data, data that are ultimately used will be processed in nore valuable products for their owners, such as:

Individuals, a photo collection or recommended music playlist, healthy diet plan, or exercise

Businesses, insights on how to increase productivity and reduce costs, when to repair equipment, what goods to produce (and the price to sell them), or whether fraud may be

Applications. Big data is only as useful as the ability to read it. Therefore, data generators and collectors med tools to analyze and read the data. Businesses use tools to extract data from business systems and integrate it into a repository, such as a data warehouse. Once in the warehouse, the data can be analyzed. Analytical tools range from spreadsheets with statistical functions to enterprise resource planning systems. Edge to Core to Cloud. The applications can be located: • On-device (i.e., on the same computing device where the data are stored); • On-device (i.e., on the same computing device where the data are stored); • On-device (i.e., at the location near where the data are generated); • At the edge (i.e., at data center mantained by an enterprise at a central or core location); • At the edge (i.e., at data center core and where the data are generated);

 stored data is uploaded); or
 Any combination of the above. Because the data landscape is more dispersed than ever, the modern organization requires IT solutions that capture and analyze data as they move from "edge to core to cloud."
 Artificial Intelligence. The phenomenon of artificial intelligence (AI) refers to the development and period computer systems and algorithms that cap before the topic of the development and algorithms that cap before the topic of the development and algorithms that cap before the topic of the development and algorithms that cap before the development and algorithms that cap before the development and algorithms that cap before the development and th stored data is uploaded); or

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DOWNSTREAM: DATA CONSUMPTION

Receipt and Consumption. Once refined data are received, government agencies, enterprises and consume the data in one or more forms. They can: Let the data sit on their device unopened.

Delete the data from their device (e.g., junk mail, remove duplicate images and media) Consume it, and then:

С

Delete the data, or
 Store the data on the device, or
 Work on the data, which restarts the data cycle of generation, processing, transmission, and

consumption. Internet Users. The global population is 7.9 billion people. There are over 5.47 billion active internet users, so they account for approximately 66% of the entire world's population. This also means that 2.7 billion people have no internet access. Approximately 7.5 billion people are projected to use the nternet by 2030 when 500 billion devices will be connected to the internet.

Data Generation, Computing and Consumption BUSINESS DATA INDIVIDIDUAL DATA GENERATION GENERATION Who Collects Individual Data (and Why)? Who Collects Business Data (and Why)

> 0,0,0 OFFICE COMPUTING

Data Cen

Hybrid and Multi-Cloud

OFFICE COMPUTING

Key Data Center Applications Categories

(Open application programming interface software that bridges an operating system and the applications running on it)			
Big Data, Machine Learning, Al (Algorithms)	Apache, Cisco Systems, HPE, IBM Software, Microsoft Servers.		
Real-time Data Collection	Oracle, Schneider Electric)		
Workload Optimization Data Storage, Management, Backup	& Recovery		
Data Center Performance Mon	itoring .		

Selected Maker

Edge Computing

THE SIZE OF DATA

Public

ic cloud is

Private

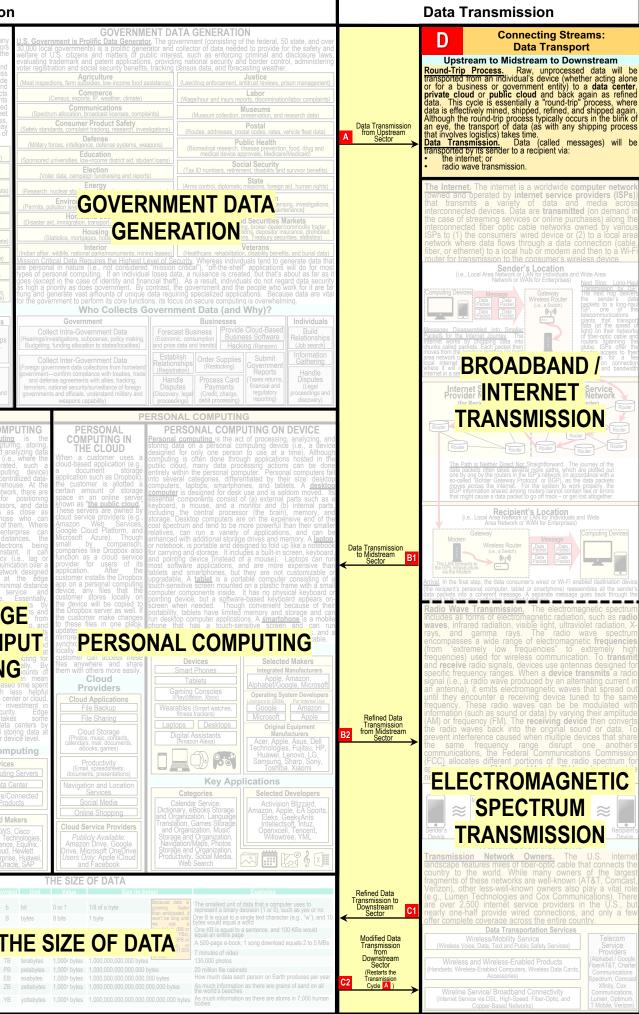
CLOUD COMPUTING

DATA USAGE

EDGE COMPUT -ING

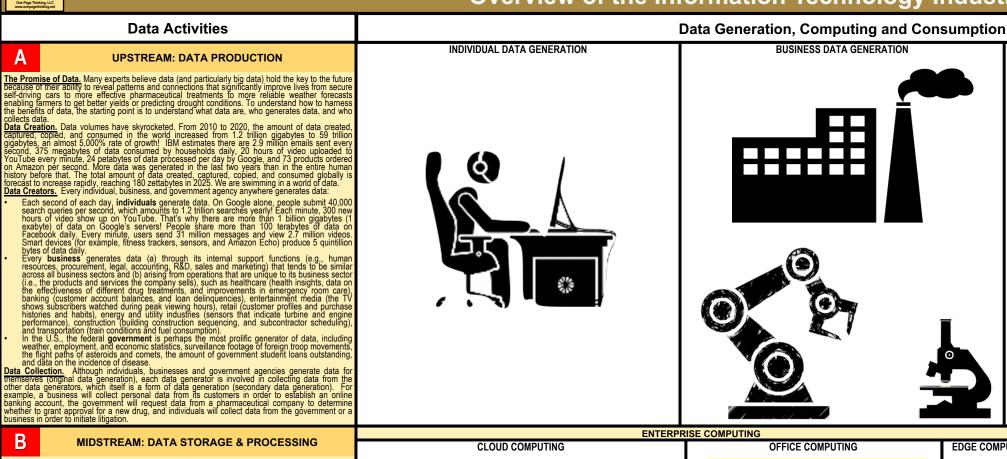
On Work Device

OMPUTING IN THE CLOUD





Overview of the Information Technology Industry: Simplified



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- Applications. Big data is only as useful as the ability to read it. Therefore, data generators and Gollectors need tools to analyze and read the data. Businesses use tools to extract data from business systems and integrate it into a repository, such as a data warehouse. Once in the warehouse, the data can be analyzed. Analytical tools range from spreadsheets with statistical functions to enterprise resource planning systems (ERP), customer relations management programs (CRM), payroll tools, and operational systems. Edge to Core to Cloud. The applications can be located: On-device (i.e., on the same computing device where the data are stored); On-premises (i.e., in a data center maintained by an enterprise at a central or core location); At the edge (i.e., at the location near where the data are generated); In the cloud (i.e., a data center operated by a cloud service provider, where over 30% of all stored data is uploaded); or

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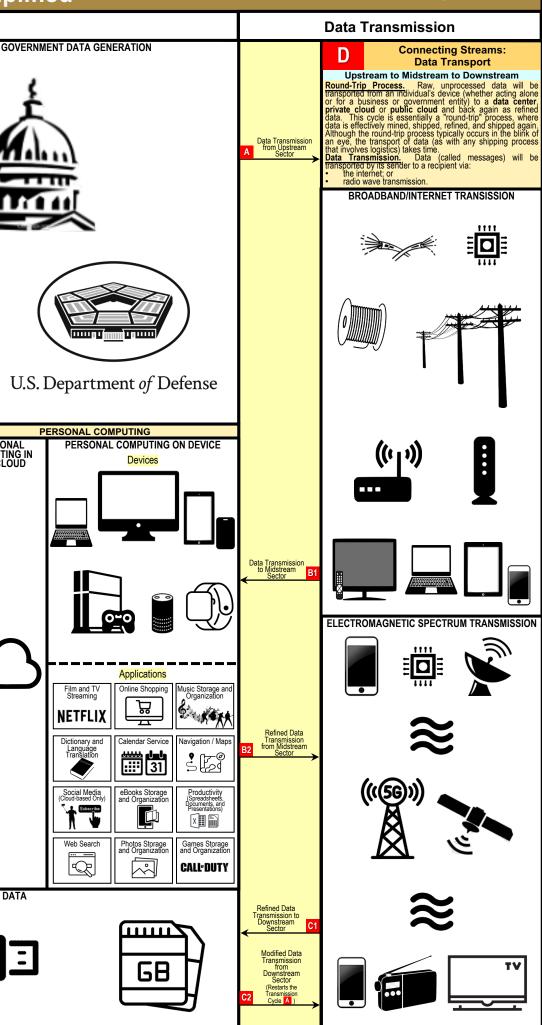
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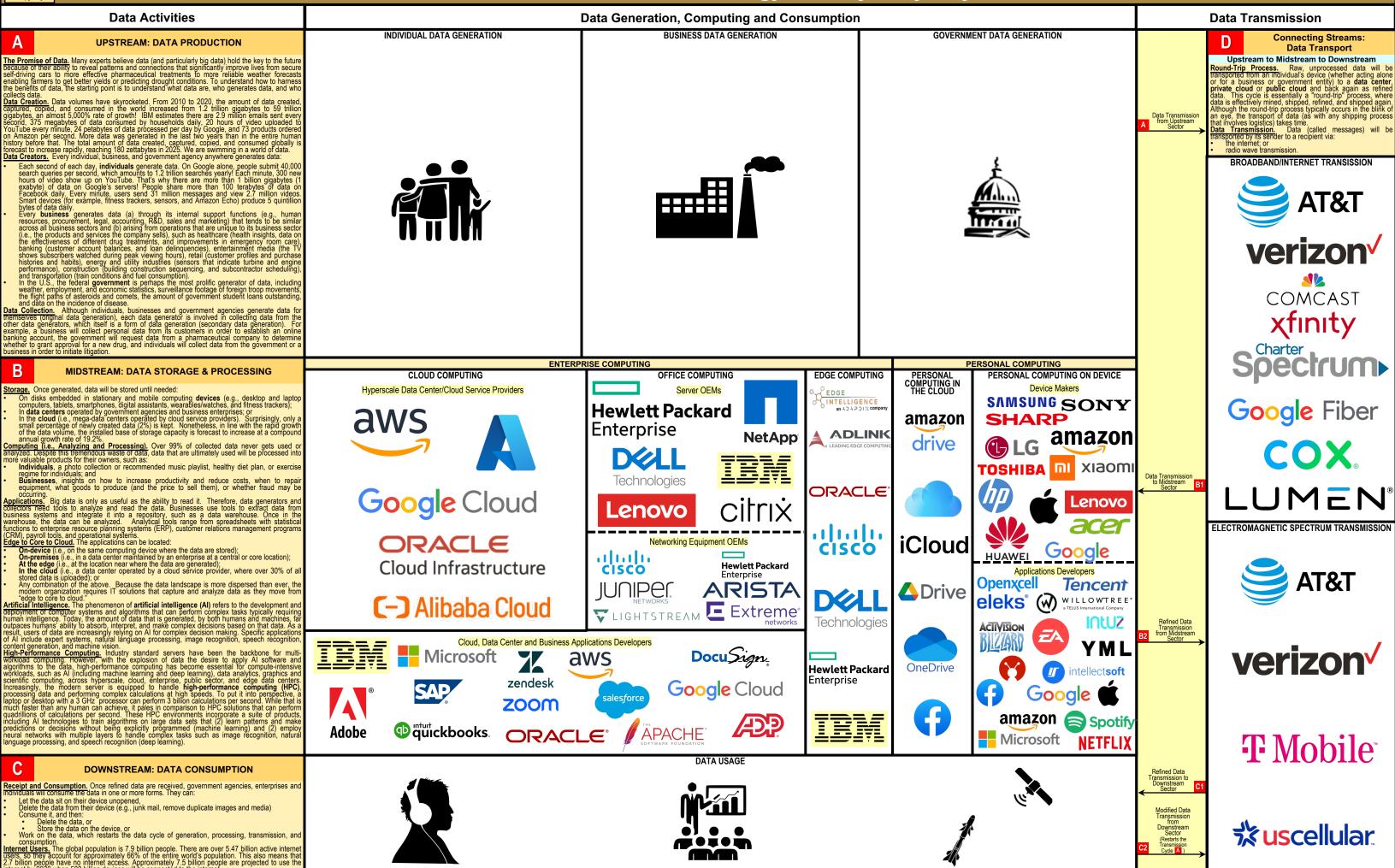
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EDGE COMPUTING PERSONAL COMPUTING IN THE CLOUD Data Center Servers/Storage and Networking Equipment Film and TV Streaming NETFLIX Dictionary and Language Translation Cloud, Data Center and Business Applications Social Media Ħ iiii Web Search SPREAOSHEET ··· — R DATA ANALYSIS DATA USAGE THE SIZE OF DATA = 32GB





Overview of the Information Technology Industry: Key Players



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Data Generation, Computing and Consumption

							GOVERNMENT DATA GEN				
INDIVIDUAL DATA GENERATION duals as Data Generators. People generate over five quintillion bytes of data each day via (1) web jes (5 billion each day), (2) uploading content such as photos, vides and messages on social media			BUSINESS DATA GENERATION Business Sectors Businesses are among the largest data generators and processors. Every company				GOVERNMENT DATA GENE U.S. Government is Prolific Data Generator. The government (con				
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300 million daily photo uploads), (3) email cor s such as connected cars, IoT devices, and sm	mmunications (294 billion emails per da	y), and (4) other	er (e.g., HR data) and (b) arising from its business operations that are unique to its business sector (i.e., the			welfare of I	LS citizens and matters of pub	lic interes	t such as e		
Photos, Videos Personal Health		Auto Data	products and services the company sells). Internal Support Data. Internal support data that Product and Service-Specific Data. Product and			evaluating t	rademark and patent applications ation and social security benefits,	providing	national sei		
ily, baby, friends, wedding, Data		ing history, traffic tion/tickets, auto	are similar from one organization to abother include		specific data	are unique 1		Votor rogioti	Agriculture		
other special occasions) (Blood pressure data, sleep, heart rate data	(porn, amazon.com, (In-store and insura	tion/tickets, auto	human resources, environmental, health and safet financial performance, customer relations, period	y, sector a	nd relate to tr	le goods and	services made	(Meat inspect	ions, farm subsidies, low-income food as	istance)	(Law/drug enfor
other special occasions) Sleep, heart rate data, medical history, blood test data, vaccinations.	YouTube, and entertainment goods and ID and	ince, driving video speed data, vehicle other information,							Commerce Census, exports, IP, weather, climate)	Γ	
allergies health	websites visited), services, product accid	dent history, das				((Wage/hour and		
	account passwords, purchase history) and service consu	umption, property value)	procurement data. Because of these similarities, processing, annue input reservations, plant-based			eet (Spectrum allocation, broadcast licenses, complaints)			(Museum o		
Communications Financial and Tax Data	Art Entertainment Ex	ercise Data	used or standard business software applications t effectively manage information and produce th	to productio	on, data from	a legal disc	overy process,		Consumer Product Safety		(Musculli c
(Bank account, tax return, data, voice mail) (Bank account, tax return, cash deposits, credit	(Music, writings, Data ctops)	rate/workout data, calories consumed	effectively manage information and produce the information, results, and insights required to manage	be requ	ired to man	age and proc	cess forms of	(Safety stand	ards, complaint tracking, research, invest	gations)	(Routes, addr
score investment	streaming history,	lome Data	the business effectively.	product a	and service-sp	ecific data.		A Chan . 4	Defense prces, intelligence, defense systems, wear		
ress books, contacts, birth auto loans and insurance,	Location Data V recording, (Home	address electricity	Internal Human Resources	Uti	lity Service (G	as. Electric. Tele	ecom, Water)	(Military IC	Education	ons)	(Biomedical r medica
social security number birth II life insurance policy	* device location II dllefludflee dl II nront	as consumption, erty value, school ict, zoning, home	(Personal employee data, compensation data, performance reviews, job postings/applications, diversity statistics)		unt information, co			(Sponsored u		t loans)	THEUIG
tes, fingerprints, passwords, account passwords, credit rest/conviction history) card usage)	tis, passwords account passwords, credit family tracking, movement tracking concerts and district, zoning, home motgage, home insurance) reviews, lob postings/applications, diversity statistics Internal Sales (Machine performance, capacity, utilization, downtime)					Election			(Tax ID numbe		
Illust	trations		(Sales data, stock-keeping units, customs duties, customer lists trade classifications, pricing, marketing programs)					(Voter data, campaign fundraising and reports)			
					nancial Servic	es (Banking and	d Insurance) a, credit cards data)	(Besserah r	Energy nuclear stockpile, wholesale energy transr		(Arms control,
			Internal Employee Safety (Death, serious injury reports, days away from work)				. ,	(Research, I	Environmental Protection		
🛎 🛛 🖓 🖽 🖽 🖓 🖄			Internal Finance	(Hous	Building a sing demand data	homeowner prof	files, blueprints)	(Permits, po	llution levels, superfund clean-up, investig	ations)	(Statistics, safe infras
V	- ···· -		(Financial performance, debt, cash, tax and accounting positions, investments, budget/annual plan, audit reports)			Defense	,		Homeland Security		
y Receipt Boarding Pass Driver's License Credit S	core Fingerprints Vehicle Registration V	accination Record		(In	telligence, surveil	lance, weapons p	erformance)	(Disaster ai	d, immigration, transport security, border of	ontrol)	(Public compa regulation, ban
			Internal Supply Chain (Sourcing, logistics, inventory levels, warehousing)		Tra	nsportation		(St	Housing atistics, mortgages, housing assistance)		regulation, bank party lists, ta
				(Navigati	on, traffic, repair a	and maintenance	logs, weather data)	(01	Interior		
			Internal Research and Development (Product / process innovation, guality, testing, IP records)	(Deline	4 d'anna an a	Health	aliainal trial data)	(Indian affair,	wildlife, national parks/monuments, minin	leases)	(Healthcare, re
Pressure Reading Sex Offender Registry Team Ph	noto Fitness Data Voter Registration	Veb Search History	Internal Tech		t diagnoses, med			Mission Crit	cal Data Requires the Highest Le	vel of Sec	urity. Wherea
Who Collects Individual Data (and Why)?		(Data centers, business software application licenses / subscriptions, IT infrastructure and devices, cloud comouting) (Analytics, user insights, algorithms, advertising records)			are personal in nature (i.e., not considered "mission critical"), " types of personal computing. If an individual loses data, a nuisar			a, a nuísance			
					r Industries	cracing rocordo)	rides (excer	it in the case of identity and finan	cial theft)	As a result	
Government	Businesses	Individuals	Internal Legal (Regulatory filings, lawsuit filings and discovery, transactional due diligence, contracts, lobbying records, documents)	I (Educat	tion, food, energy inment, consume	technology, profe	essional services,	as nigh a pr	iority as does government. By co enerate vast amounts of unique d	ntrast, the	e governmen ind specialize
aise Revenue Address Disputes returns,/ collections, (Workplace, road conditions,	Develop Products/Advertising	Build	due diligence, contracts, lobbying records, documents)	enterta	inment, consuméi	staples, cloud co	omputing/storage)	for the gove	rnment to perform its core function	s, its focu	s on secure of
refums / collections, ding allocations, 			Who Collects Business Data (and Why)?				Who Collects Government Dat			ent Data	
e Determinations Provide Domestic Security	Handle Disputes Hacking Order	social networking)	Government		Businesses		Individuals		Government		Busin
(Professional (Law enforcement, crime prevention, terrorist tracking,	(Legal proceedings (Pancom) Supplies	Handle	Raise Revenue Address Disputes	De	velop	Process	Build	Colle	ct Intra-Government Data	Forecas	t Business
nder registry, voter investigations, background checks, security clearances,		Disputes	(Tax returns, withholdings) Submit Govt. Reports	Products	/Advertising	Payments (Credit.	Relationships	(Hearings/inv	estigations, subpoenas, policy making,		, consumption
hicle registration)	Build Employment Relationships (Application, drug tests, background checks)	(L'egal	Provide Domestic Security	pricing strai	r preferences, tegy, research)	charge, debit)	(Job search, personal	Budgeting,	funding allocation to states/localities)	<u> </u>	ata and trends)
Protect Environment and Consumers		proceedings and discovery)	(Law enforcement, crime prevention, terrofist tracking, investigations, security clearances, surveillance)	Handle	Disputes	Order	investing)	Colle	ct Inter-Government Data	Establi Relations	hing Older C
Protect Environment and Consumers ict investigations, clinical drug trials, environmental and consumer product safety regulation)	Submit Government Reports (Taxes, legal reporting, subpoena response)	· · · · · · · · · · · · · · · · · · ·	Protect Environment, Consumers, Public Health		dings, discovery)	Supplies			rnment data collections from homeland	(Registrat	ion) (Rest
	Process Card		(Product investigations/recalls, clinical drug trials, environmental and consumer product safety regulation)	Build F	Business Relat	ionshins	Handle		-confirm compliance with treaties, trade use agreements with allies, hacking,	Handl	
re Public Health Allocate Services Allocate					, due diligence, cr		Disputes (Legal	terrorism, n	ational security/surveillance of foreign	Disput	es Payr
rch, product recalls)	Credit, charge, debit processing)		Make Determinations (Approvals, licenses, permits, and registrations)	Submit G	overnment Re	norts/Taxes	proceedings and discovery)	government	s and officials, understand military and weapons capability)	(Discovery, proceedir	
	proceeding,		(Approvais, incenses, permits, and registrations)		oroninient re				weapons eapaointy)	Lbioceedii	
		ENTERP	RISE COMPLITING						DE	RSON	

PERSONAL CLOUD COMPUTING OFFICE COMPUTING EDGE COMPUTING
 CLOUD COMPUTING

 4
 Public
 5
 Private
 6
 Hybrid and Multi-Cloud

 1
 Public
 5
 Private
 6
 Hybrid Cloud
 Multi-Cloud

 2
 Services (ag. servers, consumer) platforms, software, and storage)
 Services provider over the public
 Services (ag. servers, consumer)
 Platforms, software, and storage)
 Service provider over the public
 Service provider Edge computing is the practice of capturing, storin, processing, and analyzing da near the client (i.e., where the data is generated, such percenal computing device Public 6 Hybrid and Multi-Cloud
 8
 Data Center
 9
 On Work Device

 The data center centralizes a business enterprise's and in centario storing, backing and recovering, managing, processing, and storing data and applications. It consists of computing data and applications (to consuming of a acid applications) (to consuming of a acid applications) (to consult and a acid applications) (to consult acid an applications) (to computing device, such as and store data and applications) (to computing device, such and infrastructure such as hubs, switches, back and infrusion detection systems), (c) and infrastructure (e., equipment continuing to securely eustaining the highest IT system availability such as uninterruptible power sources, environment and physical security systems, and (d) operations staff to monitor and "Aff basis. Because they innerstand the staff to monitor and "Aff basis. Because they innerstand the applications (to consuming the highest IT system availability operations staff to monitor and "Aff basis. Because they innerstand the staff to monitor and "Aff basis. Because they innerstand the staff to monitor and "Aff basis. Because they innerstand the staff to monitor and "Aff basis. Because they innerstand the staff basis and (d) monesting the innerstand to a staff basis and (d) monestand the staff basis and (d) monestand the staff basis and (d) monestand the staff basis and thand the staff basis and thand thand the staff basis and thand th Data Center 9 On Work Device COMPUTING IN THE CLOUD Private a customer use sed application (ocument sto document st ication such as Drop personal computing instead of in a centraliz customer is allotted ain amount of stora edge of any network, there a ace in an online serviour as "the public cloud opportunitiés for positioning servers, processors, and data storage arrays as close as possible to those who can make best use of them. Where a business enterprise can reduce the distances, the speed of electrons being essentially constant, it can minimize latency (i.e. lag or delays in communication over a network) A network designed ese servers are owned l oud service providers (e.o nazon Web Service ogle Cloud Platform, ar oogle Cloud Platform, an icrosoft Azure). Though mall by comparison ompanies like Dropbox als inction as a cloud servic rovider for users of it polication. After th ustomer installs the Dropbo po n a personal computin evice, any files that th ustomer stores locally o the device will be copied to e ustomer make change delays in communication over a network). A network designed to be used at the edge leverages this minimal distance to expedite service and generate value. Essentially, edge computing works by pushing data, applications and computing power away from the centralized network to, and unnon workloads at its workstations, thin clients, des phones/land lines, printers, copy machines, and virtual Infrastructure equipment on a 24/1 Dasis. Because they ouse the organization's most critical asset (data), data enters are crucial for daily operations and business ontinuity of an enterprise and are viewed as top inorities. There are 7+ million data centers worldwide, use to the public cloud, modern data center infrastructures have evolved from on-premises physical ervers to virtualized platforms that support applications ind workloads across multi-cloud environments. machine wear and tools keyboard, video, mouse KVM), and virtual machin Mobile (Laptop computers, smart phones and tablets) Customer make change these files in one place lates are automatical rored everywhere. B ichronizing Dropbox file ally and online, the unning workloads at, it extremes. In technical terms, Both Categories (Apple, Dell Technologies, HI Huawei, Lenovo, LG, Samsung) 10 Servers (Standard, high-performance computing, applications, mission critical, web, database, media, and email servers) eferred to as a "distrib Device Makers network architecture" the (Arista Network Cisco Systems Citrix, Dell istomer can access these es anywhere and share em with others more easily enables mobile computing data produced locally. Mobile Device Makers (Motorola, Oppo, Xiaomi) contrast, massive amounts of centralized data often mear more risk, increased time spen sorting through less helpfu data in the data center or cloud Security (Firewalls) Stationary Device Makers (Acer, ASUS, Fujitsu, Dell Technologies-VMware, Sharp, Sony, Toshiba) Cloud Extreme Netwo HPE, IBM Syst Application Delivery Controllers Providers nnectivity to ensure rapid cess to applications and data. blic clouds can also be oloyed faster than an erprise's own on-premises structures and with an almost l itely scalable platform. (Load Balancer) Storage Arrays Cloud Applications data in the data center or clou and a heavier investment enterprise security. Edd computing takes son pressure off data centers I processing and storing data a local server or device level. ata, and Unstructured Data Storage) U.S. Cabinet Departments (Health and Humah Services, Veteran Affairs, Commerce, Energy, Homeland Security, Defense, Treasury, Justice) but many tools and systems to deal with interoperability issues are available from companies such as IBM and Accenture. File Backup Susiness Applications Networking Equipment (Wired and wireless local area network (LAN)—WIFI access points, swirches, routers, sensors, and related software; and software-defined wide area network (WAN)) File Sharing Software Categories (Accounting, Billing, Busines ntelligence/Data Visualizatio Cloud Storage (Photos, music, contacts, alendars, mail, documents eBooks, games) Iligence/Data visuances Business Messaging, Business Process and Automation, Contract Management, Custome Relationship Manageme Key Data Center Applications Categories 15 Edge Computing Middleware (Open application programming interface oftware that bridges an operating system and the applications running on it) PaaS Development Tools, Database Management, Business Analytics. Operating Systems) Security. Data Center Physical Plant/Buildings App Developers (Adobe System Productivity Email, spreadsheet suments, presentati cument Storage, Elec Signatures, Enterpris Devices Edge Computing Servers Reports, High Volume E Commerce / Payments, H Management, Marketing Automation, Payroll, Productivity, Project Management, Procureme Apache, Cisco Systems, HPE IBM Software, Big Data, Machine Learning, Al Edge Data Center lavigation and Locatio Cloud Service Providers (Alibaba Cloud Computing, Amazon Web Services, Microsoft Azure, Google Cloud, Oracle Cloud Infrastructure) IoT Hardware/Connected Home Products Services licrosoft Serv racle, Schne Electric) Cloud Hosted Applications Al and machine learning, altered and virtual reality, application integration, application rogenming interface (API management, blockchan, corpusing, conteners/bubmetes, cortent programming interface, healthcare and lies Scheros, bytond and multi-boug infermed of things (101, benefations, platient), identify and compliance, services computing, SCI database, storage, opplications (reading unstructured, sem-structured and structured data varehouse optimization applications (reading unstructured, sem-structured and structured data support)) "Armeteix) ، oducu ،nagement, ۱ and Supply Cı, oment, Purchas-tory Mana orger Real-time Data Collection Social Media Persona Workload Optimization Online Shopping Selected Makers Applications (See 20) Data Storage, Management, Backup & Recovery AdLink, AWS, Cisco Systems, Dell Technologies, Edge Intelligence, Equinix, Google Cloud, Hewlett Packard Enterprise, Huawei, IBM Distributed Infrastructure, Intel, Oracle, SAP Cloud Service Pro Manager Meeting Data Center Performance Monitoring (Data center device discovery, rack and floor space planning management, chilled water system, connectivity analysis, capacity utilization, network downtime, energy cost and utilizati tracking for physical, virtual, and cloud-assets, open application programing interface (API) to enable two business application communicate. temperature management, and KPI fracking) Software Developers (ADP, Alphabet/Google, Cisco Systems, DronBox, Microsoft Business opplication (See 13) Oracle, QuickBooks, Salesforce, SAP, Zoho) DATA USAGE THE S

21 DATA USAGE Mobile Data. Mobile data (also called "wireless" or "cellular" data) is the distribution of digital data through a wireless network and is how a person gets online when they are not on a wired or a wireless Wi-Fi connection. It is an invisible connection usually to a satellite or a nearby cell lower that allows people to visit websites and use paps on their mobile device. Mobile is not Wi-Fi. Data transmission by mobile is fundamentally different from Wi-Fi. With Wi-Fi router for transmission. The transmission signal is localized (say, in a house or cate) and only available if the user is within coles range (say 100 feet or 30 meters) of the router itself. Mobile or call phone data, by contrast, does not require the user to be tethered to a local hour or there Mobile bata Connection. Most often, mobile data is used up no ned of three ways: (1) Entails, texts, and direct messages all use mobile data is used up to ned of three ways. (2) Web howsing or suffing the Web on mobile dows use use use to data because webpages tend to have large images or videos. But a lot of this browsing data is used up by ads and under (3) Apps are likely the biggest data. Any app that needs to connect to the Web to update, refresh, of dowindad will use cell data, including all social media and streaming apps (e.g., Facebook, X (formerry Twitter), Spotify, and Netflix) will quietly eat up your data.

Top Application Categories by Data Consumption				
High-Definition Video Streaming (Netflix, Disney+, Prime Video, YouTube)	900 MB/hr			
Video Conferencing (Zoom, FaceTime, Skype, Teams)	480 MB/hr			
Standard-Definition Video Streaming (Netflix, Disney+, Prime Video, YouTube)	240 MB/hr			
Social Media (Facebook, Instagram, Snapchat, Tik Tok)	80-840 MB/hr			
Online Interactive Gaming (Steam, Origin, Roblox, PlayStation)	60 MB/hr			
Web Browsing	60 MB/hr			
Music Streaming (Spotify, Apple Music, SoundCloud)	30 MB/hr			
GPS and Ridesharing (Google Maps, Waze, Apple Maps, DiDi, Uber, Lyft)				

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 The size of data is measured in bytes.
 Bytes are used to determine (a) the amount of computer storage consumed by data and (b) the volume of information that is sent over the interment in a given amount of time. For example, the average American uses about 7 gigabytes (GB) of mobile data per month. Most internet service providers (ISPs) will charge fees to users of their intermet thetworks based on the number of bytes transmitted by the user. Most internet users have head of kilobytes, megabytes gigabytes, or even terabytes—everyday amounts of data that represent the sizes of. say, an email attachment, two hours of Netlik. TV content streaming, or an entire photo library stored in Amazon Photos. However, because because the entire digital unverse is expected to reach 180 zettabytes (ZB) by 2025, a 410% increase from the current size of 44 ZB, internet users will need need to learn the measures of larger data sizes.
 YB
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IZE OF DATA							
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