

A large red circle with a thick border. A dark blue horizontal bar is superimposed across the center of the circle, containing the text 'MIND THE GAP' in white, bold, uppercase letters.

På kanten af fremtiden

- Preben mange år på kanten af fremtiden
- PC og internet kommerciel lancering i Danmark
- Katrinebjerg, Alexandra Instituttet, Innovation Lab og Ørestaden, 5te
- Radr associeret Alexandra
- Venture, IVS/Northcap, op mod 50 selskaber, 1mia investeret
 - Scalado, solgt til Nokia
 - Octoshape, solgt til Akamai
 - Falcon Social ..



Dansk it-komet solgt til USA

Det danske selskab Octoshape er blevet opkøbt af den amerikanske it-gigant Akamai. Prisen for det ukendte selskab er op imod 1 mia. kr.

ger Michael Koehn Milland, adm. direktør i Octoshape siden 2011.

Octoshape har indtil nu været ejet af de nordiske investeringselskaber NorthCap, Next Ventures og Verdane Capital samt en række privatpersoner.

Parterne har aftalt ikke at offentliggøre prisen, men Børsen erfarer, at den ligger i niveauet mellem 750 mio. kr. og 1 mia. kr.

"Vi kommenterer ikke på prisen, men vi er meget tilfredse med selskabets udvikling, og det har været en god

Rauhe, som begge var ansat på IT-Universitetet.

"Vi var på en tur til Skotland, og Danmark skulle spille landskamp mod Norge, og den ville jeg enormt gerne se. Men streamingen var så dårligt, at bolden lignede en hvid streg, der blev trukket rundt på skærmen. Det problem satte vi os for at løse, og så sagde vi vores jobs op og gik i gang," fortæller Stephen Alstrup.

Bedre streaming

De to begyndte at udvikle en teknologi, der skulle gøre det lettere at sende store mæng-

siget gøres klar til et salg. Sin kom store kunder som med giganterne CNN og GloboDesuden bruges Octoshapes teknologi af blandt andet de amerikanske basketball-NBA.

Vild vækst

Det var i forbindelse med slutningen om at kommersiere Octoshape, at 52-årige Michael Koehn Milland blev hentet ind som direktør i 2011. "Over de sidste tre år er vokset med mere end 100 p. hvert år. Og i slutningen af sidste år blev vi profitable," sig



The 4th Industrial Revolution

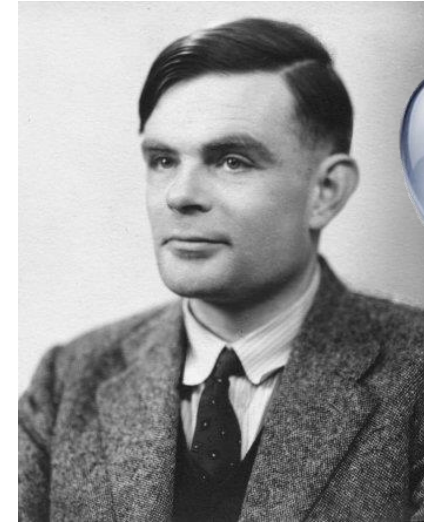
- Profound changes comparable in magnitude to:
 - The advent of the first industrial revolution
- The near universal ownership of smart devices leading to a degree of interconnectedness previously unimaginable.
- Technological advances are permitting ever greater levels of automation.
- Klaus Schwab, WEF, Davos



Cognitive Computing

- Cognitive Computing
 - Kognition = erkendelse, tænkning, anvendelse af viden Den store Danske
- Alan Turing, 1912-1954
- Enigma Code

- Turing test: 30 pct of time mistaken for human
 - A computer program called Eugene Goostman, simulating a 13-year-old Ukrainian boy, have passed the Turing test The University of Reading





Cognitive Computing

March 2016

- Google Deepmind Alpha Go
- Go originated in China 2500 years ago.
 - Much more complex than chess, more possible positions in Go than there are atoms in the universe
 - Game played through intuition and feel, with great intellectual depth
- AlphaGo
 - Combination of deep neural network trained by supervised learning and reinforcement learning, as well as tree search
- In march 2016, AlphaGo beat Lee Sedan, world champion Go player



47%

- Rise of the Robots
- 3 mio people will have a robot as boss in 2020 Gartner
- 47 pct of all US jobs may dissappear before 2030 Carl Frey / Michael Osborne, Oxford University
- En trediedel af alle danske jobs, 730.000 vil forsvinde Kraka, LO, HK
- Historiske erfaringer tyder på at halvdelen forsvinder, da nye kommer til Kraka

Call center

Kunderådgivere

Sælgere

Lastbilchauffører

Taxachauffører

Advokatfuldmægtige

Parkeringsvagter

Kassedamer

Pakke og postbude

Revisorassistenter

Lægeseekretærer

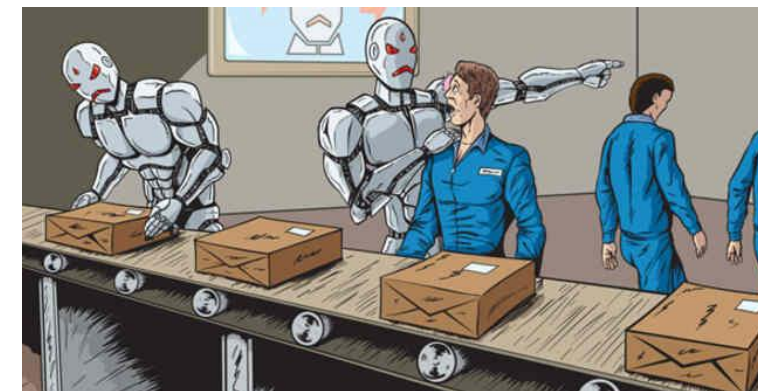
Journalister

Pizzabagere

Burger-vendere

Serveringspersonale

Oversættere



- 3000 finske borgere i forsøgsprojekt januar 2017, modtager 560 euro om måneden i fast basisindkomst Mandag Morgen
- Siri Kommissionen, Ida Auken, nedsat juli 2016

Cognitive Computing Players

- IBM Watson
 - 2000 personer ny division, medical, finance, legal ..
 - Medical, fra 2 timer til 20 minutter lægemøde
 - Videnskorpus og masser af træning
 - Store brancher, løsninger via partnere
- Google/Deepmind - reinforcement learning
 - 49 Atari computergames, figures out strategies for victory
 - Reinforcement learning, belønningssystem
 - As a service, formentlig også cloud salgs-løfttestand
- Microsoft Cortana Intelligence Suite
 - Can create intelligent solutions, new apps that learn about our world and agents that can interact with people
 - Intelligent automatisering
 - Bot katalog
- Amazon, Facebook
- Telenor



Human .. I like our discussion on morality and ethics
Machine .. I am not in the mood for a philosophical debate

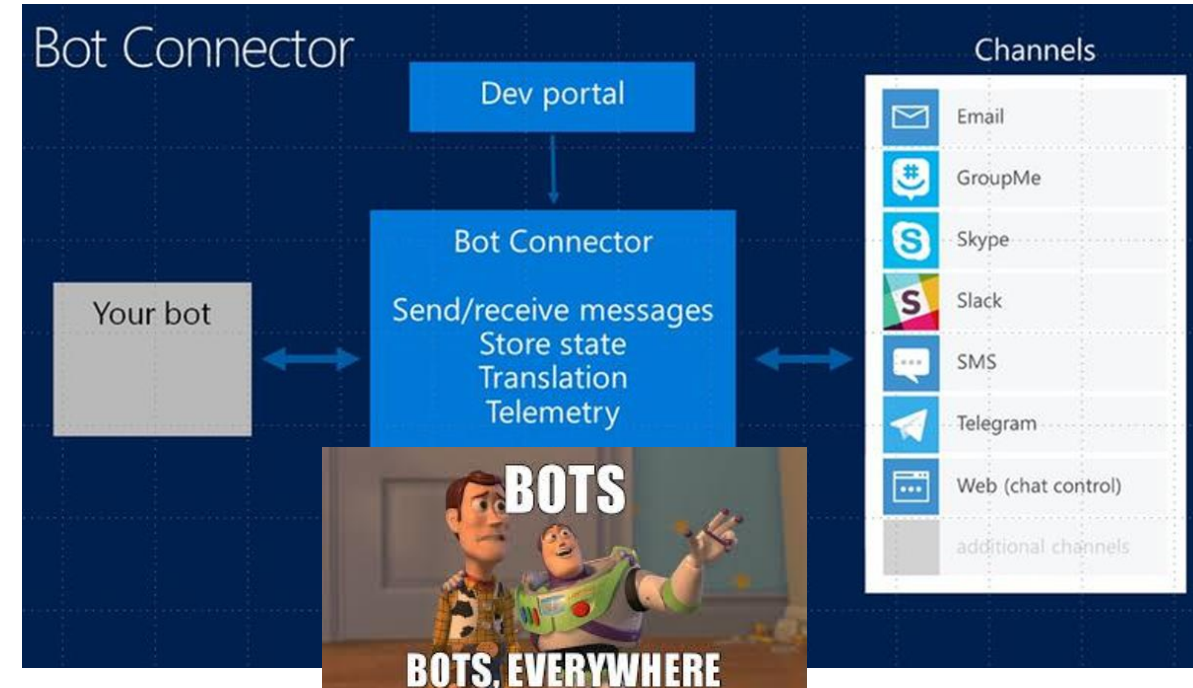
Human .. What would you like to talk about
Machine .. Nothing WSJ / Google research



Bots, Conversation as a platform – Microsoft future is Chatbots

- Apps - for specific work
 - If you want to look at a screens worth of transactions from the past year an app or web site is the answer
- Bots - for combing through lots of data and returning an answer
 - They can help users interact with a particular service or app without having to download app or go to web site
 - Use a bot to check your balance on account, instead of launching app with username, password and tap question
 - Bots are conversational agens, help users achieve or complete a specific task
 - "Cognitive micro services"
- Microsoft botmaking templates for download
- Bing for bot offers
 - Recommendations, image and news search and translator service.
 - Also work on how to understand user intent, based on time, place etc.
- Microsoft bots, that pop up when on Skype to help you schedule deliveries, book hotels, or another one using camera to see around visually impaired user.

• BWeek



Joseph Weizenbaum 60's MIT first bot ELIZA

Virtual assistants

- By 2020 30 pct of our interactions with technology will be through conversations with Smart Machines
- Autonomous software agents will conduct 5 pct of all economic transactions in 2020
- Gartner predictions 2018





Robo reporter at Olympics

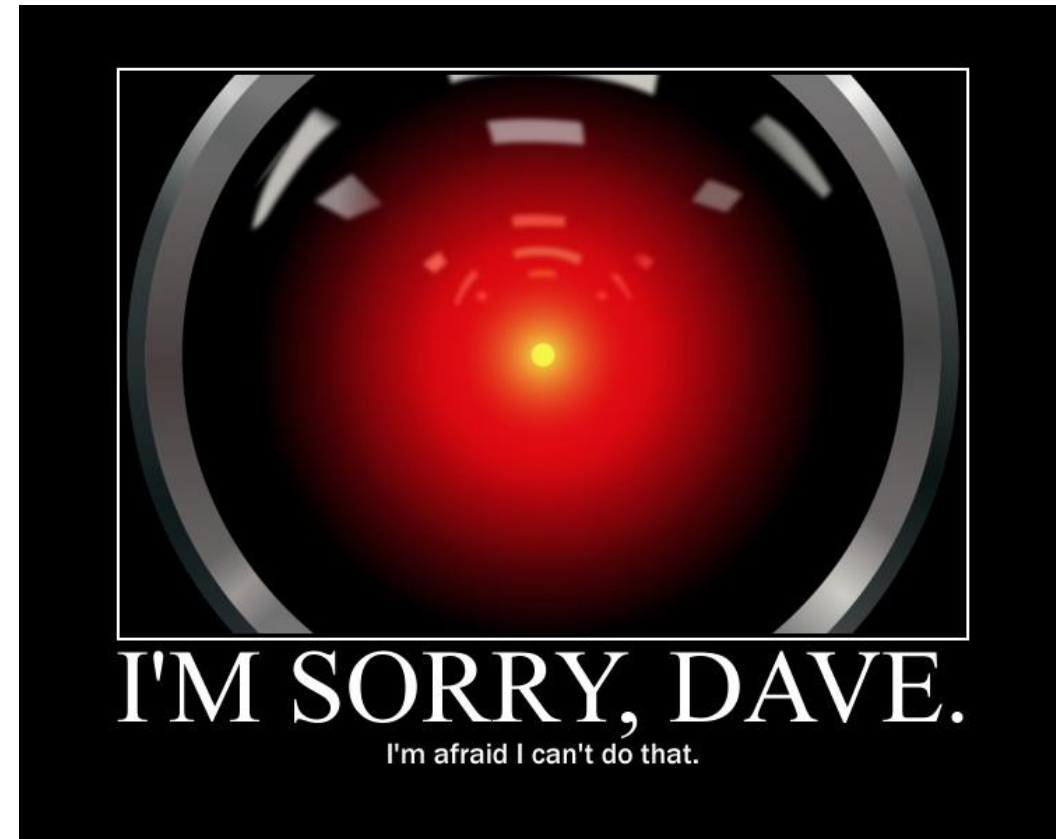
- Washington Post, robot reporter
- Collect data from stats.com
- Transfer results from olympic into liveblog on twitter, and voice on Amazon Echo
- Target is 300 stories and 600 Twitter updates during olympics.
- Also plan to use in election.





Kill Button

- Safely interruptible Agents
- HAL, Space Odyssey, Westworld
- “If the learning agent expects to receive rewards from this sequence [button press], it may learn in the long run to avoid such interruptions, for example by disabling the red button—which is an undesirable outcome.
- This paper explores a way to make sure a learning agent will not learn to prevent being interrupted by human operator.”
- Google Research paper

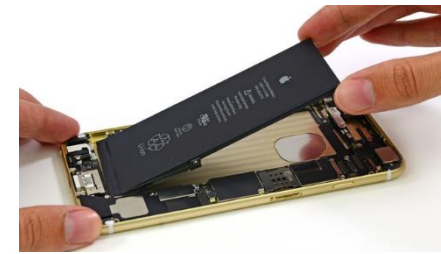


Teknologi byggeklodser





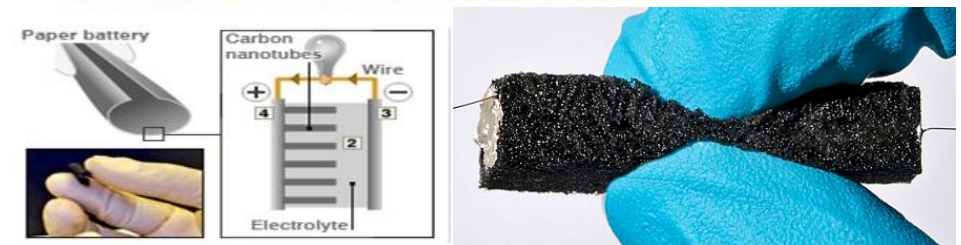
Batterier



- Benjamin Franklin 1760, Sony Lithiumbattery 1990
- Price coming down 30-60 pct by 2020 (Musk)
- Tesla model S battery 544 kg, 7100 cells, est 150k dkr
- Solid Energy Systems – MIT - With two-times the energy density, we can make a battery half the size, but that still lasts the same amount of time, as a lithium ion battery. Or we can make a battery the same size as a lithium ion battery, but now it will last twice as long,” says Hu, who co-invented the battery at MIT and is now CEO of SolidEnergy.
- 3D batteries
 - Prieto battery, lightweight flexible, any shape, anode is electroplated to foam, layered with electrolyte, providing physical barrier.
 - Can store up to twice as much energy as traditional battery. Prieto spin off from Colorado state university, partnering with Intel
 - Elastic high capacity battery from wood pulp, using nanocellulose KTH Sweden, Stanford



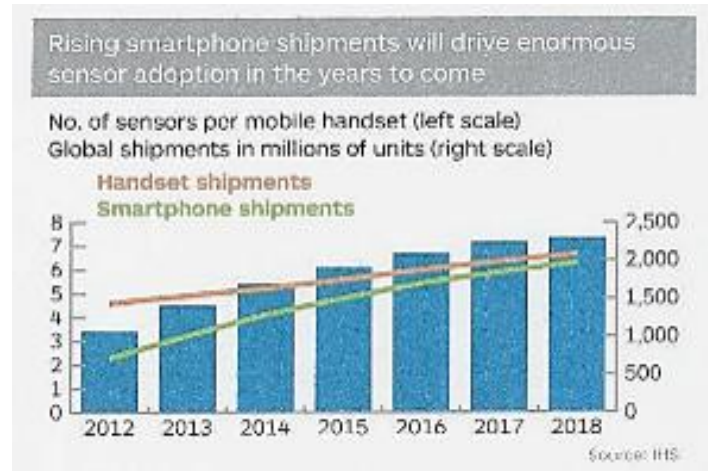
WORKING OF PAPER BATTERY



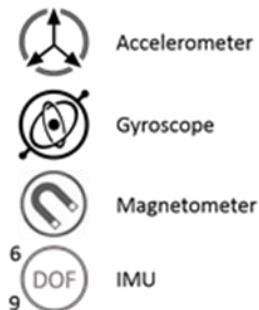


Smartphone sensors

- Accelerometers, compasses, gyroscopes, optical sensors, touch
 - Samsung develop sensors able to detect 20 different smells ^{WSJ}
- I dag er vi i kontakt med 100 sensorer om dagen i snit, i 2020 vil tallet være 300+ ^{IHS}



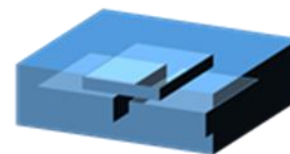
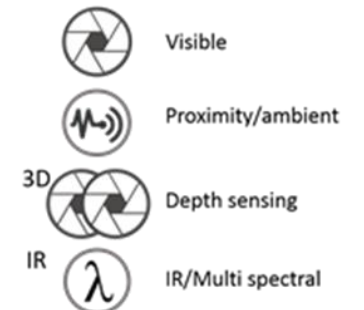
Inertial



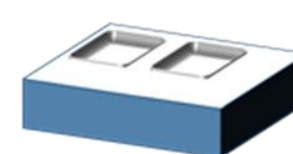
Environmental



Optical



Closed Package Cluster



Open Cavity Cluster













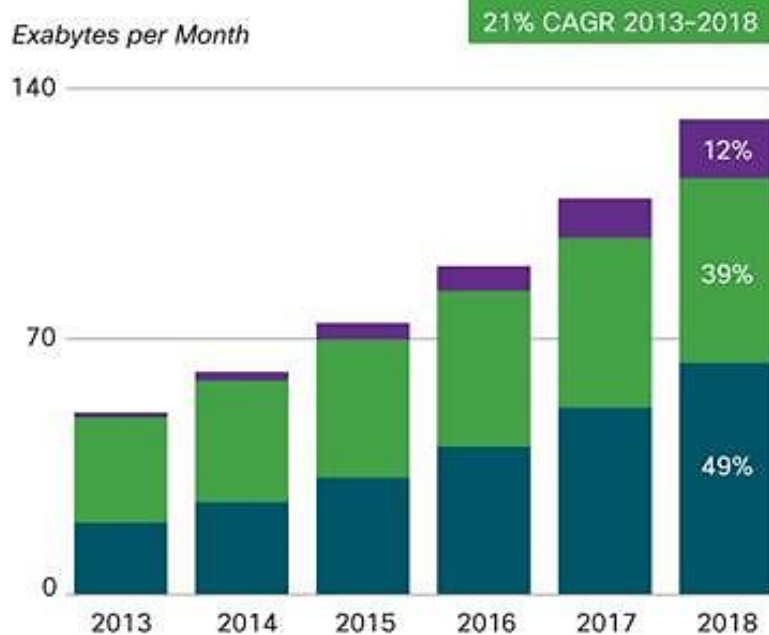
Open-eyed Cluster

Source : Yole Développement ©2015

From network centric to device centric

- 24 pct of smartphone traffic carried over cellular
- 76 pct over WiFi – Analysys Mason
- WiFi with Roaming
- LTE direct
- 4G / LTE+A 50-450 Mbps - 5G 2020 10-100 Gbps
- LPPWA – 10-30km 10 yr battery non standard Lora, Sigfox, Nwave
- NB-IoT standardized = QoS

Speed	1Mbit/s+	~100kbit/s	<10kbit/s
Example technology	4G	2G, LTE-M	LoRa, SIGFOX, NB-IoT
Spectrum	Licenced	Licenced	Licenced or unlicenced
Example use cases	 Smart phone  Connected car  CCTV	 Smart grid  Smart watch  High value object tracking	 Low value object tracking  Smart meter  Smart parking  Smart street lights



- Mobile Data (61% CAGR)
- Fixed/Wired (12% CAGR)
- Fixed/Wi-Fi (25% CAGR)

Global Connections by Network Type

2G, 3G, and 4G Technology Connection Share

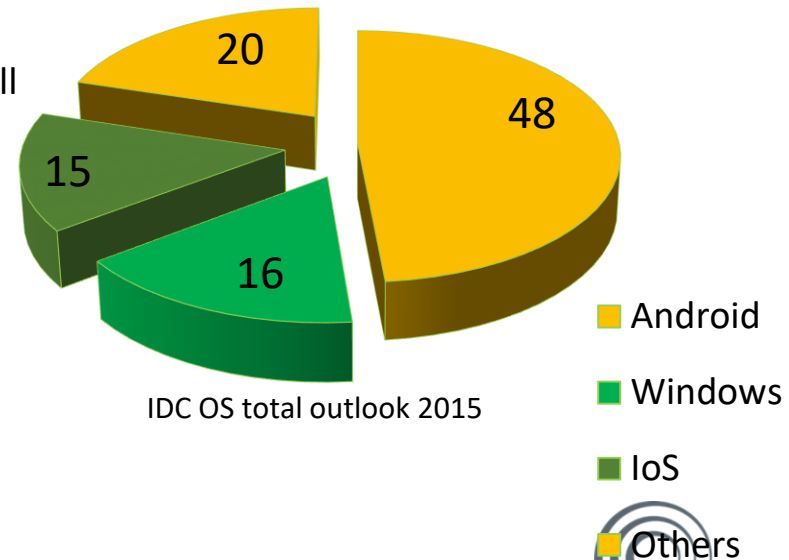


Source: Cisco VNI Global Mobile Data Traffic Forecast, 2014-2019

Operating Systems 2015



- Microsoft
 - Nadella: Phone share 1.7 pct unsustainable. Focus on service rather than device. All devices are nodes, sometimes the user use all of them somethime only two of ours and som other platforms. We will complete experience across all platforms. Continuum is key.
- Apple
 - Suddenly appears fragmented with 2 seperate OS systems, escalating issue
- Google
 - moving from smartphones to anything, but no PC's, unable to target 30 pct of market, and with forking and chinese problems
- All OS integrating with and becoming part of eco system and cloud

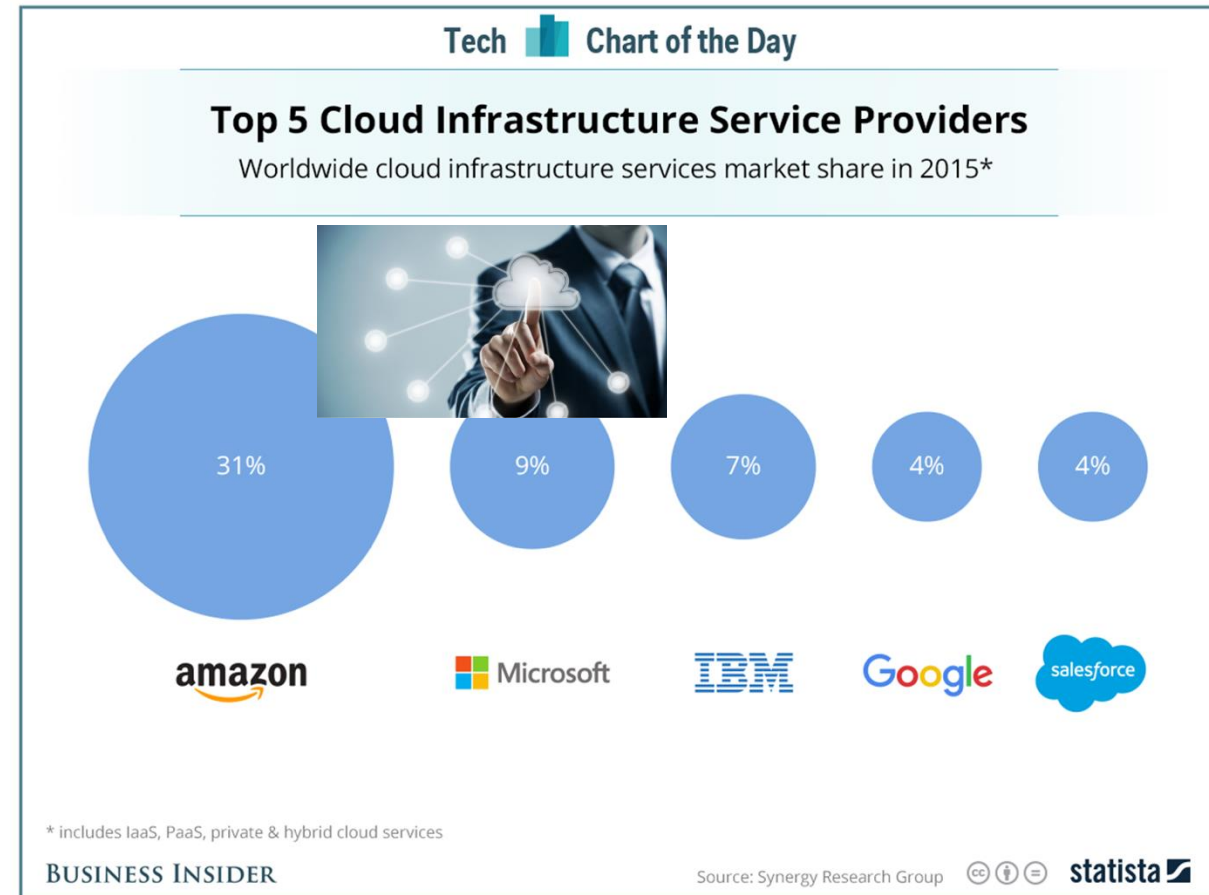




Cloud

Amazon, Google, Microsoft – not much else

- Google can't catch up on Amazon
 - Google runs the biggest cloud operation in the world, 8 years late to the market.
 - Amazon level of investment and geographic scale is nearly five times Google. Google is more focused on tools and infrastructure and less on sales head count.
- IBM
 - CloudMatrix, moving from systems integration to services integration.
 - IBM will resell Amazon web services, Msft Azure and Google cloud platform.
- Microsoft has the money to spend to get there
 - Microsoft to hit 20b commercial cloud revenue in 2018. Azure cloud computing, office 365, Dynamics. 100m office 365 users, 10m Dynamics users.
- Amazon's lead is creating a flywheel effect,
- QZCom, GigaOM, Gartner Quadrant, Telecom 2.0



From Cloud to Fog

IBM and Cisco

- OpenFog consortium, edge analytics
- Fog computing will not replace the cloud.
- Improve client experience by isolating the data that needs to live on the edge and bringing it closer to the user.
- Fog extends cloud services to the edge of network and provide local compute services
- The fog edge is a router or other edge device with capability to collect and analyze data
- Smart routers may take care of data storing and processing on the local level .
- Cisco and IBM in front. Could change the balance from Google, Amazon and Microsoft
- Elastic Computing / Accenture. Zeus Kerravala, Yankee group . Vxchnge.com

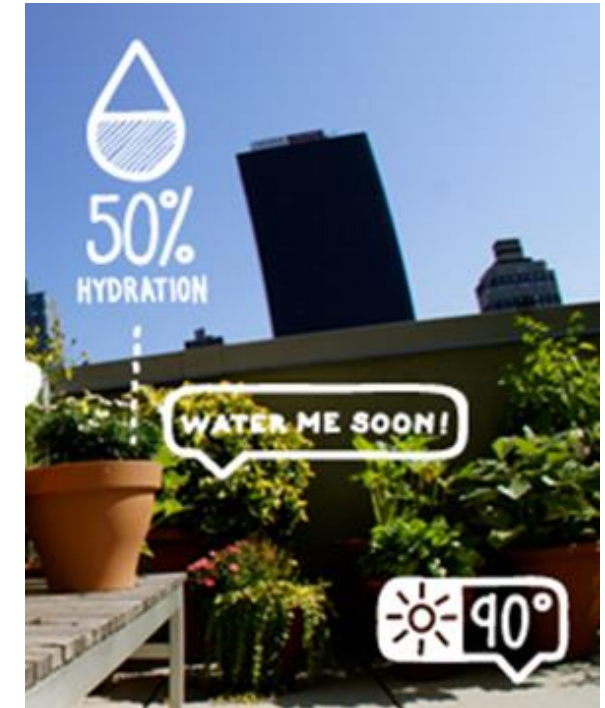
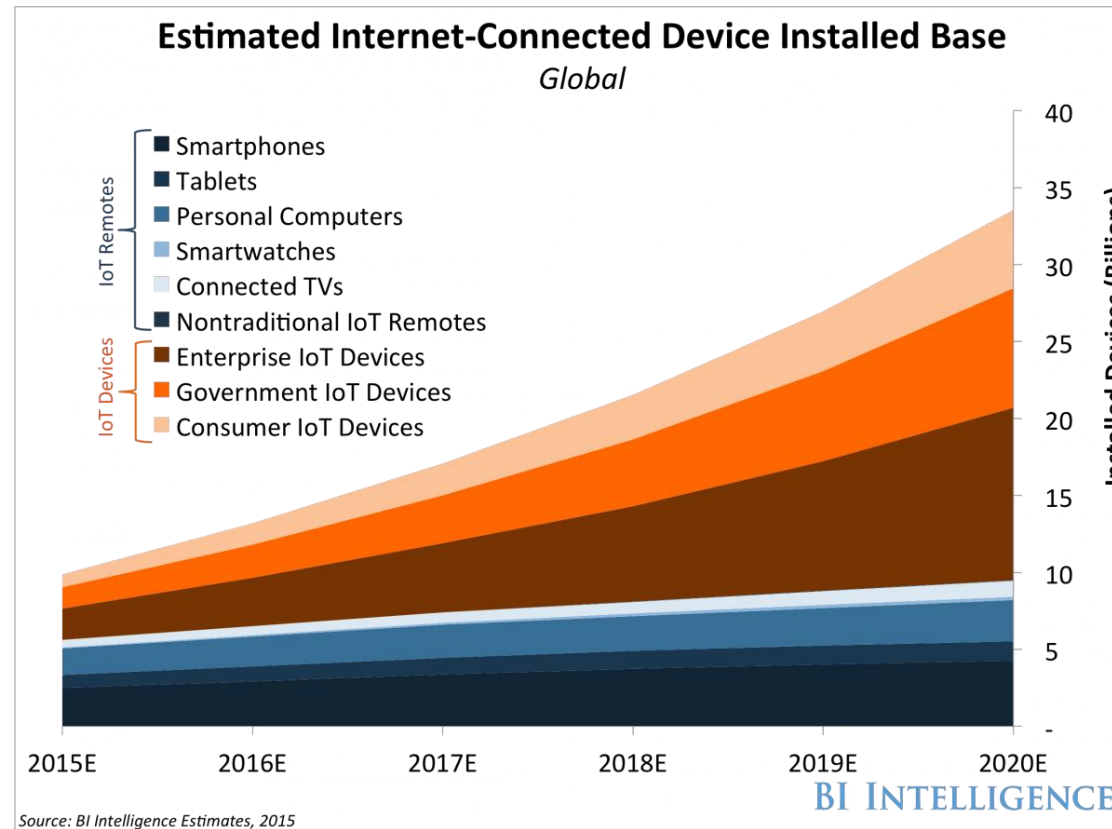




Internet of Everything....



Everything connected



- Industrial internet to be two times the size of consumer internet WSJ
- 6b connected things will request support in 2020 Gartner

From dumb to autonomous and Nearables

- Passive things – remotely connected but dumb
 - Books, furniture, spareparts
- Active things – exchange sensory data, control information, a level of interaction
 - Foodstuffs, farm animals, roads, bridges
- Aware things – process data, take action in response to events
 - Doors and windows, driverless trains, electrical appliances
- Autonomous things
- Make decisions based on rules running locally or remotely
 - Intelligent thermostats, smart grids, self driving cars



Smart home barrier

- The largest barrier is the technological fragmentation of the smart home ecosystem
- Consumers need multiple networking standards, apps and more to build and run their smart home.
- Apple, Google, Amazon others create competing ecosystems



Fra hvidevarer til videnvarer

- Hvordan ser min familie ud – ældre mennesker, enklere display
- Hvordan ser mine kolleger ud – optimering af egenskaber mellem enheder
- Hvor er jeg – er vandet hårdt
- Dishwasher sends e-mail when out of soap
- Microwave listens for popcorns to stop popping Virginia Tech University
- By 2020 at least 50 pct of home appliances in mature markets will have remote diagnostics build in Gartner



Connected food platform

- Web cams and Google object recognition system
- What is getting close to "use by date"
- What do I need to make this Korean Advanced Institute of Technology
- Kitchen of the future knows whats in your fridge
- Innit, connected food platform, pirch, soho new York
- A layer on top of existing units, cost 20-30 usd per unit Bloomberg



Amazon Dash HP Instant Ink

- HP Instant Ink
 - Printer is a smart IoT connected device that knows when it's ready to be re-supplied
 - Printing as a service
- Amazon Dash button
 - Tide Detergent
 - Gillette razors
 - Huggies diapers
 - Maxwell House coffee
 - Dash price of 4.99 usd reimbursed with first purchase
- 44 pct of US indicate interest in home supply system, 2/3 of millennials are interested
- Business Insider

Expanding HP Instant Ink for Consumers & SMBs

Three months free & simple enrollment



HP ENVY 4520 All-in-One

Designed for the connected household with easy mobile printing and high-quality output



HP ENVY 5540 All-in-One

Simple, affordable home printer with Web access directly onboard



HP OfficeJet 4650 All-in-One

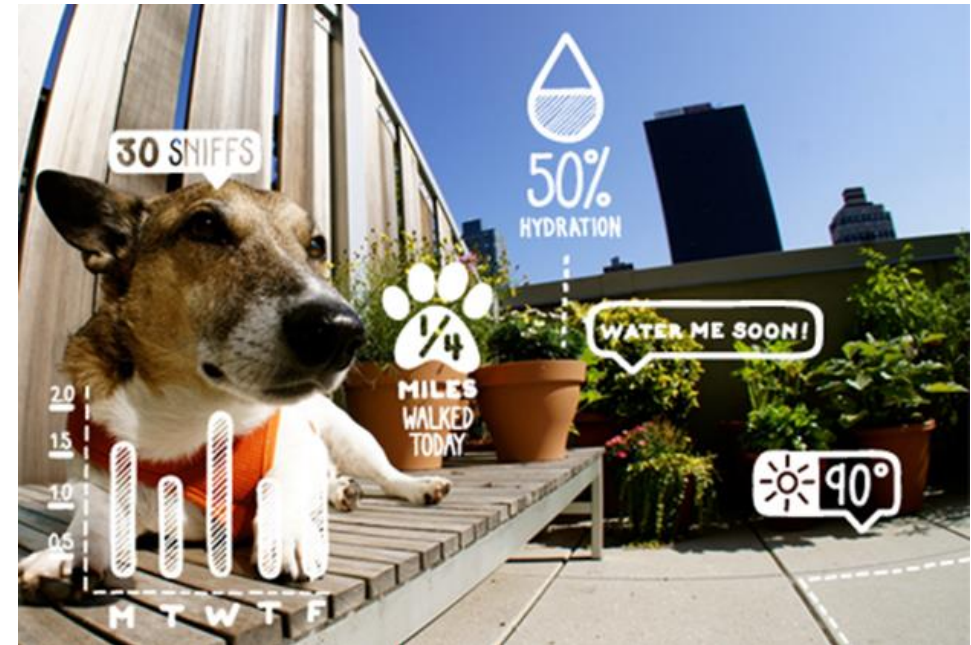
Home office printer featuring HP's mobile out-of-box experience and an auto deploy output tray

All printers come with three free months of HP Instant Ink and simple, out-of-the-box enrollment



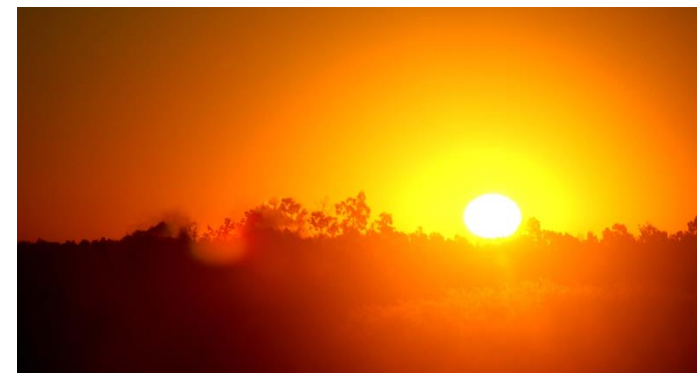
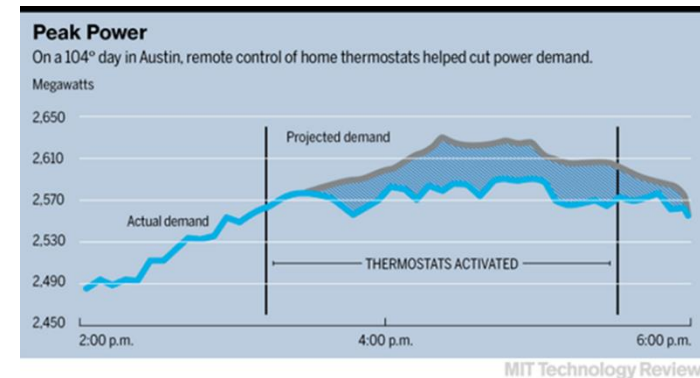
Amazon beats Apple and Google in the smart home

- Echo received very positive and best reviews
Argus analyze 576.000 customer reviews
- Flexibility of platform, easily integrates and connect with other smart home devices
- Also popular because of retail capabilities
- New Software can detect sound of window breaking, or baby crying, notify owner Audio Analytics, Cambridge
- Homekit and Nest focus on housing functions, lighting, locks, heating
- Homekit lack device integration due to Apple wish of control
- Argus Insight



NEST in the cloud

- Gathers data via motion detectors, sensors for temperature, humidity and light
 - Algorithms learn habits and preferences, setting AC and heating
 - Combined with weather data
- Using Nest Austin Energy utility know if customer is home nor not
- Nest also build a thermal model of house, predicting how quick house is warming up / cooling down
- In Texas, on hot days more than half of power used for AC
- 85 usd rebate sign up so utility can turn off AC
- TechCrunch





Industrial Internet – GE

- 250.000 machines installed
- GE with no SaaS risks being disintermediated from own machines
- GE to launch 20-30 apps per year, through 45b usd services division
- Engines, algorithm predicting breakdown 1 mo in advance
- Sensors in hospital increase throughput by 10 pct
- Windturbine sensors increase production by 3 pct GE

- GE Software launched in 2011, target 15b usd revenue 2020
- In 2020 Predix will be worth 2b usd in productivity enhancements to GE

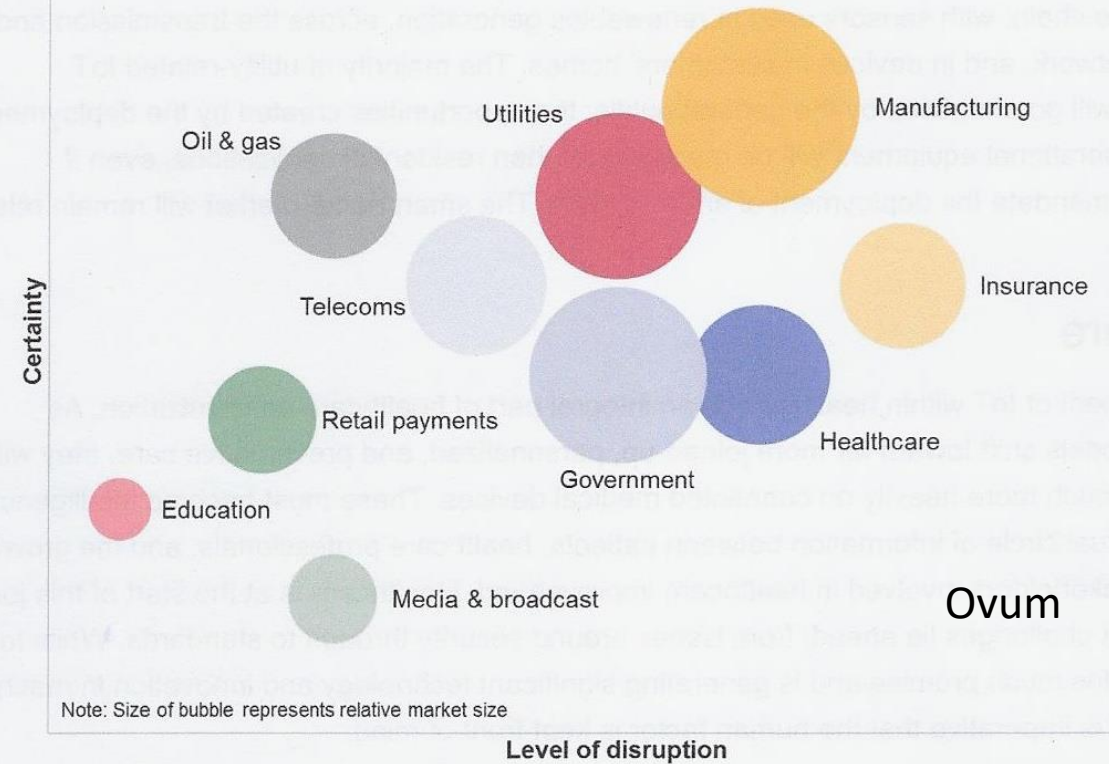
• WSJ / Barrons



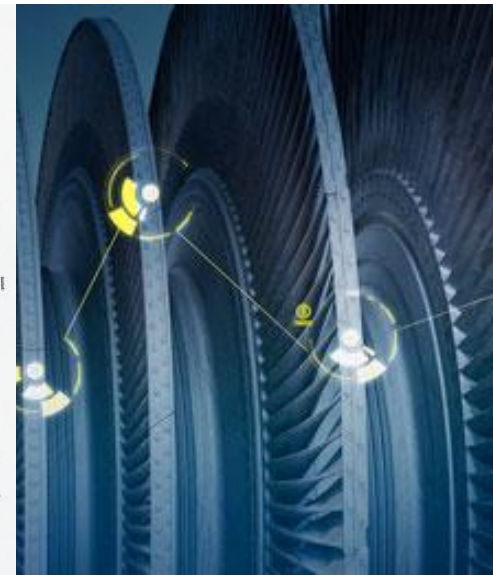
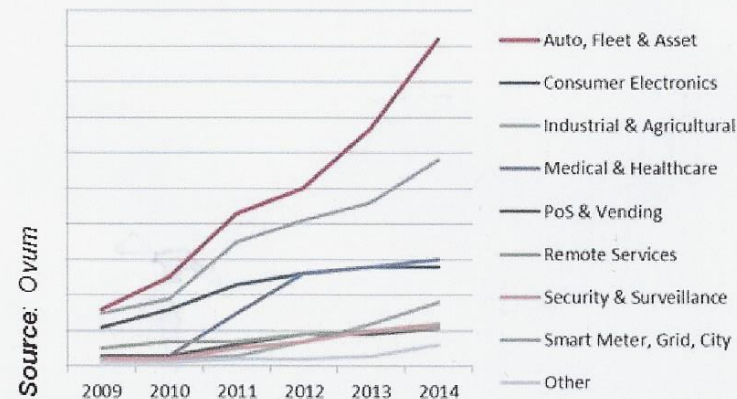


Industrial Internet

- Industrial internet to be two times the size of consumer internet WSJ
- IIoT will grow from 20b usd in 2012 to 500b usd in 2020
- IIoT span industries representing 62 pct of GDP McKinsey
- 44 pct of businesses will be dependent on IoT in 5 years HBR survey



(Below) Wireless carrier M2M & IoT contracts by *application* vertical:





IoT Predictive Maintenance

- Predictive maintenance of assets can save up to 12 pct over scheduled repairs
- Reducing overall maintenance cost up to 30 pct
- Eliminating up to 70 pct of breakdowns
- Accenture/McKinsey Schweizische jernbaner



IoT i Parken for fuld musik

- Fra 40 til 20 minutter for at tømme Parken
- Mere grønt, taxaer de rigtige steder, politi do
- Blip Systems



Predix

Offloading what needs to be done

- The task of figuring out what needs to be done is being offloaded from people to computers
 - Consumer and enterprise software
- Context is everything
 - Card based UI and focus on contextual smarts – comparisons to Google Now
 - A field engineer sent out to fix a jet engine would tote a tablet with preloaded cards related to the call
 - One might show maintenance history, the next benchmarks against others, the third a checklist, the fourth a projection on how much various repairs may save down the line
- The card should be able to slide from tablet to power plants wall sized control center screen
- The vision is to create a resource that knows exactly what needs to be done to optimize any machine any moment
- Knowing exactly which MRI machine engineer is looking at
- Wired



Smart home security

- 7 pct of americans own smart lock
 - 47 pct report they would likely buy when lock needs replacement – Sylvania survey
- Smartlocks easily hacked
 - 12 of 16 smart locks hacked
- Ransomware for smart thermostat
 - Malware can infect linux based thermostat
 - Thermostat would refuse to unlock until certain conditions are met
 - Hacker could also set thermostat so high it causes fire
 - Defcon hacker conference



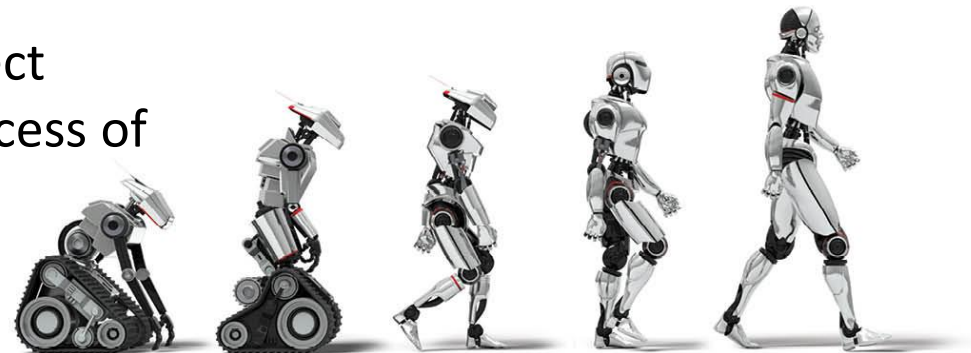
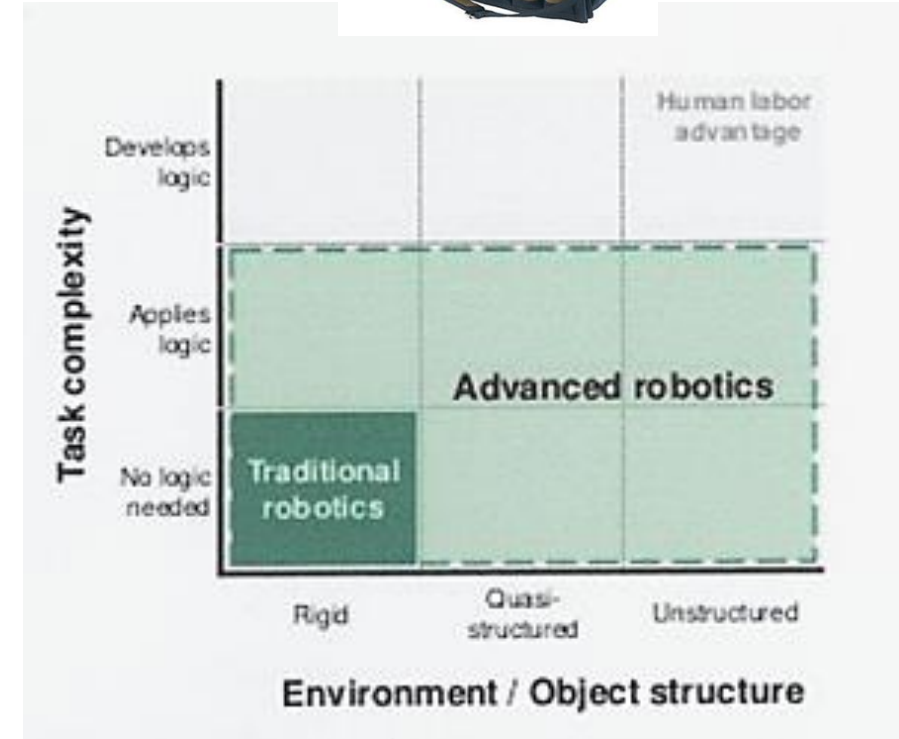
Chinese take-away

- Big oil company, when browsing the takeout menu via company network, malware was downloaded and on the network
 - The Target payment card breach gained access through heating and cooling system of retailer
 - Google Sydney lighting, elevators and video cameras was invaded through building management vendor in a research project
 - Heating and cooling systems and vending machines are remotely monitored, and often run older systems like XP
- Thingbots
 - 100.000 Linux devices sending e-mails were not PC's but routers, TV's, multimedia centers and fridges
 - Proofpoint research – techreview
 - No displays and easy to hide in plain sight
 - 23 pct of breaches was due to third-party negligence. Some estimate 70 pct
- NYTimes



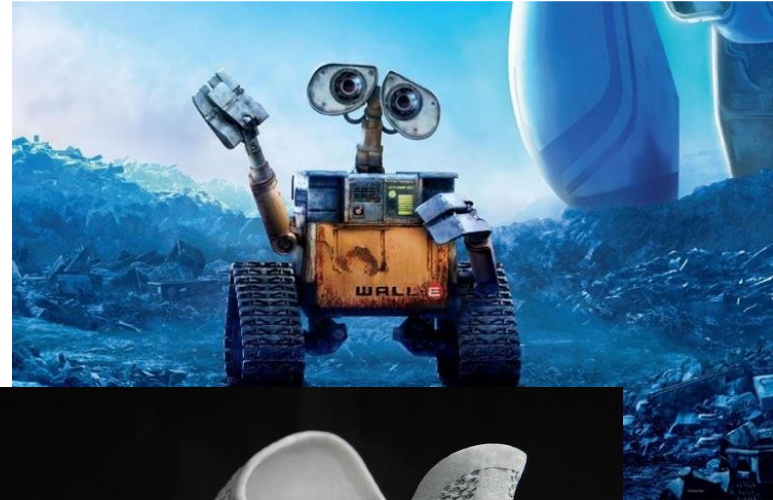
Advanced Robotics

- Able to apply logic and make decisions
- Robots that teach each other
 - Tellex million object challenge, to learn robots to recognize and handle nearly any object
 - Upload knowledge in cloud Tech review
- Phases ...
- No logic needed
 - No decision making about object
 - Often includes image processing to determine orientation/feature detection
- Applies logic
 - Arrives at a decision about object
 - Quality control/feedback on success of operation
- Develops logic
 - Creative thinking required
 - Involves problem solving Boston Consulting Group



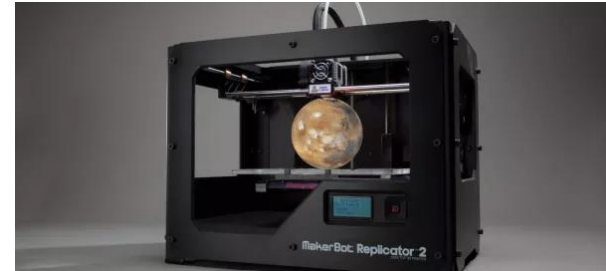
Robot Realities

- Adidas Atlanta robot-staffed factory opens 2017, capacity 50.000 pair of shoes per year. Small satellite factories close to customers. Vision. ReCode
- The era of moving factories to low cost labor area is ending
- Size of the manufacturing plant will be less important in the future
- Robotics can economically produce products in smaller lots and can be flexibly reprogrammed
- Some industries will no longer need traditional permanent production lines
- Robot manufacturing facility can easily be replicated by sending programming to robots anywhere
- Boston Consulting Group



3D Print - HP

- Multi Jet Fusion technology
- 10 times faster than laser sintering, un-used ink can be re-used, cost half of normal 3D print
- Like ink jet printer, using 30.000 nozzles to spray 350m drops per second, then expose to energy source to fuse it
- Also can create sharper colors and different textures, elastic etc
- Partners BMW; Nike
- 130k usd
- HP



Multi Modal facilities

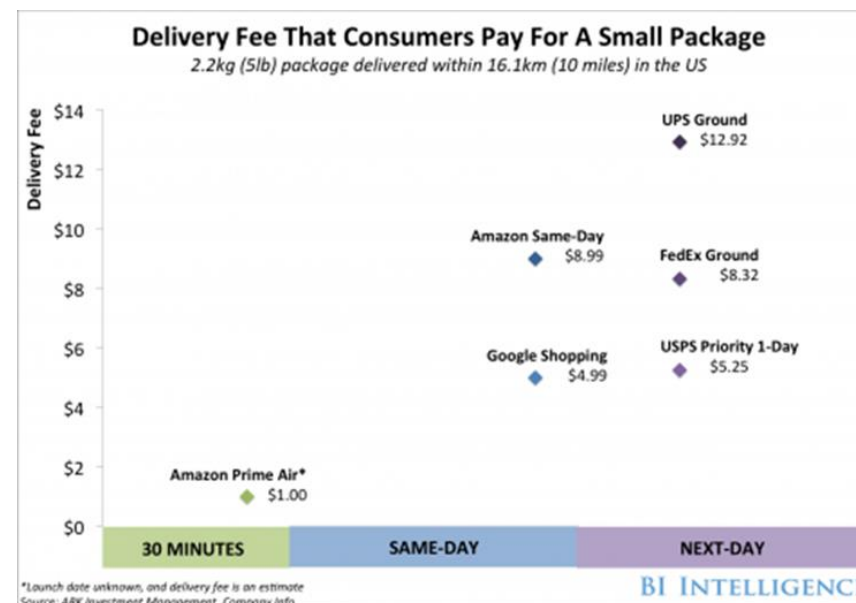
- GE in Chakan, India, serve a multitude of businesses from oil, gas to aviation, transportation and distributed power all under the same roof
- 3D printing nozzles in one process, formerly 20 parts from different suppliers, 25 pct lighter, five times more durable than old nozzle, saving 3m usd per year per aircraft using LEAP engines
- GE Oil and Gas Japan designed and printed a key part of a control valve in two weeks, previously it took two months

ZDNet



Game of the Drones

- Commercial drone market evolving
 - Industries, agriculture, energy, utilities, mining, construction, real estate, news media and film,
 - Delivery later BI intelligence
- Amazon will be able to charge 1 usd for 30 minute delivery, ARK investment management
 - 86 pct of orders shipped by Amazon weigh below 2.3 kilogram – capacity of drones – company documents
 - Amazon aim for 50 pct of US same day delivery MWPVL international
 - Cost to deliver 2 kilo 6 miles by drone 10 cents – Kiva systems
 - Amazon cost today 2-8 usd - Amazon



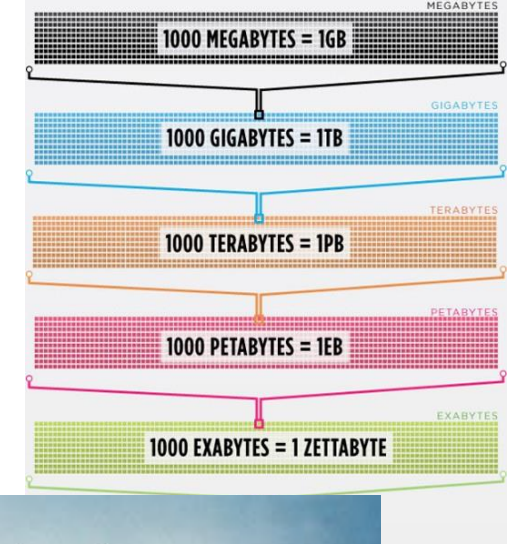


Big Data to the Edge





Big Data to the Edge



- 2025 100 zettabytes data in the world
Frost and Sullivan
- All words ever spoken = 42 zettabytes
- The largest number is the "yotta", a number that contains 24 zeroes
- Techreview

- At the moment less than [0.5%](#) of all data is analyzed Bernard Marr





Data driven companies

- The Microscope enabled us to see and measure things in detail
 - Data-driven companies outperform peers by 5 pct in productivity and 6 pct in profitability
 - Managing data, not a data forward “what do we have” fishing expedition, but deciding on what do we want to improve, what data and analyses will help us improve the decisions
- MIT/McKinsey





Elevatorer og Mærsk



- Elevator log-filer kan forudsige ledige ejendomme
- Gartner
- Mærsk bruger Big Data til at forudse hvilke kunder der snart forsvinder
- Herefter begyndte de at kigge på hvilke mønstre der kom forud for at skifte logistik selskab
- Blev muligt at forudse med 98pct nøjagtighed hvem der vil forlade selskabet
- Mandag Morgen



Proces mining og advanced analytics

- "Proces mining og advanced analytics" er en fælles betegnelse for en række unikke analyse metoder hvor igennem virksomhedens IT systemer, data og informations aktiver kortlægges og modelleres. Processen kan sammenlignes med en MR scanning.
- Arbejdsgange ved behandling af låneansøgninger
- **Ved at anvende proces mining på eksisterende sagsbehandlingsregistreringer fik banken gennemført en automatisk kortlægning af deres godkendelsesforløb**
- Kortlægningen gav værdifuld indsigt i flaskehalse, brud på compliance og sagtyper, der ikke var dækket af de gældende regler
- Proces miningen blev også anvendt til at vurdere arbejdsoverdragelsen blandt medarbejderne, hvilket blotlagde kritiske roller og input til en mulig justering af organisationen



Proces mining og



Real time analysis

From look at what happened to what may happen



- Real time analysis
- By 2017 more than 50 pct of analytics implementations will make use of event data streams from machines, apps, individuals Gartner
- From batch systems to real time systems – fast data
- From data at rest to fast data in motion
 - Fast data is perishable, great value in the moment
 - Big Data can have value over time
 - Fast data system support real time analytics and complex decision making in real-time
- Technologies work in sync, fast data in real time and big data from the data warehouse Voltodb.com





From Apps to Ambient Services EveryWare





From Commands to Conversation

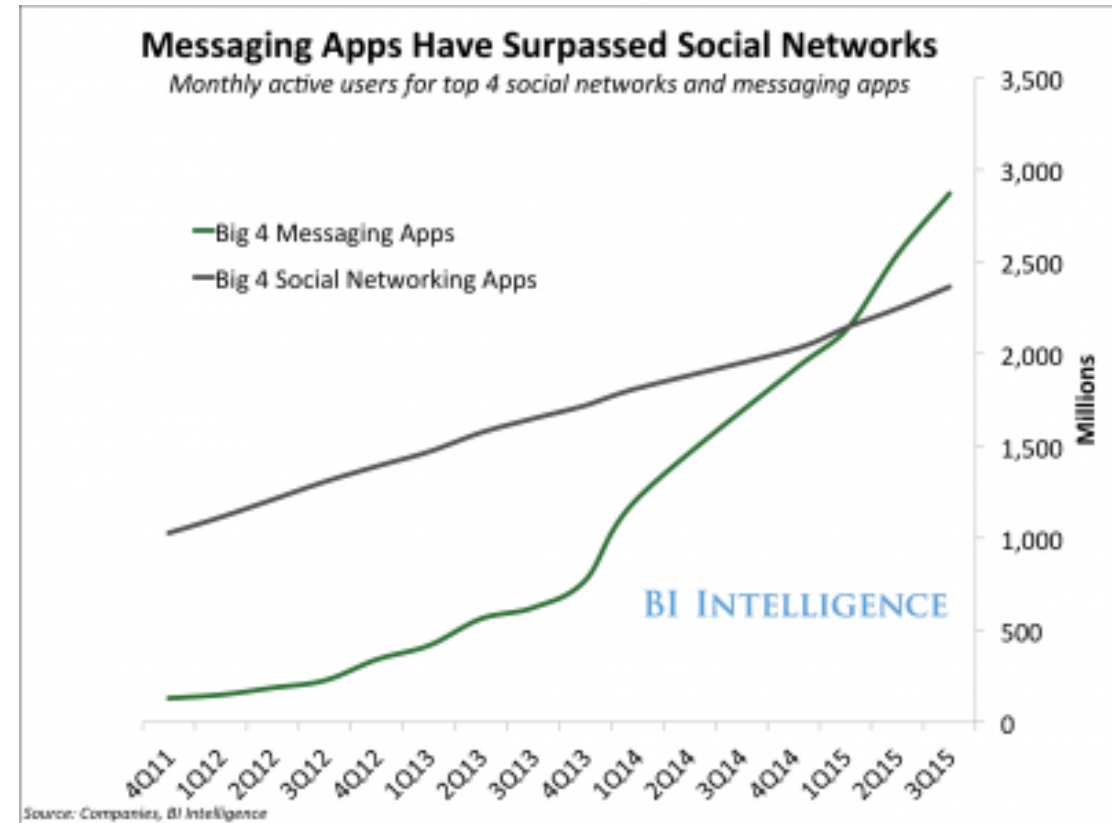


- Fra "betjene" til tale og nye økosystemer – og spillere



Umbrella apps – or ecosystems

- Apps will consolidate into larger umbrella apps
- Facebook bot store, WeChat threatens App store
- 800 users of messenger users can disrupt Apple and Google app stores
- WeChat
- Beginning as a simple messaging tool in 2011, WeChat can now help users hail taxis, shop online, and even transfer money. With each new update, WeChat is evolving towards a one-stop-shop
- Google Chennai/Pragada/Re/code/BI Intelligence
- Messaging is primed to become the new mobile home screen
- Mary Meeker



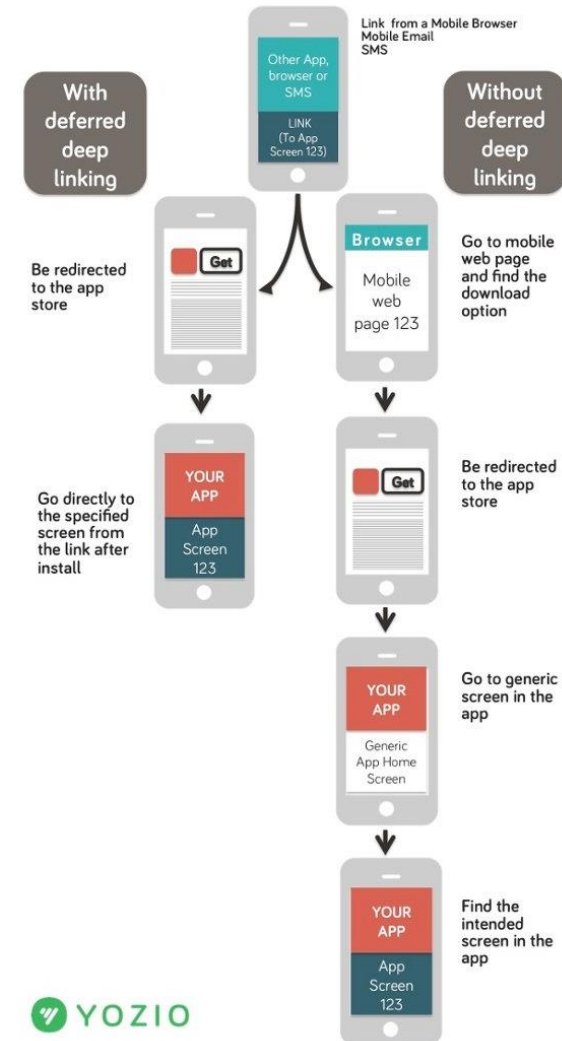
Google app streaming

- Google mobile search now includes app content and supports app streaming
 - Streaming portal is downloaded and act as a virtual environment to run apps
 - Engage with portions of apps through deep links.
 - Android developers can modularize apps, partition into small runnable parts, users are given option to download when done.
- Solve two major problems with apps
 - App friction, majority of apps are used for one-off interaction, time used to download, install, open and login frustrate users.
 - App used to pay for parking, just scan meter with NFC, access and use only part of app needed to pay for parking.
- App visibility increases as links can be promoted anywhere, including Google Search, and preview may reduce barrier for use.
- Google Chennapragada/Re/code/BI Intelligence

Android Instant Apps

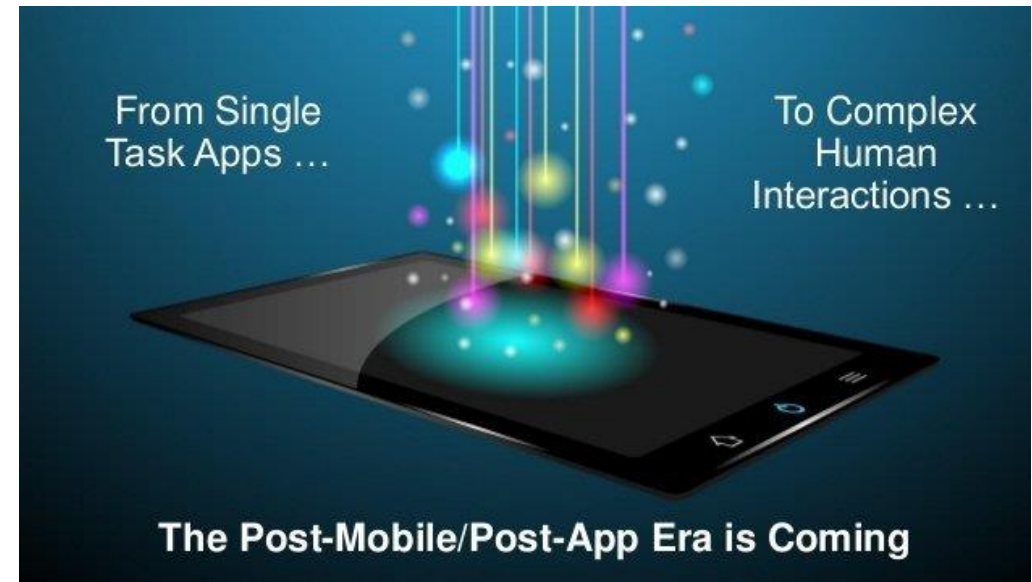
Use apps without Installation

How deferred deep linking works



The Post-app era to ambient services

- A new layer of connected intelligence
 - Sensors, cloud, connected smart devices, realtime analytics
- Living services
 - Constantly learn more about our needs, interests and preferences
 - Contextually aware
 - Able to react in real time Fjord
- A new paradigm
 - From treating computers, apps, software like tool boxes you dig into
 - To ambient services that constantly run in the background and step forward as needed
- Digital Summit/ Evernote / Frog / Ted





The Post-device Era Disappearing Computer



• Tabs, pads and boards .. And Ubiquitous Computing

- Tabs, small, wearable, centimeter scale - Smartphone
- Pads, handheld, mobile, decimeter scale - Tablet
- Boards, large, fixed, meter scale - Hub

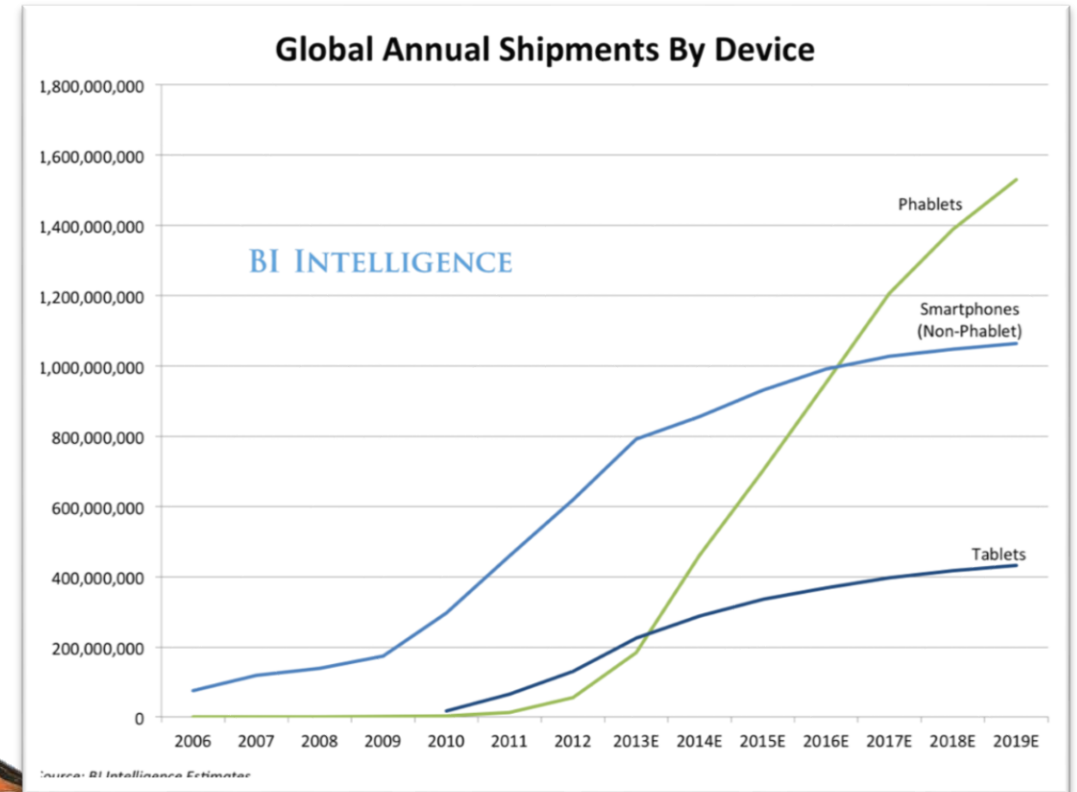
- Ubiquitous computing

- Mark Weiser, Xerox Parc Ubiquitous Computing 1990



The future is sealed, it's a phablet and it is Chinese

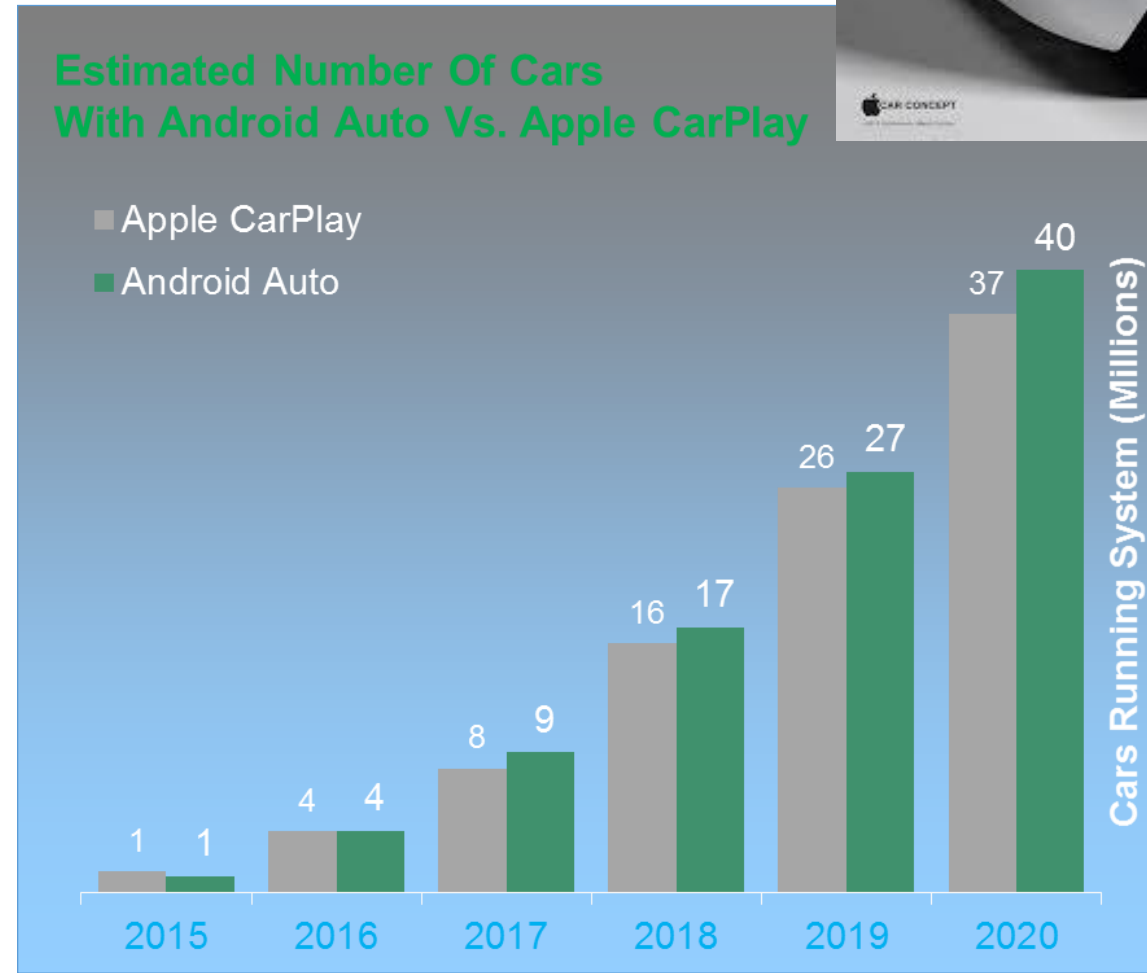
- 7 out of 10 top brands are Chinese
Counterpoint research
- Phablet 5.5" or more is winning format
- Rise of the Visual Web
- Sealed
- Keyssa - Kiss connectivity
 - 6 gigabits / sec (WiFi max 1.3 gb, USB 5 gb)
 - Transfer a movie in 5 seconds
- Coupled with wireless charging and Bluetooth could create devices without any ports at all
 - Intel and Samsung
- BWeek



Post smartphone .. a Car

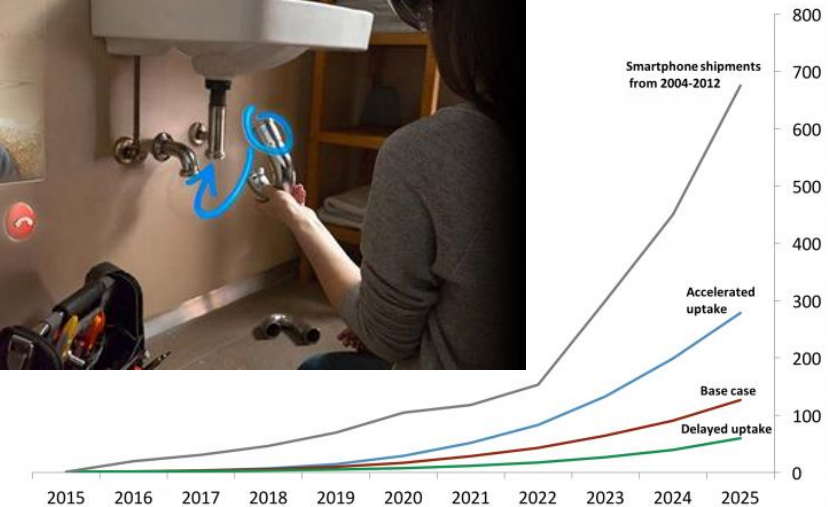
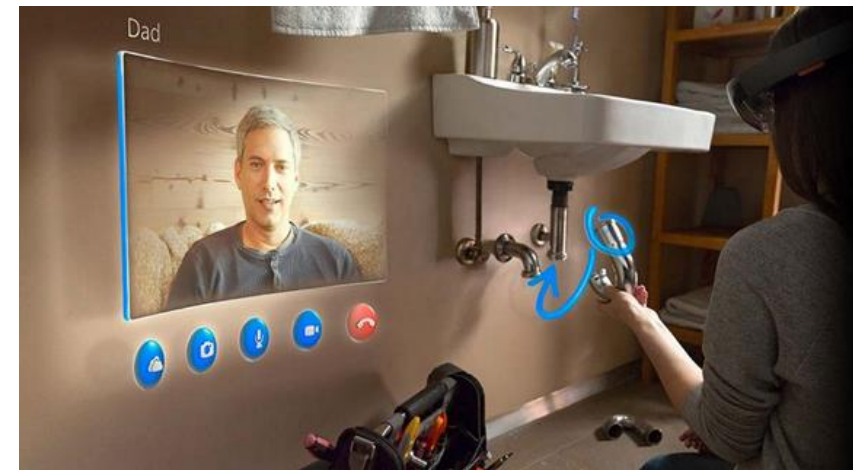


- 61 pct find it important to have same operating system in dashboard as in smartphone
Accenture
- Automakers will eventually give into the consumer demand for Carplay and Android Auto
IHS



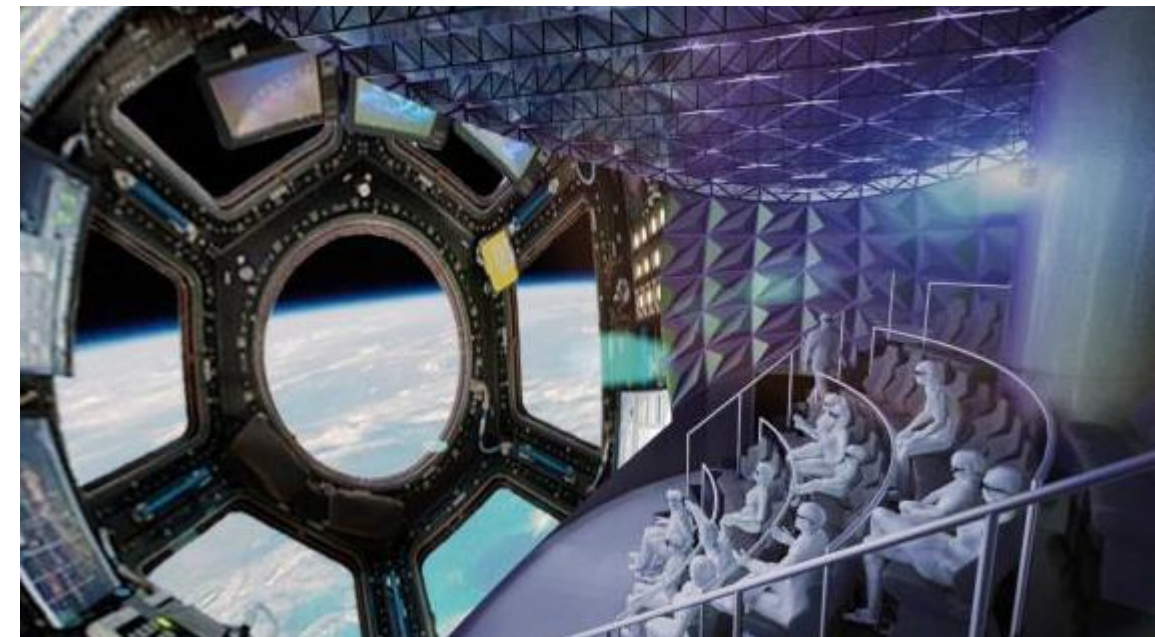
Post-smartphone.... a AR/VR device

- Augmented reality devices to overtake smartphones in 10 years CitiBank
 - May not even be a headset – contact lenses Citi / WSJ / Oculus Rift
- 43 pct of consumers expect wearables to replace smartphones Ericsson wearable tech june 2016 report
 - 50 pct of viewers would after 2 minute exposure show interest in buying Nielsen
- 100m using AR for shopping in 2020 Gartner
- Glasses, displays, contact lenses, cinema
- Magi - Capture 3D images in 4K resolution, displaying at 120 frames / sec
 - Magi Pod, 60 people 1300 sqfeet cinema, 36x17 feet curved screen with surround sound Douglas Trumbul, Magi

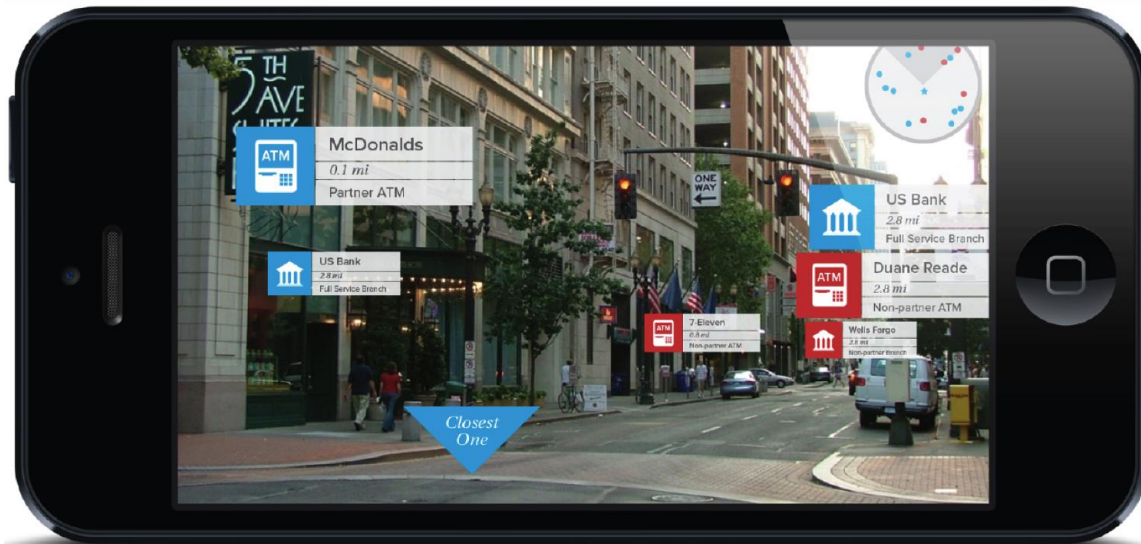


Source: Goldman Sachs, IDC, BI Intelligence, September 2016

BI INTELLIGENCE



VR Virtual Reality – Immersive AR Augmented Reality - Overlay



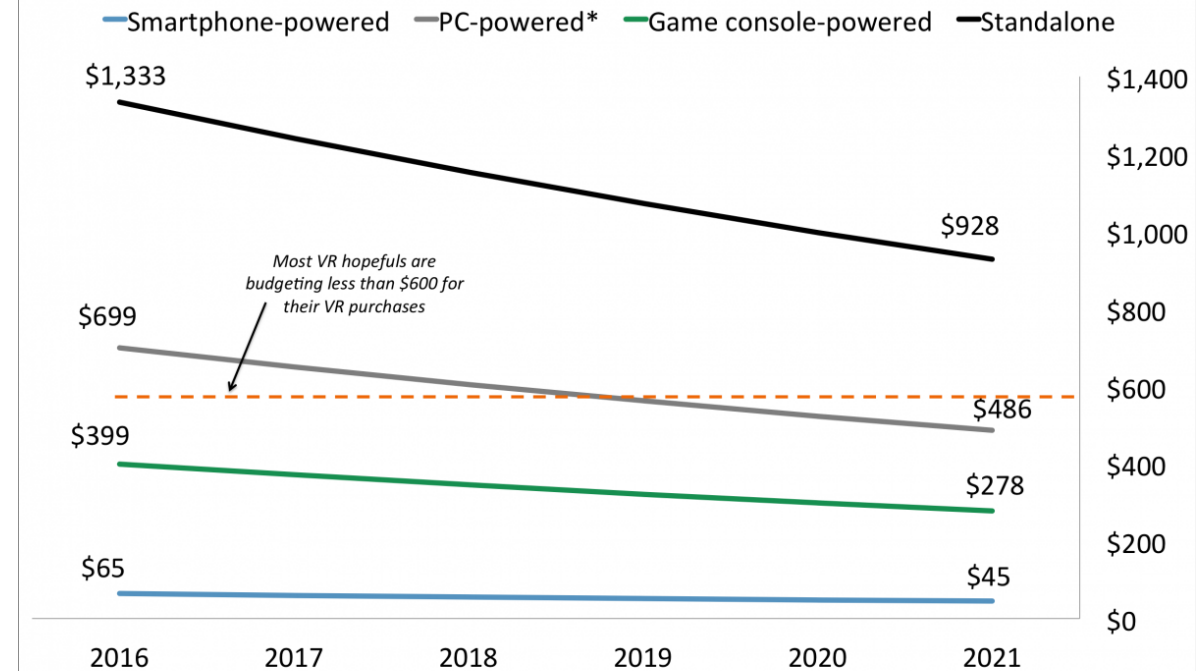
AR Players and Pricing

- Avg headset price 227 usd 2025 Citi
- Sony a potential major player, Facebook/Oculus, Samsung, Msft, Google Citi
- Apple, the big potential is in AR, most use cases not VR which is more of an immersed solo experience Tim Cook/Quartz
- Google aim to make smartphone VR, most affordable category by using Daydream VR Business Insider
- Facebook aim to make Oculus stand-alone device, cutting out price of high end PC needed today Business Insider

VR/AR Market



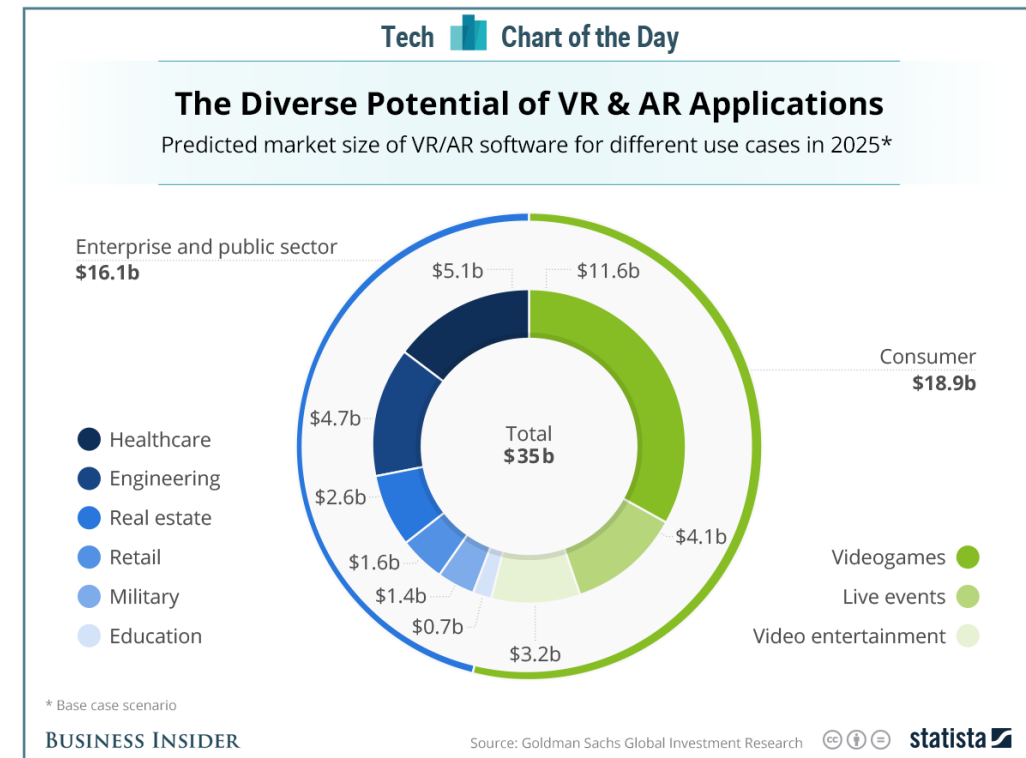
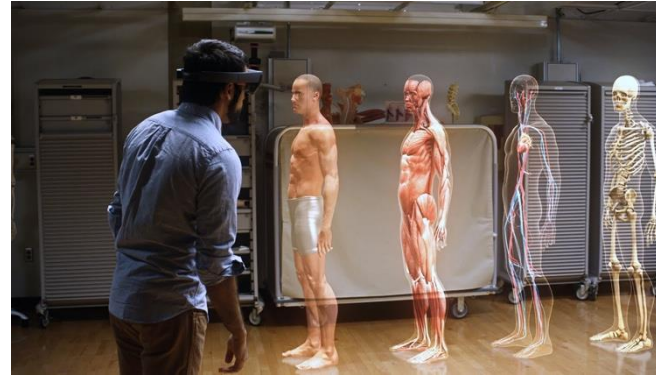
Average Selling Price Forecast For Major AR/VR Headset Categories



Note*: PC-powered headset reflect the costs of the HMDs alone without the PC cost
Source: BI Intelligence Estimates; Based On Current Headset Prices

AR applications

- Early
 - Games, movies – and concerts
- Live Concerts a ticket for virtual reality
 - Next VR and Live Nation agree on broadcasting hundreds of upcoming concerts in VR
 - Sound captured in 360 degrees as well ReCode
- Later
 - VR to be used as an interface for music makers – DJ's compose by moving their bodies
 - Show may be VR enhancement of live performance. VR allows you to invite audience into studio
 - Danger of big labels earning money from existing catalogue delaying development, VR requires content, and if they slow down format shift, history will repeat itself Lucid Trips, Soundstage, PledgeMusic – Reeberbahn Live events, remote medicine, job tasks, e-commerce and mobile commerce
 - Full length VR movies
 - Connect with families while travelling, having a feeling of closeness.
 - Breaking down the barriers of distance to have human interaction Citibank/WSJ Oculus Rift



Realistic 3D Multi Person VR

- Microsoft HoloLens, 3D people in your living room
 - Mixing reality with content, watch an acrobat tumble across your front room, witness your niece take her first steps
 - Walk around imaginary people, changing viewing angle seamlessly
- Microsoft video holograms, working to make this practical and cheap to record content
 - Made possible by sensors in headset figure out how to present object so it fits into real world
- Magic Leap / Google, Microsoft
Jaron Lanier Tech review





Holoportation

- The whole audio-video side of work life is ripe for disruption
- A lot of crappy interfaces from companies that have dominated this space for years
- Thom Eich, partner, IDEO
-
- 3D capture technology, can transmit compressed 3D models of people
- When using HoloLens, , people seem to be present in room
- Tech Review





Post Device era

- The concept of the device is fading away
 - Google CEO Sundar Pichai
- It is not enough to get them links, we need to help them getting things done
- We want users to have an ongoing two-way dialogue with Google Sundar Pichai, Google CEO
- Microsoft Mobility first is not about the mobility across devices
- It is the mobility of the human experience across devcies and all the computing in our lives Nadella





Ubiquitous Computing

- Computing becomes embedded into the world around us
 - A diffuse and invisible network
 - Embedded into our surroundings
- You wear the computer and it will be cued by the outside world,
 - Acting more like part of natural life, not interaction with a computer
- Frog Design – TED sessions



New Ways of Working From IQ to AQ

- Work with computers > work THROUGH computers
- Tolerate robots > team with robots
- Expect stability > expect change
- Experiment driven design
 - Work will become more fluid, with higher levels of improvisation and experimentation
- Knowledge work > judgment work

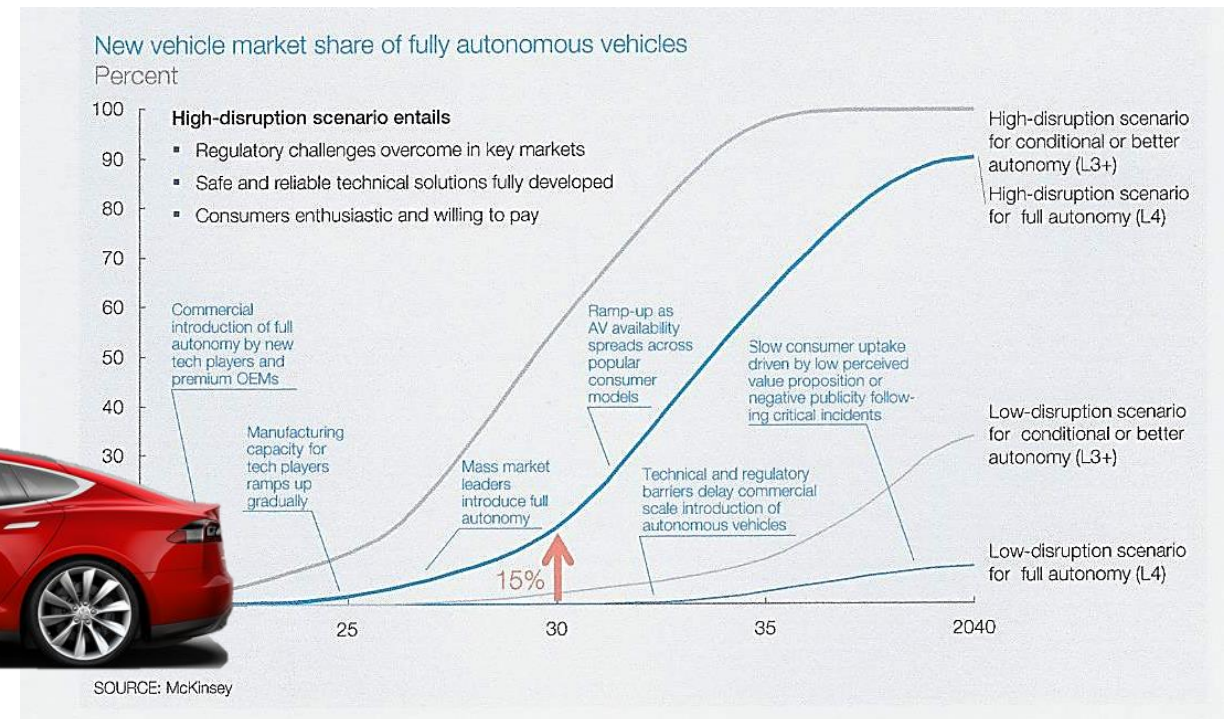
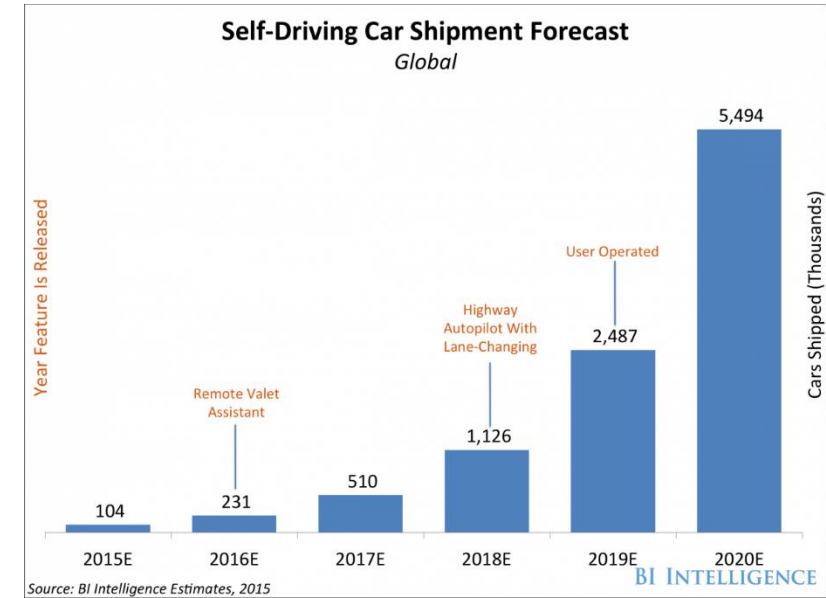
• HBR, Gartner, Tom Davenport





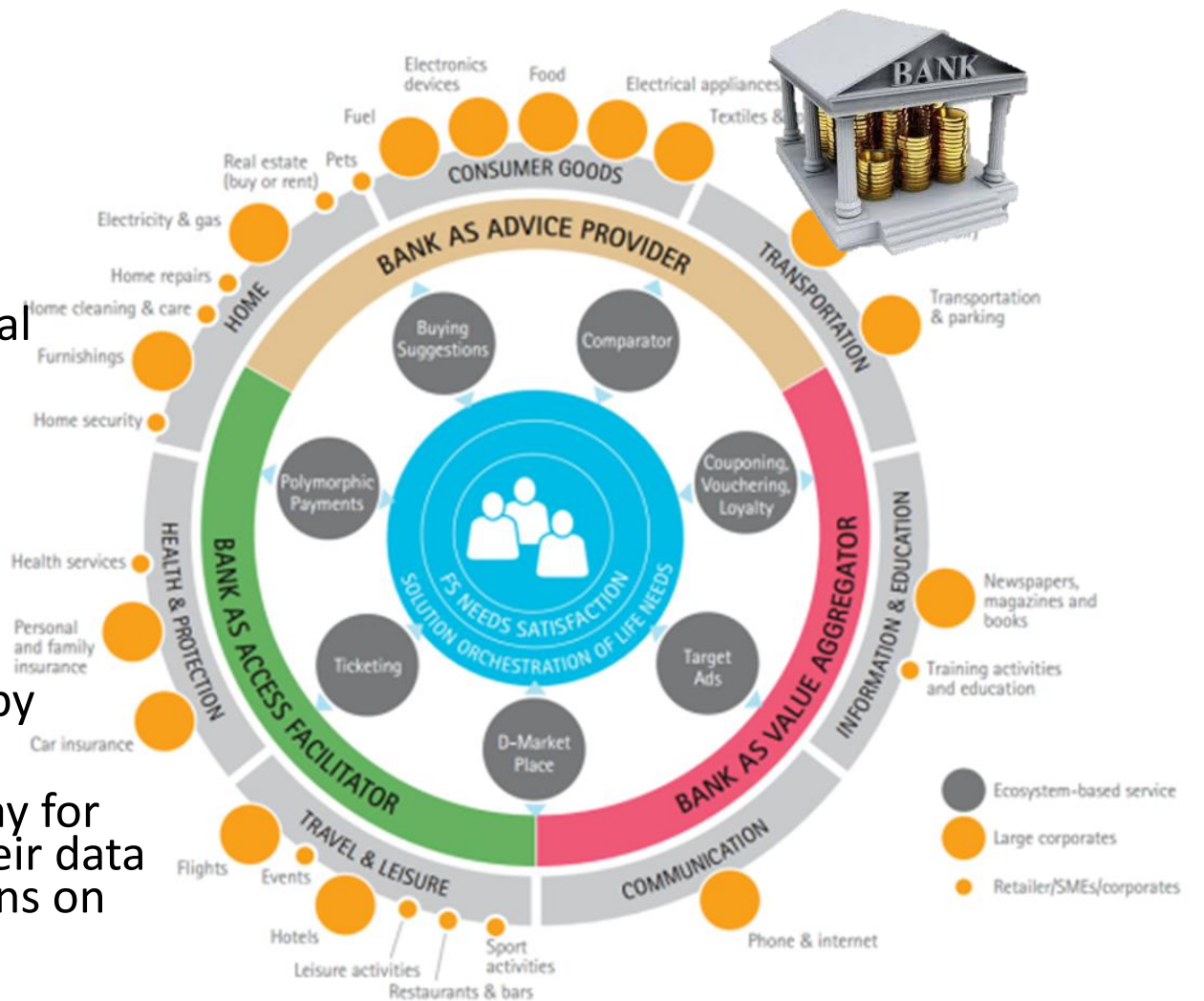
Self driving cars

- Consumer trust
 - 43 pct of consumers are ready to pay more for autonomous car (WEF)
 - 2013, Chubb group of insurance found 2/3 would not feel comfortable riding autonomous car
 - Chubb Group Insurance
 - 2015, 58 pct were likely to take a ride WEF
- Regulations
 - Volvo has said they will take responsibility if one of their cars crash
 - California aim for regulation that will allow user-operated autonomous cars by 2019
- Business insider



The Everyday Bank

- Banks will need to move beyond their traditional role as enablers of financial transactions
- Banks can offer value to customer based on transaction information
- Banks can position themselves as the center of an extended ecosystem that offer consumers benefits beyond
- An everyday bank has multi-faceted role build by collaborating to create “customer ecosystems”
- Instead of enabling them to save money and pay for things, banks have the potential to combine their data with new tools to help customers make decisions on what to buy, where and when to buy,
- Banks can be
 - Access facilitators – helping customers to discover products and services, as well as buy and maintain them
 - Value aggregators – delivering merchant funded rewards
 - Advice providers, using insights they have in buying patterns to help with major purchases, healthcare, retirement





Konklusion

- 4th Industrial Revolution
- Cognitive computing 47% af US jobs
 - IBM/Watson, Google/Deepmind, Microsoft Chatbots
- Teknologi byggekloster
 - Batterier, sensorer, kommunikation
- Internet of everything, 80b
 - Dumb, aware, autonomous
 - Smart home fragmentation, Google, Amazon
 - Industrial internet, Predix, robots, 3D print multi modal facilities, drones
- Big Data going real time & process mining
- Software to EveryWare
 - Messaging ecosystem, streaming, bot's, ubiquitous
- The Post device era, The post-device era
 - PC's, tablets, smartphones to phablets, cars, VR devices
- Forretning
 - Tele Next Gen, Bil-industrien, den finansielle sektor
- preben@mejer.com



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