

Welcome IoT Auckland



John McDermott

Carl Beck The logo for 'aeroqual' features the word in a blue, lowercase, sans-serif font. To the right of the text are three small, blue, circular icons arranged in a vertical line, resembling a stylized 'a' or a cluster of bubbles.

Patrick Verryt & Andrew Leckie



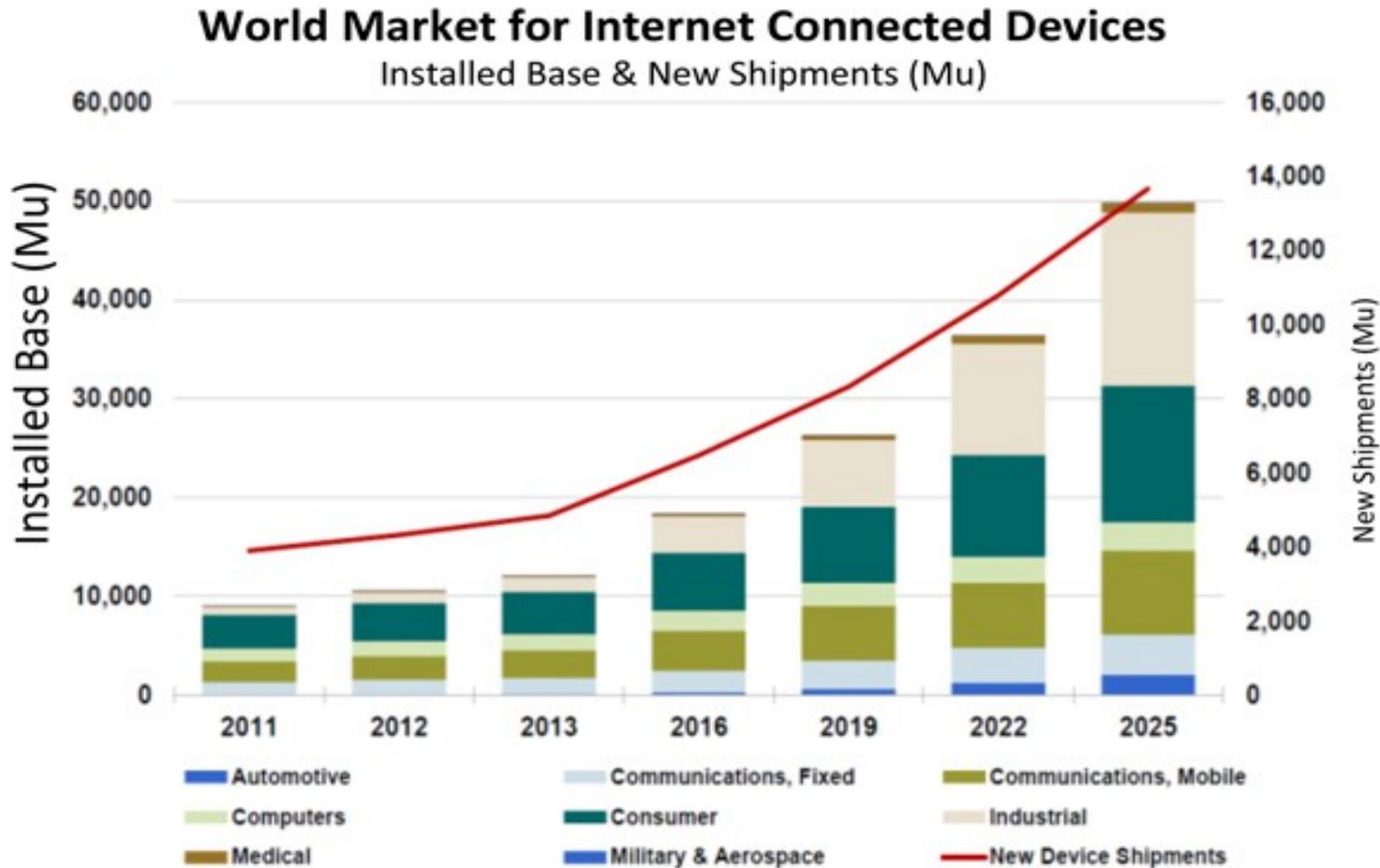
Quick Pitch

Why Are We Here?



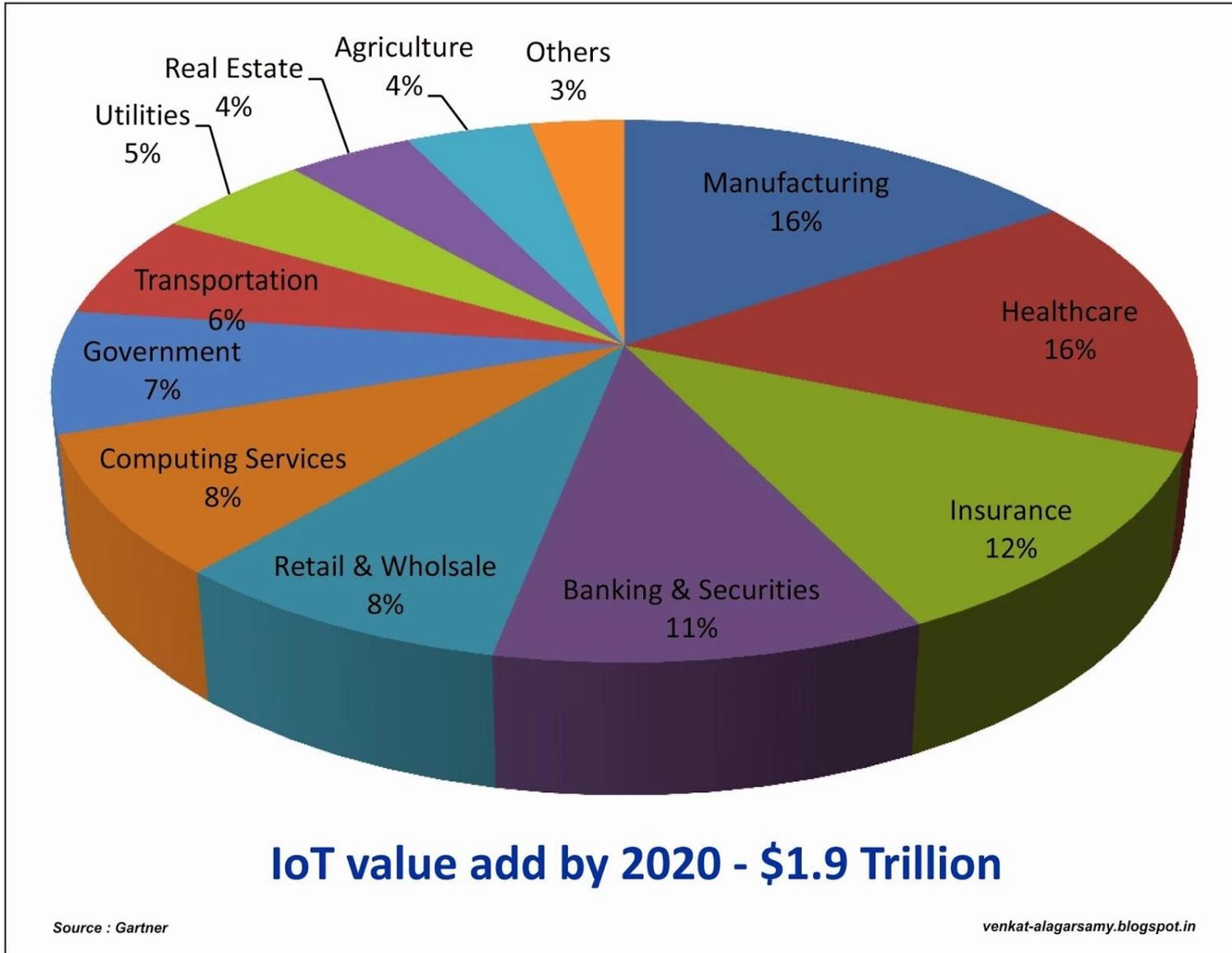
- Educate and Inform about IoT applications
- Networking
- Create applications and business opportunities
- Auckland as a IoT centre of excellence

IoT - Are We Ready?



IHS: US\$50 billion by 2025 14 billion devices per annum

2020: US\$1.9 Trillion



Many IoT Sectors



Vehicle, asset, person & pet monitoring & controlling



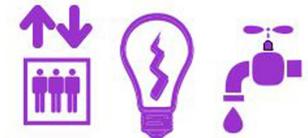
Agriculture automation



Energy consumption



Security & surveillance



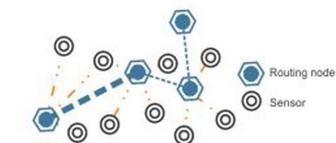
Building management



Embedded Mobile

Internet of things

Everyday things get connected for smarter tomorrow



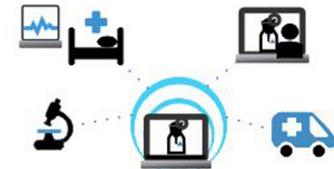
M2M & wireless sensor network



Everyday things



Smart homes & cities



Telemedicine & healthcare

How Did We Get Here?



Industrial Process Control

Isolated m2m systems

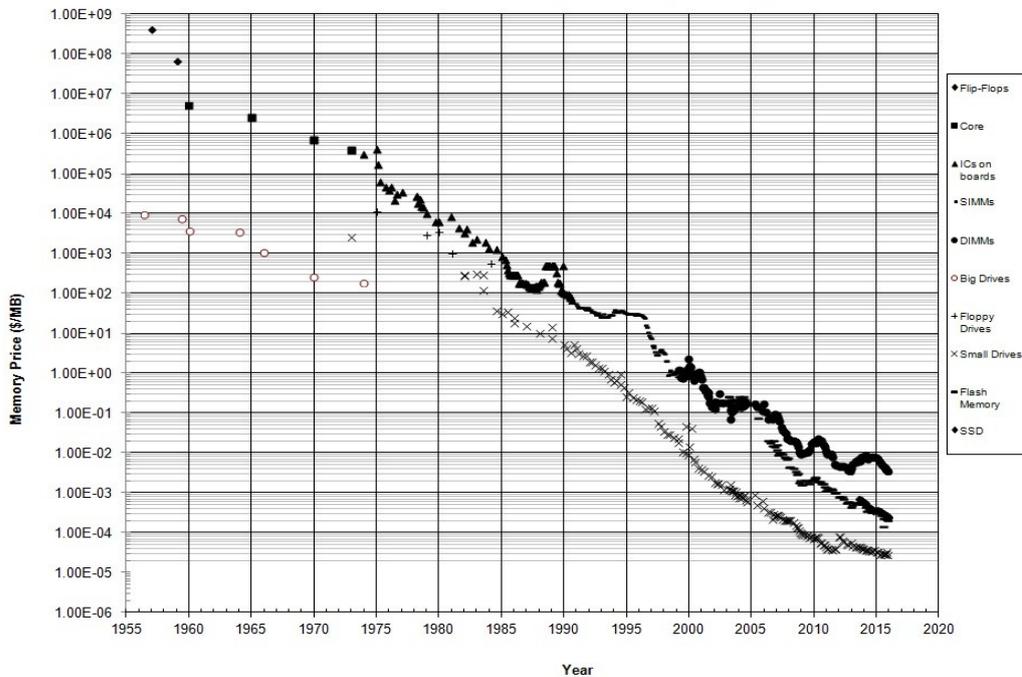
Wireless Communications



Technology Cost Falls

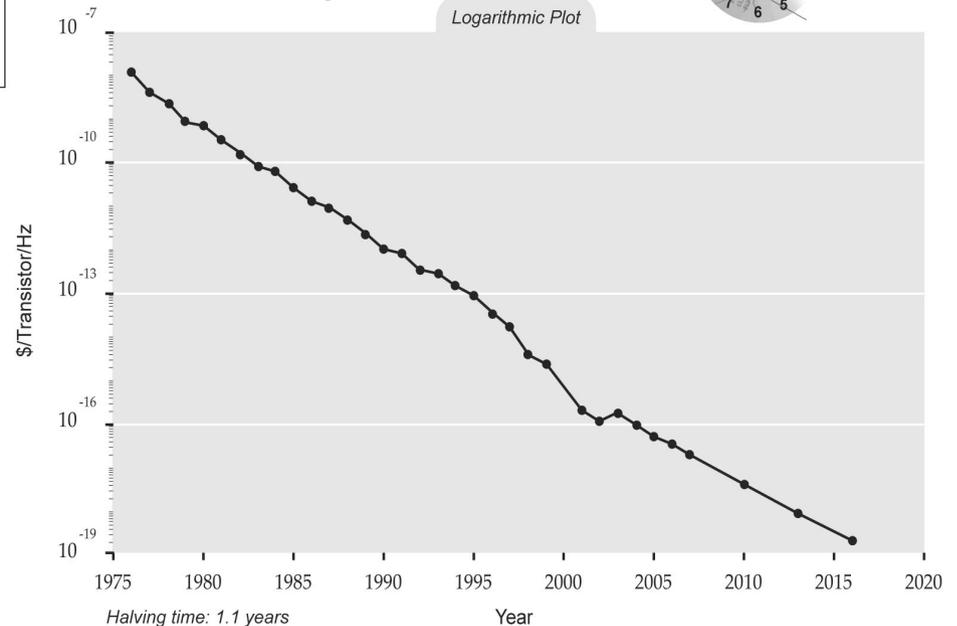


Historical Cost of Computer Memory and Storage



Memory cost
 1960: 1 Byte = \$5 2015: 1GB = 10c
 X50 billion cheaper

Microprocessor Cost Per Transistor Cycle



Processor cost halves each year
 x100 billion improvement in 40 years

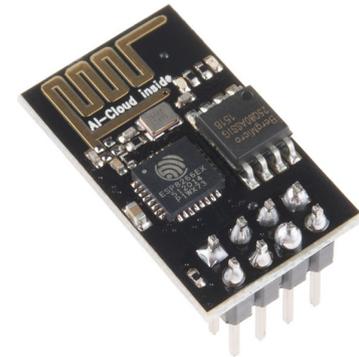
We Are at the Tipping Point



1965 PDP-7 with Unix
\$72k (=\$540k 2015)



Raspberry Pi zero with Linux
\$5 (x100,000 cheaper, 4,000 faster)



System-on-chip Wifi modem,
processor 1MB flash
\$7



NFC temperature sensor
\$2

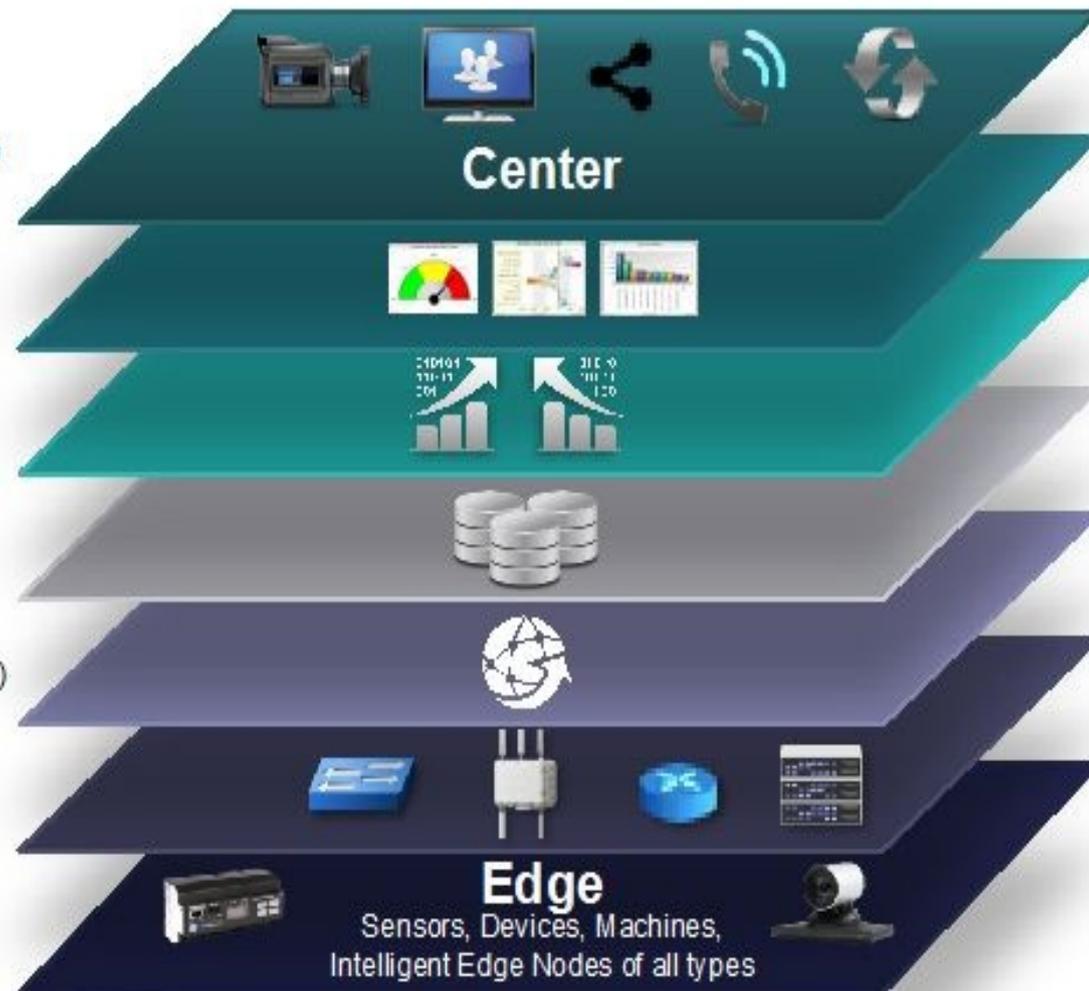
Pieces of the Puzzle



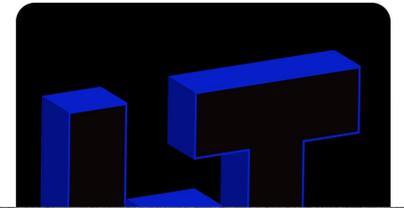
Internet of Things Reference Model

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)



IoT Landscape



Internet of Things Landscape 2016

Applications (Verticals)

Personal Wearables Apple WATCH, Samsung Gear2, pebble, motog, LG, HUAWEI, CAEDEN, MOTIV, textronics, BDO, IONIX, Jewelbots, nymi, RINGLY	Home Automation nest, LIFX, Honeywell, SAMSUNG, CHAMBERLAIN, Devices, beikin, WEMO, icontrol, SAVANT, ecovent, ecobee, SHIVAIR, LIGHT, SENTRY, Q, view, OLUTRON, ORVISO, leviton, SOMFY, roosts, tado, KEEN	Vehicles Automobiles INRIX, Waze, AUTOMATIC, STREETLINE, dash, Zbic, navdy, Automile, vinli, Airbiquity, OpenXC	Enterprise Healthcare STANLEY, AUGMEDIX, VERSUS, amcio, vitalconnect, Novasom, Omim, Senseonics, PEERBRIDGE, vivify, AIRSTRIP, Sotera, Medica, INFOBASIC, TeleTracking, Pneumac, PRISTINE, Wellgate	Industrial Internet Machines CATERPILLAR, SIEMENS, BOSCH, GE
Fitness JAWBONE, fitbit, romtom, GARMIN, NIKE, H, MISFIT, BASIS, nuami, Microsoft Band, ATLAS, mapmyfitness, RunKeeper, LUMO, amigo, LifeBEAM, ATHOS, lark, senSoria, WHOOP, striviv	Hubs nest, INSTEON, IRIS, BOSCH, SmartThings, connect, iRule, Control, ivee, wink, vera, prodea, NINJABLOCKS, Fluent, NEXIA, zonoff	Autonomous Google Self-Driving Car Project, TESLA, DAIMLER, UBER, CYRUS, QUANERGY, DELPHI, NOVARANT, Aironomy, Peloton, Valeo	Retail euclid, theatro, PRISM SKYLABS, hihu, cloudtags, GIMBAL, PHUNWARE, NOMI, VARIABLE	Energy Schneider Electric, Iron, enlightened, SolarCity, ENERCON, Trilliant, enovo, ENERCON, e-on, Outsmart, enbala, EnergySavvy, HydroPoint, lucid, SilverSpring, ENERYSAVVY, HydroPoint, Blue Pill, AutoGrid, Panasonic, Telemecanique, Festo
Health Withings, kinsa, TELCARE, NeuroSky, holo, Thync, beam, QUANTUS, proteus, SGLY, Gingerio, iHealth, EarlySense, XETHRU, nanowear, vessyl, beddit, sano, holo, CHROMA, eyeSmart, GLOBAL KINETICS, AchereTech, AliveCor, PROPELLER, HEALTH, Geogig, IDP	Security eugust, SCHLAGE, Kwikset, dropcam, canary, vivint, SimpliSafe, ring, XIIVI, evercam.io, Locktron, KeyMe, cocoon, SEEK, LATCH, scout24	UAVs DJI, sDR, Parrot, Airware, LILY, CyPhy, SKYCATCH, SKYDIO, YUNEEC, DroneDeploy, H2XO, DRL, SKY FUTURES	Payments / Loyalty PayPal, shopify, Square, Verifone, payleven, belly, coin, cantaloupe, 8CS, SHOPKEEP, ciright, LevelUp, DUBAI	Supply Chain Fleetmatics, Impiny, VILOC, Omni-ID, SkyBiz, SMARTDRIVE, Telegis, assetpulse, WEFT, Blue Pill, AutoGrid, Panasonic, Telemecanique, Festo
Entertainment SONOS, ROLI, Narrative, doppler labs, Electric Objects, neural normal	Family nucleus, ily, HALO, Glow, Good Night Lamp, FILIP, bellabeat, menbaby, ovuline, livescribe, LULLY	Sensing i, netatmo, leeo, ambient, birdi, AWAR, CUBESENSORS, wolly, sense, TRANSFORMAIR	Smart Office LogMeIn, CRESTRON, kisi, Robin, BUILDING, CLEAR, XORA, EB eventboard	Robotics amazon robotics, ABB, CLEARPATH, HARVEST, relliq, Boston Dynamics, KUKA, ROBOTIX, EMPIRE, LIQUID, ROBOTICS, tempo automation, OPENRV
Sports STRAVA, WILSONX, Babolat, PELOTON, ZEPP, ARCCOS, INFORMATION, ruccon, swingstyle, GOLF, X, UBOOLY	Toys qnri, sifto, MAKIES, Lively	Pets Whistle, Petnet, EDYN, plant, iotera, Athenitek, TrackR	Infrastructure World, SENSING, TACHYUS, mTest, ELTAV, Smart Cloud, M2M, SMARTSTRUCTURES, LUMASENSE, SensorLogic, GROUNDMETRICS	Industrial Wearables GLASS, DAQRI, parsable, BITSTEW, GUARANT, waveLink, APX
Consumer Robotics ALDEBARAN, jibo, iRobot, RoboLabs, HACHIKO, Petcube	Garden EDYN, plant, iotera, Athenitek, TrackR	Trackers iotera, Athenitek, TrackR	Bicycles / Motorbikes SOLID, HAMMERHEAD, superpedestrian, gogogo, SKULLY, SKYLOCK	3D Printing / Scanning: BOYSYSTEMS, Project Tango, intel, REALSENSE, stratasys, occipital, occipital, matterport, formlabs, DESKTOP METAL, Carbon, BotFactory, shapeways, scultpteo, voodoo

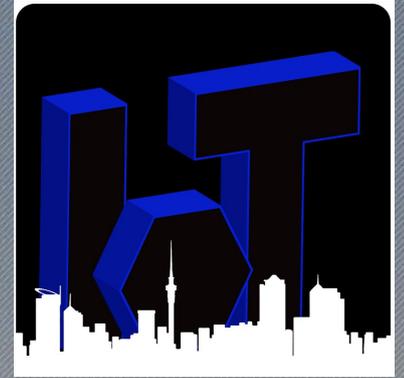
Platforms & Enablement (Horizontals)

Software xively, Axeda, Jasper, Ciemely, Ayla Networks, ThingWorx, IFTTT, Numerix, seebo, M2M, wot.io, davra networks, ZATAR, covisint, AUTODESK, SECCONTROL, PubNub, thingsquare, BSQUARE, greeneye, M2M, WSilica, InnoPath, xipositive, machineshop, C3, lot, arrayent	Full Stack samarsa, EUROTECH, Predix, Telit, Developer: electric imp, TESSEL, resin.io, Particle, theThings.io, KONEKT, Wozom, SensorCloud, NewAer, Analytics: splunk, sumologic, STRATOSCALE, iobeam, KAAZING, Templo, UPTAKE, glassbeam, Sensor Networks: placemeter, SAFECAST, SST, MotionLoft	Connectivity SIGFOX, SIERRA WIRELESS, NEUL, FILAMENT, aeris, iNGENU, VENIAM, KORE, intamac, skyroam, ARKES, senet, acility, Security: Symantec, gemalto, Bastille, inside, MOCANA, NEURA, SHODAN, escript, SecuriThings, CyberFlow, OWASP, Open Source: KAA, ThingSpeak, iot, webinos, openHAB, nimbits	Interfaces Virtual Reality: oculus, VIVE, PlayStation VR, Samsung Gear VR, OSVR, Augmented Reality: Microsoft HoloLens, magic leap, Meta, SONY, bippar, zSpace, VUZIX, EPSON, PARACOSM, Other: amazon alexa, THALMIC, nod, EMOTIV, LEAP, SIXSENSE, ivee, RYTHM, Omni, api.ai	3D Printing / Scanning: BOYSYSTEMS, Project Tango, intel, REALSENSE, stratasys, occipital, occipital, matterport, formlabs, DESKTOP METAL, Carbon, BotFactory, shapeways, scultpteo, voodoo, Content / Design: Sketchfab, Thingiverse, GRABCAD, AUTODESK, BODY LABS, FLOORED, DASSAULT SYSTEMES
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Building Blocks

Hardware Processors / Chips intel, QUALCOMM, TOSHIBA, TEXAS INSTRUMENTS, Atmel, ARM, LG, SIEMENS, NP, Movidius, Sensors: NXP, Atmel, TEXAS INSTRUMENTS, NATIONAL INSTRUMENTS, libelium, psickick, Qualtre, MEMS, VALEN, ELL, PetaSense, XERAFY, skyetek, mCube, MOOG, ThingMagic, Parts / Kits: ARDUINO, raspberrypi, initio, Octopart, relay, adafruit, Charging: uBeam, WiTricity, AMPY, Mobile OS: ios, android, Brillo, HomeKit, BlackBerry	Software Cloud Google Cloud Platform, cisco, IBM Watson IoT Platform, Microsoft Azure, amazon WEB SERVICES	Connectivity Protocols WIFI, Bluetooth, ZigBee, LoRa Alliance, MQTT, NFC, WAVE, AMQP, M-Bus, MIWV, XIO, THREAD, HART, BITX, DDS, RFID, CoAP, RuBee, 2G, 3G, 4G, LTE, 6LoWPAN, LWM2M, DDS, LIDAR	Telecom verizon, at&t, T-Mobile, Sprint, airtel, Telefonica, China Unicom, US Cellular, Vodafone	Consultants / Services IDEO, Dragon Innovation, MESH SYSTEMS, PTC, pch, R/GA, 3D HUBS, makexy, alifix, 8	Partners Retail amazon, Walmart, BEST BUY, apple, Target, Lowe's, Manufacturing: foxconn, flex, JABIL, PEGATRON, Benchmark, Celestica, Funding: KICKSTARTER, AngelList	Incubators techstars, Highway1, LEMONS Labs, HAX, BOLT
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The Internet is Thing Ready



- **IPv6 – ability to address billions of things directly**
- **Cheap connections, especially wireless**
- **Cloud computing – platforms, storage, analytics and applications with API's for integration**
- **Security – trusted and managed**
- **Visualisation of data – 4kHD, AR, VR**

IoT is Human Centred

