The Internet of Things Isn't

A thought leadership briefing
on profiting in the Next-Gen Internet

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The Next-Gen Internet will radically change not only how we interact with everything but also who we are. This paper describes the NGI's characteristics and consequences – including the rise of Homo Cumulatus – and how the NGI will subsume the Internet of Things.

The next wave of the Internet is not the Internet of Things (IoT). That is a big misnomer and an unfortunate umbrella term that, like Big Data, is often just not helpful in seeing a movement or phenomenon clearly and seeing where it's going.

After Jim Barksdale left my alma mater, FedEx, and went on to an almost unheard of little company called Netscape, he said, "The Internet will change everything." The Internet has indeed changed so much. And the Internet of Things will change much more.

The Next-Gen Internet is a network of things, patterns, behaviors, humans – and humans as network nodes – augmentation and aggregation that will bring more change than we have seen in generations.

While much of the IoT's future is foggy and is yet to be invented, it clearly exhibits the patterns of just the beginning of something. I refer to the new Internet as the Next-Gen Internet or NGI. It is a network of things, patterns, behaviors, humans, augmentation and aggregation that will bring more change than we have seen in generations.

While clearly not intended to nail the near future 100 percent, I hope this commentary will drive focus, debate, creativity and action in a better, more directionally correct path.

The combination of three things will define the NGI, the Internet's next wave:

- Human beings will have embedded IP nodes; the human will be a network node. I pitched this in October 2007 at the Aspen Partners to help think through the mobile space. It is now upon us, and it will change everything.
- Many, many **things** will have IP / network nodes embedded, and their flows of information will be new and truly useful.
- We will move beyond just data analysis and clever math, machine learning, predictive analytics, etc. We will watch networks of human and synthetic data behave, and that behavior will create new questions and opportunities.

The NGI will radically change who we are and how we engage with service, commerce, the environment, ideas – and, yes, other humans.

The end of Homo Sapiens and rise of Homo Cumulatus

What we today sometimes think of as the Internet of Things is the beginning of Homo Cumulatus. Just as 40,000 years ago Neanderthals disappeared and the era of Homo Sapiens began, we will see the rise of Homo Cumulatus and the decline of Homo Sapiens. (Yes, there is an overlap. Neanderthals interbred a bit with Sapiens; most of us have met individuals with a bit too much Neanderthal in them.)

Cumulatus means augmented and also can mean aggregated. The businesses that understand that the new human will be an aggregated human and an augmented human in a sea of IP connectivity and sell into that, design for that, service for that, will win.

The business case … or raspberry pies, newborns and Uber

Let's begin our look at the NGI by looking at three key characteristics:

- How it's associated with raspberry pies, newborns and Uber
- Why it is not an Internet of Things
- Why this is just beginning

The NGI is not really an Internet of Things at all. It is three other things. In one way it is a newborn baby, but it is also a raspberry pie. And it is an economic game changer.

Three factoids

- The FX trading daily is about $6T (yes, T)
- By 2020, 100B+ items/things will connect uniquely to the Internet
- By 2020, we'll see a global GDP of about $95T

There is reasonable, rational, realistic analysis by informed smart folks that says the Internet of Things will have huge impact across smart utilities, smart auto, smart cities and smart buildings, and all that will have a GDP impact of $10 - $15 trillion over the next decade.

That sounds like a lot, but how connected are we today and how much waste/opportunity exists in our global economy? So, yes, there is certainly an economically feasible case – and it's huge.

Let's make that case.

The pie first

You really like raspberry pie. There are three for sale. The pies are all good. But Pie Two is better and cheaper. Pie Three is a bit cheaper and slightly more delicious then Pie Two.

Pie One is at the local bakery you walk by on the way to work two blocks from your apartment. Pie Two is also in your neighborhood, but it is in a unique shop that is a three-story walk-up and requires you to jump through a hoop of fire to enter and then roll dice, and if you hit a prime number then the store will sell you Pie Two … but if you don't hit a prime number, you have to go back downstairs and repeat the process.

In addition, the most awesome, Pie Three, is actually on sale today for people in your market segment; but unfortunately the location of the pie is only known to the NSA, so there is no chance you will ever find it (in fact, you have no knowledge of Pie Three's existence).

The majority of markets today work like the three raspberry pies.

There are so many markets, revenue flows, diffused foggy supply-and-demand segments, B2B layers and poorly engaged consumers that are analogs of the raspberry pie mess/opportunity. The majority of markets work this way today. The NGI will begin to alleviate this and mine these profit pools.

Now the newborn

The beginning pattern in complex things is something we often don't recognize. Knowing something and recognizing its pattern in a useful way are two different things. The NGI will help with that in many ways.

So what does the early pattern for explosive growth, change and complexity look like? Visualize a three-month-old child. Visualize the same human 10, 15 and 20 years on. That is the pattern evolution. NGI today is a three-month old – a lot of input and output, discovery and learning happening at a quick pace. Quite a marvel in many ways. But it is nothing compared to what the NGI will be.

We can think about the NGI as a broad penetration of things into the existing tech/IP fabric and a smart responsive multi-dimensional net of nets. The entire thing will largely rest on the profitable elimination of friction/waste in the pursuit of existing and new profit pools. The IoT isn't a thing. It's a convenient and occasionally useful umbrella term we created. It's like Big Data – but it is even foggier and more confusing.

The Next-Gen Internet will cluster into two things

- An Internet of friction / waste killers
- A pragmatic layer: the Internet of patterns and meta things

Commerce is primitive and broken today. There are myriad markets where the inventory doesn't have a common nomenclature, consumers lack visibility into the clumps of variegated dispersed supply, pricing is opaque, value analysis is difficult and the marriage of supply to demand is failing and haphazard. Layer on top of that a generalized service deficiency and a lack of experience metrics of any sort. We often also have regulations that additionally obfuscate markets even more and move them away from a clear interaction of supply and demand.

These are the raspberry pie markets, and most markets work that way. That is changing slowly.

Now the Uber aspect of the NGI business case

Think about all the players just in New York that vied to supply the personal transportation market. Think about how a consumer would have to know the mini cab company, or flag down a taxi, or find a gypsy cab or set up transportation in advance.

Then think about the general service levels, pricing variability, experience variability and the overall low utility because there was so much friction in finding, getting, using and paying for this simple service.

What size could that market be and how much consumer utility could it have if that friction were eliminated by a networking of things and simply creating a better, less friction-oriented set of processes?

That is what Uber did. It walked up to the giant messy profit pool opportunity and owned it despite some stakeholder missteps and brand management issues. Uber's internet-of-connected-things approach allowed it to aggregate an unaggregated market. Kudos to Uber. But, really, they started at third base; they didn't really hit a triple.

It's just the tip of the iceberg

The icing on that cake is that this network model, like all of them throughout history, also allows for a huge increase in asset utilization.

Having said that, that is just the tip of the iceberg. What else can we learn, fix, offer or improve to that ecosystem of data? What other experiences and commercial opportunities are latent for the nodes in that now aggregated and augmented Uber network? Ditto for users of Waze.

So it's not just about the raspberry pie markets that have friction and fog between demand and supply but also about those that have asset-utilization opportunities, which often is just the mathematical flip side of that demand/supply mismatch coin.

Uber landed smartly in one of those friction-laiden market spaces. They didn't invent a market. Other great examples are Airbnb, GrubHub, Keychain Logistics and Waze. Waze is of particular interest as it aggregated patterns of data from human nodes to create a very valuable service.

A huge part of this change is tied to the fact humans now have an embedded IP node – or close to it: the smart thing that we used to call a phone. This allows for Cumulatus … augmentation and aggregation. Every human will have an Onboard Diagnostic Port (ODB) that is used for their info exhaust and their networks' exhaust. Things and patterns of things will have ODB ports. The ODB is something the automotive industry adopted to move beyond the "idiot light" that alerts you are running out of oil, gas, brakes, etc. GM did some very clever early work in this area. Your car would email you. It can easily be a two-way information path.

As applied information networks become inherently more proactive and preventative, new opportunities and profit pools will be clear.

Anyone in manufacturing will tell you that generally fixing a problem in design costs 1X - 10X, fixing it in production costs 100 X and fixing it after it's been sold costs 1000 X. This isn't just true about manufacturing; it's directionally true about all economic flows, services and experience.

As NGI data behavior is better understood and applied information networks become inherently more proactive and preventative – not just the tech network layer but what the networks support in the real world, like being alerted to change routes because there is a traffic jam beginning to form a few miles ahead, new opportunities and profit pools will be clear.

Finding the NGI profit pools

What other markets are ripe for Cumulatus-based change? Here are a few.

- **Power.** Buildings account for about 40 percent of New York's power consumption. The buildings don't really talk to the patterns or the meta things of the IP embedded nodes (humans) that use the building. There is huge friction and waste. The distribution model for power has a similar set of problems.

- **Autos.** Cars are massively under-utilized assets. As cars continue to move towards part of how smart I am, the choices I make and real utility versus who I am and part of my self-image, we will see change accelerate in this area. That I am cooler and better looking and a better stronger man because I drive a Ferrari never was true and will become less "true" as fewer folks believe it.

Technology and next-gen data analytics married to very clever applied mathematics will be the winning combo for profit … assuming you get your service design right.

Smarter semi-autonomous cars with network meta-thing-level information connectivity changes insurance, asset utilization, sales models, usage patterns and, of course, traffic. Mathematically connecting cars into train-like convoys and adjusting traffic lights to accommodate smart pulsing of those convoys may eliminate a huge chunk of traffic. Semi-autonomous cars doing what would normally be bus routes will work … it has worked in Mexico for 60 years. Beyond that, the car is a floating tub of software connected to many networks with human IP node(s) inside it. Surely there is so much more to its utility than moving folks around. It should be the toll gate to 20 other related networks I need help in while I am just sitting there as the car is in motion.

While there are huge regulatory hurdles to overcome, the distribution/sales/dealership model is also massively inefficient – and the last thing you would design for a consumer.

- **Brokers.** How many sectors still have brokers? Brokers are additional layers in the commerce function, often existing simply because there is so much of a gap between production/inventory and actual consumption. The resulting service friction is such that people will pay for others to deal with it.

  Some of this can just be a simple inventory visibility problem. Think of travel agents. In 1956 Braniff complained that travel agent interactions were becoming too burdensome and variable. This lead to developing a clearinghouse. That didn't help complexity, although it helped Braniff and the like. Today there are still about 100,000 people employed in the travel agency business broadly defined. That number is down probably by half since 1982, but still that is a lot.

- **Brokers, part II.** Credit card companies are in many ways brokers, as are banks. My commercial spend value is monetized by a credit card company and begrudgingly foisted on merchants that give up some of their revenue so the card companies can give me a tiny slice back. They can do this because they have a network or are connected to a network that manages all this. I am just a single human. I do not have a network. Hang on! I am an IP node and I am in a series of networks.

  So this market will be Ubered. It's just a matter of time. Banking is going the same way. The data behavioral patterns will show humans need support, help and efficacy in spending, managing spend, and managing financial health and assets. In an NGI world,

that is not a disjointed set of providers with retail banks, multiple credit cards in a wallet and a sea of foggy providers touching parts of that.

In the B2B layer, if you need more convincing, take a look at how international payments/settlements work in today's banking world. The payments process is costly, opaque, ancient and cumbersome. Companies like Earthport may fix that, but it is clearly today a raspberry pie situation. The Block Chain Protocol will also have an expansive impact on banking and commerce as a fundamentally different functional platform approach. There is and will of course be a dark side to cryptocurrency expansion.

What other sectors still have brokers? Having a broker means there's a profit pool and friction opportunity; it doesn't necessarily mean brokers will all disappear soon. In insurance, for example, it is more likely that the broker role will evolve and fewer better ones will exist. In sea freight and air freight, surely a lot of those brokers will disappear and be Keychained/Ubered.

- **Security.** The various "markets" under this umbrella are definitely not designed from the consumer out and are essentially a series of unaggregated barely coupled markets. Why isn't there a "Toby-aware" service that offers me security as a service in all of its aspects or at least across key areas I select?

  Maybe the insurance industry will figure out there's an opportunity there with an aggregation, internet of patterns / meta-things approach. Peace of mind, preventive and detective controls, smarter insurance coverage, travel support, child services, product advisory and secondary event services all add up to profit pools.

  Why don't I have a personal security index and advice on how to improve that … heck, how to improve that AND save money?

  These are just a few examples where intuitively technology and next-gen data analytics married to very clever applied mathematics will be the winning combo … assuming you get your service design right.

- **Healthcare.** I think this fits the same model as security. Healthcare is, again, something where a smarter, more informed, proactive, networked model has the potential to deliver better products and service at a lower cost point with probably lower government costs too.

  I know there is a lot of talk about precision medicine and the pace of tech-infused improvements in specific micro verticals that is truly breathtaking and positive. There is no steeper curve than the cost and/or speed (over the last decade) at which we can sequence a human genome (which in March, 2003, was something that had never been done).

  The pricing models for in-hospital services across the country are obtuse. The utility per dollar spent on prescription medicine is one of the largest and foggiest things on earth. This definitely smells like the biggest of opportunities. The delivery models for healthcare are sub-optimized (to be nice about the facts). The micro siloed nature of this industry is not just costly; it is dangerous.

The space between providers and consumer utility optimization, especially for middle-to-lower-income folks, is mind boggling. The level of curative care versus the proactive, preventive, personalized precision-based results focus is simply rotten, broken and under-architected. It is such a raspberry pie market that consumer utility and profit often don't intersect at all. The ecosystem itself is not designed for purpose. We can say the same about maintaining and servicing diesel engines, but it's clearly not the same level of social importance.

An example: When my mother was hospitalized, she was serviced by at least four physicians, nine pharma companies, 15 equipment companies, a hospital service business, a pretty bad food service company, etc. These services were not networked or connected in a smart way whatsoever. In one case, one silo prescribed a medication that, when taken with a medication another silo had given her, had very negative known side effects. There were clear prohibitions against this combination. Unfortunately they were not in the data pattern these silos used. That info, by the way, was found in the mysterious, hard-to-access thing no one had heard of … called Google … by my smart brother whose medical training was non-existent (he's a pilot).

- **Education.** Like the entrenched auto dealer network model that is really a past era's design, education is structured in a bureaucratic way that is not designed for its real purpose. I am not optimistic that profit and opportunity pools (real educational impact) are tempting enough to really break the mold and defeat entrenched stakeholders, regulatory morass and fear of change. Maybe step improvements within the existing constraints will be attractive enough for big change.

Many markets have additional fog and barriers simply because in the past vested interests got favorable legislation that helped them but also diluted real market forces and created artificial barriers to change.

But if you think of what the consumer really needs in education including valuable skills/knowledge anchored in the IP-connected real world for future jobs that will exist and then how we barely attempt to optimize, clarify and deliver that, the education sector screams out for smarter approaches.

What would the educational approach look like if designed for Homo Cumulatus? I think you will see this first in places like Brazil, Australia, Mexico, Canada and Scandinavia and then later a catch-up cycle in the United States. The ugly soup of student debt, lack of graduate hiring and consumer dissatisfaction with education will continue to boil while the next-gen approach grows in parallel and in stark contrast. MOOCs, nano degrees and the likes of Udacity, Khan Academy and Codecademy offer such a better value proposition that sooner or later they will infect the old system and start to take over.

The APIs to "engines" of all kinds will become a fount for improvements.

The NGI I am talking about clearly changes manufacturing and pushes information back from networked end use all the way to smarter concurrent engineering coupled with proactive service design and warranty optimization/maintenance. The API to "engines" of all kinds will become a fount for improvements. But I foresee that only a minority of firms will seize upon and leverage this over the next 20 years. Many firms will just "Kodak" themselves and cease to exist. GE has the tech savvy, the complex engineering knowledge and the vision at the top to really go fast in this space but may have a problem digesting parts of itself as it does this.

- **Wholesale/distributor layers.** The sheets on a bed in a Ritz Carlton in the United States go through many layers of distribution and consolidation from the original manufacturer. This is true across many, many areas, not just sheets. I am not sure any consumer cares that these sheets came through all these layers existing only to try to manage out friction and fog between vendor and consumer. A lot of these layers will change simply because it's an untapped profit pool.

Data behavior views will be captured and curated to outmaneuver competitors.

Direct marketplaces and procurement tech will help, but it will be the Internet connectivity up through supply chains that drives out these costs and players. It will be the Internet data exhaust from the stuff itself, the patterns it exhibits and the meta patterns/behavior the data ecosystem exhibits. Supply chain data will look more like weather patterns than plan, WIP, channel inventory, sell through, excess inventory blocks of data. The data behavior view will include a mass of "soft" social signals cleverly captured and curated in order to outmaneuver the competition.

- **Other target industries.** Other industries that are equally well suited for disruption are construction, wealth management, retail in general but especially things like clothing, entertainment (screens, sports, consumables), financial asset retail, farming/food supply, arms/weaponry, flowers, furniture, incarceration, DYI and air freight / sea freight.

  Two that stand out are food supply and military spend. By some accounts, 40 percent of agriculture for human consumption ends in waste – and that's just the number tied to the stuff itself. The "systems" that create food and match it and deliver it to you are chaotic on a good day. A lot of it never meets a mouth.

  Military spend is worse. Yes, there is huge inherent fog between supply and real demand (e.g, kinetic impact). That is the nature of that "market." But we have layered in our own raspberry pie elements.

  What sort of a power would the United States be in a decade if we were to stop building tanks the end users say they don't need and stopped building an aircraft carrier group that would be great for fighting the last war and put that money/effort instead into a focused cyberforce spend that realizes the enemy is the new Homo Cumulatus in the big everything-connected IP future? Imagine being at home and taking delivery of a huge locomotive even though you had told them several times you not only didn't want one, you no longer travelled by rail and weren't actually connected to the rail network.

  In defense of Defense, they are some amazingly dedicated, smart folks doing brilliant work. So there is room for optimism. The economic efficiency of a JDAM, a mountain of stuff coming out of DARPA and the Zumwalt class destroyer are all great examples we can be proud of. Having said that, the data layer for that market is broken. The structures in place that separate the "manufacturer" from the end user utility are a Sisyphean Gordian Knot (yes, that's a thing).

  Unlike what some folks imagine, I really don't think we'll have many big supply chains turn into 3D printed localized additive manufacturing super-flat chains any time soon. But there definitely will be a flattening and simplification of costly, opaque, error-prone supply chains. While 3D printing is extremely buzzworthy and will have important niche impacts that amaze us, we are a decade or two from that really mattering economically at

scale. 3D printing / additive manufacturing will do some amazing things near term, but not at an economic scale that matters much.

Ten secondary consequences of the NGI

So what else does all this connectivity in the NGI mean for us?

There are 10 secondary consequences of this new swarming of IP connectivity in things, patterns, motion, pragmatism, sentiment and commerce in general.

1. Building management systems will begin to really matter. They will save money and support the greening of brands – something every brand needs to excel at in the millennials-centric future.

2. Service Design will start to dominate and UX (user experience) and CX (customer experience), while still important, will become subservient.

3. Process dominance will be the key execution skill for business. Yes strategy still matters; no amount of smart process work will save bad strategy from killing itself. Process dominance will underpin agility, which over time will be one of the most important sustainable competitive advantages.

4. Modern tech including BPM and next-gen data behavior/visualization tools will anchor the agile companies. Agile will beat scale. Agile at scale will beat everything. Ten percent of companies will get and leverage modern (post 2002) tech, and they will savage their competition.

5. The management of cumulative IQ will matter inside firms and across market segments and social fabrics. Homo Cumulatus!

6. Big Data will grow up and the meta-level information around data behavior will change the way we look at analytics. We think incorrectly about market segmentation in most markets. Understanding data behavior will surface brand new questions and then insights that, coupled with the de-fogging of markets, will revolutionize product/service design.

   Human characteristics like race, gender and age, coupled with a sea of sentiment social data, will become dependent data elements inside models of data behavior that include human and synthetic inputs / patterns / choreographies. Influencing data choreography will become a marketing focus for leading-edge firms.

7. The tech intensification of everything and the growing volume of options, voices, output and mass personalization will require the rise of smart, value-added curation in areas that heretofore have had none or nearly none at all. These voices will not be brokers; they will be curators. Expertise will matter and data behavior will be a key lens. Smart listening and expertise will matter more. Curator bots and curator botnets will emerge and will matter. Experts in value enhancement will pop up all across increasingly flattening value networks.

8. The tech intensification of everything will make “submergence” an overt design priority and an architectural imperative. Submergence will be the deliberate conscious

approach of hiding the tech complexity and pushing it below the waterline – not as a secondary activity but as a prime design directive. This approach will be about driving functional and transactional value in clever but pragmatic ways. And it will tie directly into the growth and emergence of service design as a winning approach.

9. Skating to where the puck is going to be won't matter much. The winners will leverage cumulative IQ to create a new place with their consumers to meet to experience the new pucks.

10. Math will matter more. Math-tech companies will win in many markets. Intelligent and even volitional agents will become common.

Of course, we still need great strategy and service design. And of course none of that happens without great leadership and talent. No amount of technology can stop the repetitive train wreck that is the common combination of bad strategy, poor talent management and lackluster leadership.

Bottom Line

The companies that understand Homo Cumulatus and design to engage, leverage, invent, surprise, entertain, support and evolve for Homo Cumulatus will win. They will have an underlying agility and information advantage.

Those that don't will wither.

Radical changes in marketing

Implicit in all this is the NGI's radical change of one more huge market.

The old 4-Ps formula of marketing (Product, Promotion, Place, Price) will be replaced. Marketing's new 6-Ps formula will include:

- Presence
- Persuasion
- Preference
- Personalization
- Permission
- Peers

In addition, successful consumer plays will incorporate a new consumer-oriented 4-Ps formula:

- Predictive
- Proactive
- Personal
- Pattern matching.

Today's market of marketing/advertising is a foggy, messy, poorly evolved space. More and more, we will see spend opt in to transactions and commerce

opportunities as opposed to commercial-endeavor bullhorns trying to draw consumers in. How much money is still spent on TV ads, bus stops ads, online content pop-up ads and print? In an NGI world, those inefficiencies are clear.

Yes, there are improvements continually in this space from algorithmic smart targeting to the latest cleverness from Facebook.

Having said that, the underlying model of brands initiating contact to try to land a commercial transaction in their net will slowly become inverted with the data behavior patterns logically exhibiting need, desire or explicit requests for product/service connectivity – which is different than sticking an ad in my face. Transparency and the connected advantage that Homo Cumulatus has will put so much more power into the hands of the consumer.

How to monetize one's commercial value is a question that, when answered reasonably well in an augmented, aggregated world, will change advertising. Ironically, maybe brand and brand transparency will become even more important.

Conclusion

The depth, amount and breadth of the available profit pools will fund an economic transformation and a global economic renaissance with the NGI. Renaissance is a beautiful word; however, it always carries serious wreckage in its wake. The Next-Generation Internet will advance far beyond the "things" of today's IoT and will, as Barksdale said, change everything.

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