inCode Consulting Announces Top 10 Industry Predictions for 2017

inCode Consulting (a division of Ericsson Inc.) announces their Top 10 predictions for the game-changing events that will shape the North American information and communications technology (ICT) industry in 2017. For over a dozen years inCode has annually released predictions that cover key industry trends such as industry consolidation, new technology adoptions, disruptive business models, and next generation consumer applications with associated service requirements.

inCode Consulting, a leading business strategy and technology consulting firm working in all facets of telecom and media, has demonstrated a strong track record for its predictions, which are highly anticipated by our clients for their insights.

2017 Highlights

"Hot" technologies like AI, VR and voice enablement will gain critical mass
Automation in various forms takes a big leap in 2017 with many technologies moving past the hype cycle and into mainstream products and services. The vast amount of data that is generated by various applications requires timely processing and analytics, thus driving network function virtualization, enhanced security, optimized data center and content distribution, and mobile edge computing needs.

Capacity demand continues to drive Network densification
For several years, outdoor and public venue small cells have appeared to be on the cusp of breakout expansion without realizing the expectation. In 2017, the explosion in small cell deployment seems to be real, fueled by new business models that combine with continued spectrum constraints and the need for more network capacity. The emergence of new, shared spectrum solutions including neutral host applications, unlicensed band LTE and/or supplemental downlink solutions add significant impetus for going small.

Regulatory will be much cloudier before it becomes clear
The regulatory landscape in the U.S. in 2017 will likely be the most unpredictable we have seen in many years, if ever. The electorate has made its voice very clear about the need for changing how government operates. The political environment is much more fractured, making it hard to determine which coalitions will form over what issues. A change in Presidential administration with consequent changes to the FCC always creates some degree of upheaval, but this time around it seems magnified. The future regulatory direction of topics like mergers and acquisitions, net neutrality, privacy, and security are uncertain and will likely delay certain actions and create some unexpected consequences to industry players.

TOP 10 PREDICTIONS FOR 2017

| 1 | ## AI: Networks Get Much Smarter |

Emerging Artificial Intelligence (AI) tools make the managing of the increasingly complex networks feasible and cost effective. AI and Machine Learning (ML) tools will allow automated network management including unified performance management, alarm detection and threat detection/prevention/correction. <u>At least one major carrier will make a significant investment or an acquisition of an AI/ML company in 2017</u> demonstrating the critical importance of these technologies for future operations. Of course, we've seen this movie before…but it will be different this time, with the advent of cheap computing resources, networked databases, and large unstructured data lakes.

| 2 | ## It's a Small World After All |

Explosive growth of small cells seems to have been an annual forecast for many years, and each year has seen hype tempered by reality, especially for outdoor applications. Finally, in 2017, all the forces may be present to create the growth that has been long expected. Three key factors that have hindered the growth of small cells have been backhaul, technology & spectrum, and site acquisition. With backhaul provider investments in small cell, new unlicensed spectrum technologies enabling neutral host business models, and increasing third party site acquisitions the road block will be alleviated to a point that satisfies the business case requirements for explosive small cell deployments. Therefore, <u>2017 will be the year outdoor and public venue small cells finally show major growth with at least a doubling of these types of small cell deployments in the U.S.</u>

| 3 | ## Slow Down You Move Too Fast… |

Irrespective of potential changes to the FCC under a new administration, the policies set in place to enhance adoption of new spectrum models and small cells may create a world of unintended consequences that may ultimately create more problems. Local regulators may be out of step with the Feds by not keeping up with zoning, siting, approvals and rules for new architectures such as small cells or remote radio heads creating obstacles to deployment. The push by the FCC for new capacity alternatives such as spectrum sharing and use of high order spectrum at 3.5GHz and above will only serve to <u>undercut the value of 600MHz</u>

spectrum, whose value inCode predicts will fall to below $20B when the auctions are finally completed in 2017. At this level, a new FCC may decide to reevaluate the allocation of 600MHz and seek an alternative to the incentive auction scheme.

4   Power Shifting: Bandwidth on Demand Accelerates

As enterprises have become more dependent on communications and technology to become more efficient and effective, their need for a network to support dynamic, responsive, and customizable demands is crucial to their success. With the development of SDN/NFV, long-haul carriers have begun to offer real time bandwidth on demand (BoD) ethernet services, putting customers directly in charge of managing their own traffic requirements, with the flexibility, scalability, security, and speed of provisioning demanded by enterprises. With BoD attracting new customers and improving operational efficiency, expect at least one MSO to begin offering BoD to enterprise customers in 2017.

5   Advertisers go Over the Top

It has become evident that digital advertising has emerged as a dominant force in just about every market by enabling more cost-effective and dynamically targeted ads based on user-specific data. Though it has stood the test of time, TV is now evolving with the growth of Over the Top (OTT) and IP-based linear/live TV offerings (e.g. Sling TV, DirecTV NOW, Comcast's Stream TV). Expect virtual multichannel video programming distributor (V-MVPD) TV providers to begin offering increasingly targeted advertisements in 2017.

6   Next Cut is the Deepest

Since the inception of OTT services, the worry of cord-cutting has been on the radar of traditional PayTV providers, but so far, large-scale shifts have not taken place. Traditional providers have made improvements to successfully deter the number of subscribers leaving their service, but that will not be enough with the emergence of V-MVPD as a substitute for live TV. V-MVPD options have disrupted the market with their lower costs, easy sign-up processes without operator equipment, access via multiple devices, and no lengthy contracts. They are also continuing to gain momentum with functionality improvements and growing

content options. As a result of this, <u>in 2017 expect the number of households cutting traditional PayTV to accelerate by at least 40% over 2016, to 1.5 million,</u> further blurring the line between OTT and linear TV.

7 | Virtual Becomes Real

VR gaming is approaching a pivotal point in its evolution with the acceleration of VR gaming hardware and content. With VR-enabled gaming content creating a significant amount of buzz, expect the <u>VR gaming content market to quadruple in 2017, to at least $1 Billion</u>. With VR games pushing the boundaries of technology (e.g. high frame rate graphics) the next wave of VR experiences will begin to take shape in 2017. Since much of the initial content will be intended for consoles, there will be minimal impact on networks in 2017. However, the longer term impact to networks will be dramatic as 360 degree videos need 4 to 5 times the bandwidth as video from different angles are stitched together. 2017 will also see a growth in VR content on social media platforms (Facebook 360, Oculus and YouTube 360) as companies begin to adopt VR technology for marketing purposes to highlight product features.

8 | You Talking to Me?

Voice enablement is going to be a significant factor in 2017, all thanks to recent market momentum and technology advancements in speech recognition. With a large drop in speech recognition error rates (now in the low single digits) over the last two years resulting in a huge uptake of daily voice searches amongst teens (51%) and adults (41%), we will see a spike in growth of voice-assistant devices. <u>In 2017 expect a doubling in the number of U.S. households that have a voice-assistant device</u>.

9 | A Big Link in the Chain

<u>2017 will see at least one major Internet of Things (IoT) player adopting blockchain for its IoT security infrastructure</u>. The chaotic growth toward an everything connected world has introduced several challenges to the current infrastructure and architecture of the IoT ecosystem, such as identifying, connecting, securing, and managing devices. Blockchain will enable IoT ecosystems to eliminate the bottleneck and single point of failure that make these

networks vulnerable to DoS/DDoS attacks by breaking their reliance on a central cloud server to identify and authenticate individual devices.

10 | Drones Fly High (As Far as You Can See)

Commercial use of drones will continue to rise under the watchful eye of the FAA. Current regulations require keeping unmanned aircraft within a visual line of sight (LOS) and limit vertical elevation. The most attractive opportunities for drones will be small, well-defined use cases that are risky and time consuming for humans to perform. Driven by utilities, telcos and energy companies, operations they conduct such as inspections of towers, wind turbines, pipelines, and mines will be the primary drivers <u>pushing enterprise drones in the US to grow 100% in 2017</u>. Also, expect a continued evolution in FAA thinking and the emergence of early standards and APIs that will begin to create an even broader set of viable applications where drones can play a role.

11 | A Walk on the Wild Side

The 2016 election season contained no shortage of surprises whose results will certainly create upheaval in the future. One thing that is certain is that the electorate has expressed major disdain for traditional modes of operation. The role of big government, big business, and Wall Street will all come under more scrutiny and any direction that does not improve employment and the overall national interest will be severely challenged. Exactly how the policies expressed on the campaign trail are acted upon, and potential political fragmentation between Executive and Legislative branches, will create much uncertainty. This will make for a very interesting environment for mergers and acquisitions (M&A) where the changing political winds may cause disruption and result in significant delays. Large multi-billion dollar deals will be closely examined and require substantial proof that they will aid jobs, the economy, and the individual consumer. Major concessions of different types may be required by companies seeking to get their deals approved. The end result is that <u>in 2017 there will be a reduction in the number of M&A deals that are consummated compared to 2016, until the uncertain landscape settles down</u>.

About inCode Consulting

Founded in 1998, inCode Consulting (a division of Ericsson, Inc.) is a respected business strategy and technology consulting firm with unique expertise within the telecom, media and technology (TMT) industries. inCode distinguishes itself with its combination of deep technological expertise and exceptional strategic vision. Our industry focus allows us to integrate business insight with technology foresight, delivering tangible impact and sustainable value to our clients. From private equity firms to multi-billion dollar companies, decision makers have trusted inCode's unique approach to tackling unprecedented business challenges.

Please visit our website to learn more and read our past Top 10 Predictions – www.incodeconsulting.com
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