

# TMC'S ADVISOR

Covering IT and Telecom from a Canadian Viewpoint

September 2015

## Emerging Tech Issue



### *Just When You Thought You Were Safe—When Leading Edge Becomes Bleeding Edge*

By Ellen Koskinen-Dodgson

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[15th Generation Networking](#) - By Peter Aggus

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[Physical Security - a Word from a Pro](#)- By Guy Robertson

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- By Bill Tracey

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**For more information,** Contact David Miller at

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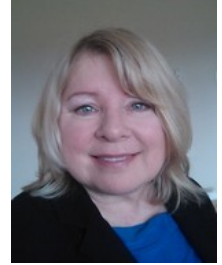
**Guy Robertson**, a global expert in Emergency Management and Disaster Recovery Planning

**Peter Aggus**, a Business Continuity expert who understands the human side of Emergency Planning

# Just When You Thought You Were Safe: When Leading Edge Becomes Bleeding Edge

**By Ellen Koskinen-Dodgson**

No one plans to make the painful slide from leading edge technological awesomeness to bleeding edge disaster. We all plan to implement transformative projects where the rewards far outweigh the risks. We aim for kudos, but sometimes, like a slow motion train wreck, leading edge can become bleeding edge and it's your fault.



## **Tech Leadership**

You have all of the credentials:

- You have a track record for successful project delivery
- You invest time learning to become more business savvy
- You know something about your customers and competitors
- You understand the implications of emerging technologies
- Management respects your opinion

You're perfectly positioned to lead your organization into leading edge technology.

## **Technology Wish-list**

There are so many choices – which emerging technologies would deliver major benefits for your organization?

- The Cloud?
- Volumetric displays?
- Cryptocurrency?
- 3D printing?
- Wearables?

You decide to implement wearables for the contact centre. The contact centre is a critical resource in your organization where the goal is not to handle more calls but to improve the

The end-users thought that the concept was 'creepy'

quality of calls. You've heard that quality is affected when agents are under stress. You talk to the Customer Service Director and your management and get the green light to start planning.

## **Fanfare**

You do the research and identify headsets that will track heart rate and breathing patterns to identify agents with escalating stress levels. You figure out how to feed the information back to supervisors so they will know when coaching may be required. You also know that the results can tie into the background music system and the contact centre software, so that soothing music can be triggered and the queue can slow down a bit until stress levels reduce.

You present your business case and get funding approval. You issue an

RFP and the pricing that bidders submit fits within your approved budget. You build the project plan and you're feeling good. You announce the project with great fanfare and receive lots of congratulations.

## **Slow Failure**

It's clear that you didn't allocate enough of your time to properly stay on top of everything. No one has done this implementation before so every little thing starts to sidetrack. Team members are slow to respond to requests for status updates. The integration contractors are doing new things so they find weasel words to explain that they will need more budget. You keep posting schedule delays on the intranet.

You roll out a 'crippled version so that you have something to show. Results are glitchy. The Customer Service Director is unimpressed. The agents tell you that the whole idea is 'creepy'. You pull the plug and decide what you'll post on the Intranet.

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*Ellen Koskinen-Dodgson is President and Managing Partner of TMC IT and Telecom Consulting Inc. She is an IT and Telecommunications Management Consultant, electrical engineer, author, speaker, media resource and Expert Witness.*

# 5th Generation Networking

By Peter Aggus

Wi-Fi 802.11ac is promising speeds up to 1.3 Gbps so some say “why install cabling?”. Category 8 cabling promises up to 40 Gbps, but do we need that speed? What’s behind these numbers and what do you need to know to plan a ‘future-proof’ infrastructure?



## Current Technology

Wired technology is dominated today by Ethernet, using Unshielded Twisted Pair (UTP) cable — 4 pairs of 22 AWG copper wire. Today’s high-end installations use Category 6 (Cat6) cable with a bandwidth of 500 MHz. This uses the familiar RJ45 connectors and supports data rates up to 10 Gbps (known as 10GBase-T).

Wireless technology is dominated by ‘Wi-Fi’, systems based on the 802.11 standard. Until the newest version, the highest performance was achieved from 802.11n access points using the 5 GHz band. As each radio channel can support 150 Mbps and the technology supports the use of up to 3 channels in the 5G band, this results in a maximum theoretical data rate of 450 Mbps.

## Next Gen Technology

The wired world has tried to move from Cat6 to Cat7—but only got as far as Cat6a universally as Cat7 was never ratified by the Telecommunications Industry Association (TIA). Current efforts are working to produce Cat8 as a standard — with 2 GHz bandwidth — with a staggering data rate of a 40 Gbps. It will likely require shielded rather than unshielded cable but will probably stick to 22 AWG wire and



RJ45 connectors — giving important ‘backwards compatibility’.

The wireless players have developed the latest general-release spec in the 802.11 family — 802.11ac. It multiplies the capacity of each of the three radio channels 3-fold to 450 Mbps, leading to a potential speed of 1.3 Gbps.

## Benefits

Sticking with RJ45 connectors means that it’s possible to specify Cat8 cable long before equipment is available to exploit the new bandwidth. Organizations can stick with lower speed equipment at 1 or 10G — or even legacy 100M. This allows network speeds to be upgraded without rewiring.

With the new wireless 802.11ac specification comes a new way of

defeating interference (or at least reducing it). This is known as ‘beamforming’, where the technology locates the distant node on a link path and adjusts the directional antennae to ‘point’ that way. Since interference is the greatest problem with Wi-Fi, this is a very significant improvement. This works to a degree even if the distant node is ‘n’.

As ac nodes support ‘n’ grade performance with an ‘n’ node, investment in 802.11ac APs and routers makes sense even if the majority of devices are 802.11n.

## Reality Check

Very few 40 Gbps devices will exist for some time, however backbone hardware will likely be first in line. Also, careful design, installation and testing will be even more important for Cat8 than it is for Cat6.

Wi-Fi installations require even greater levels of knowledgeable design, installation supervision and operational policies to maximize speed.

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*Peter, as an engineer & technology management consultant, has developed innovative & cost-effective solutions for clients in many industries.*

# Physical Security—a Word from a Pro

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I'm a thief, and this is how I work. You hurry off to a meeting and leave your laptop in your car. It takes me less than a minute to break in, start the engine and go. I sell the car to a crooked dealer. I sell your laptop too, but not before I've copied all of your confidential data, which I then sell.



## How I Earn My Living

Your laptop probably contains substantial amounts of useful information that you've worked hard to organize into useful reports and presentations. This is worth a lot of money to the right people, and I'm the guy that sells it to them.

These people may be unscrupulous buyers who know exactly what I'm doing. Some of them are completely naïve, and have no idea that I stole the information.

I might call myself a researcher or a specialist in corporate intelligence. I deliver the goods via email or on fancy letterhead in an attractive binder.

Your tablet or phone are even more attractive to me. They will likely carry digital photographs, and report data voice recordings, all of which I can translate into cash ... and smaller devices make it easier for me to take while you're looking the other way.

In many cases, you won't realize that your data has been stolen until it is already in the hands of my customers and I'm walking away with my cash.



## Lost-and-Found

Remember that it's not always a thief that takes your electronics. You could have left it behind yourself, which is why I frequent Lost-and-Founds. Maybe you left your phone on the roof of your car as you were getting in. Maybe you forgot it in the bar. The Lost-and-Founds of any airport, train station, public transit system or store usually holds a large selection of abandoned laptops and other devices. They gather dust behind the counters of library, pubs and coffee shops ... until I come by. Most devices have no

identifying marks, so when I ask for a white iPad or a silver MacBook, they usually hand it over.

## Why I Love You

If you're like many people, you're not very security conscious – after all, there's never been a problem before, right? Of course there are options to install password controls and encryption, but unless the IT department forces this on you, you probably won't bother as you want convenience and ease of access.

## Ignore IT

Your IT department will tell you that you should not keep important data on your laptop, tablet and phone. Failing that, you should install tracking software and remote data deletion capabilities. They just go on and on, always preaching security. Please continue to ignore them.

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*Guy Robertson is a Senior Management Consultant at TMC who specializes in emergency management and disaster planning. He has written extensively on emergency planning and IT security—hundreds of articles as well as a book with worldwide sales.*

# Emerging Technology—Software Defined Radio (SDR)

By Bill Tracey

Software-defined radios are expected to become the dominant technology in radio communications. SDRs, along with software-defined antennas, are the enablers of the 'cognitive radio'.



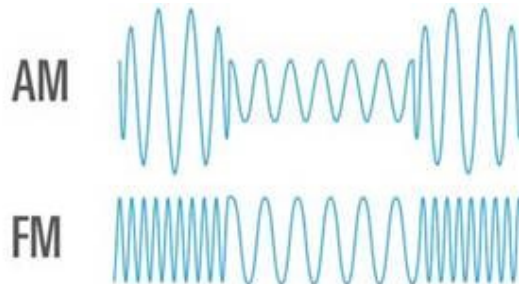
## What Is It?

First, think about how radio works - visualize a repeating sine wave, curving up and down, nice and smooth. If you convert that signal into audio, you hear a tone. You don't get anything more than a tone until you 'modulate' the signal so that it carries useful information like music or speech. There are many ways to modulate a radio signal. The simplest and most common techniques are AM (amplitude modulation) and FM (frequency modulation). Cell phones, walkie-talkies, municipal radio systems, satellite radio, Wi-Fi ... they all use different modulation techniques and are therefore blind to each other. Software defined radio changes all that.

SDR transmitters and receivers can vary their frequency range, modulation technique and power levels under software command. Cognitive radio takes this a step further and adds the ability to detect the radio signals in the environment before making these changes.

## Where Is It Used?

While regulators have limited the use of SDR to certain frequency ranges, there are many examples of SDR currently in use, even though we may not readily recognize them as such.



There are SDR versions of Wi-Fi frequency analyzers, used for optimizing performance. Cell-phone and Wi-Fi service providers use software-defined antennas (cognitive antennas) to improve frequency re-use and better coverage. Experimenters have successfully loaded SDR applications onto common cell phones. The GNU Radio Companion (an open-source Visual programming language for signal processing) is used by many experimenters and will contribute to the flood of developments.

## Business Benefits

SDR promises lower cost, smaller size, flexibility and more efficient use of limited radio spectrum. One hardware design, along with suitably efficient and 'portable' programming software, will reduce development time for new products or extend the life of existing products with software updates. SDR will make business 'wearable' technologies more effective.

## Timelines

We probably won't see SDR widely commercialized, until at least the following obstacles have been overcome:

1. Development of small, low-cost transmit and receive radio front-ends covering a wide frequency range
2. Software improvements to address interference-mitigation techniques and environment 'awareness'
3. Improved network management capabilities
4. Regulatory changes to allow greater spectrum sharing

## SDR Caution

Where there's wireless and software, there'll be hackers. Don't be too trusting when considering new technologies.

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