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What the heck are GSM, EvDO and HSPA, and why should I care?

September 11, 2008

Next generation wireless technology promises big things, but it's a future drenched in acronyms. Here's some help

By Gail Balfour

EvDO and LTE and WiMAX, oh my. If that alphabet soup makes no sense to you, don't worry. The acronym-laden world of wireless protocols and standards can read like an alien language even to the most dedicated of technophiles.

As carriers and device manufacturers move us toward 4G (that's fourth generation: read "faster") networks, new terms are cropping up even more quickly than before. That means it gets harder and harder for consumers to map the best wireless communication solutions for their work and play.

"The wireless world is always at the stage of continual change and leapfrogging," said David Crowe, president of Calgary-based consulting firm Cellular Networking Perspectives. At its most basic, there are two major wireless cellular protocols: CDMA (used by Bell and Telus in Canada) and GSM (the Rogers network). But then there are higher-speed versions stacked on top of those: CDMA uses EvDO (Evolution Data Only) and on the GSM side the higher-speed system is called HSPA (high speed packet access). GSM-based networks are by far the most common, used by about 85 per cent of the world's mobile subscribers.

And now new 4G technologies are emerging, such as the GSM-based LTE (long-term evolution) and a new telecom-based radio interface called WiMAX.

So what does all this mean for consumers? "There is no real difference between HSPA and LTE, besides speed, that consumers are going to see. And the challenge with WiMAX is being able to provide the (necessary) network capabilities," Crowe said.

Is CDMA on the way out?

A fundamental shift may be coming, as providers move away from CDMA altogether. "Most CDMA carriers, at least in North America, have said they are not going to go to the next generation of CDMA-based technology. They are going to the GSM variant LTE," said Mark Tauschek, senior research analyst with London, Ont.-based Info-Tech Research Group.

"Verizon in the U.S. announced it would be moving to LTE. In Canada, Telus has certainly hinted at that as



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well, and Rogers is already GSM. The only remaining straggler is Bell, and I suspect they won't stay CDMA either."

One of the problems with CDMA is that it's a proprietary standard owned by Qualcomm, Tauschek said. "So Qualcomm gets royalties from carriers for their infrastructure and equipment deployments. Anyone who makes a CDMA-based chip pays royalties. So carriers don't like that; handset manufacturers don't like that. And in the end, consumers and enterprise users are the ones who pay for it."

GSM, on the other hand, is an open standard. "There are no licensing or royalty fees to pay to anybody. So that being the case, I am surprised (CDMA) has hung around for as long as it has."

Tauschek said there are clearly some serious decisions to be made by current CDMA carriers. There are two paths they can go down: one is WiMAX and the other LTE. "They have to decide, do they want to build another network for LTE or do they want to build a completely separate mobile WiMAX network? On one hand, LTE is a little bit more robust in terms of speed and performance. But, WiMAX is available now. Sprint will have a full (WiMAX) deployment available in the U.S. by the end of the year.

But WiMAX isn't perfect

On the WiMAX side, Crowe said it is really being pushed by computer companies using it for data (Intel is a big supporter, for example), but if WiMAX proponents want to use it for voice they may not have the same experience as LTE, which comes from a telecommunications background.

"If it's only data services, that's one thing. But VoIP, which would be the way they would have to go (for voice), has been a problematic technology. There is a lot of what is called VoIP out there, but in most cases it is not pure peer-to-peer VoIP."

IP has many different levels, Crowe said, and most of them go through regular phone networks at some point.

"So, are the providers of WiMAX going to be able to solve those problems and provide seamless voice of a high quality on these networks? That is where the big open question lies."

Tauschek said WiMAX will likely generate a lot of interest but he doesn't think there will be much of a role for CDMA-based technology in the 4G space.

Don't let speed stats fool you

The main difference between 3G and 4G networks is speed, Crowe said. But determining how fast something operates is not that simple, because the speeds quoted by carriers refer to an increase in aggregate bandwidth and not to an individual's experience.

"That's an important thing to note with wireless...when you are looking at speeds, often what they are telling you is the total speed of the radio interface shared by however many users there are."

Because of this, Crowe advises never to rely on performance stickers alone. "If you are going to be buying a lot of equipment, you should run your own tests. It's becoming more of an issue."

On paper, LTE is supposed to have much higher speeds, he said, but there are no guarantees the user will actually experience a noticeable difference. In the IT world, if you are having problems with performance, you just throw more bandwidth at it. But there are some performance problems that are not amenable to that solution. If things scale exponentially, then it doesn't really matter how much bandwidth you throw at it. If you double the traffic, you are still out of bandwidth."

Further to that point, "spectrum efficiency" will become more important in the future, as industry works to employ every little bit of the available wireless spectrum, according to Vino Vinodrai, president of Brampton, Ont.-based telecommunication consulting firm Vinodrai & Associates, and an adjunct faculty member at McMaster University in Hamilton, Ont. "Spectrum cannot be created; it's a finite resource," he said.

By 2011, the Canadian government has vowed to convert all TV signals to digital, thus freeing up some radio spectrum. This is a good move, because as more devices are produced and developed, we may start to run



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out of spectrum on which they can operate.

So when will we get LTE?

Vinodrai said LTE will probably not be commercially viable until at least 2010, and maybe later. The main reason for that is cost.

"People are not going to push for it too quickly because when it comes out, operators and service providers will have to make new investments. And they are still recovering their money from the other investments they have made so far," he said. "That's a factor people don't talk about, but it's on the line."

Tauschek agreed. "For the next two to three years, carriers will be able to make due with 3G networks; the speeds are pretty robust. AT&T (for example) just finished rolling out their 3G network. So they are not going to, in a year, roll out a 4G deployment."

According to Crowe, carriers will have to tread carefully with customers in this time of transition, so they are not left high and dry with an obsolete device and a locked-in contract. "(Moving from a CDMA-based network) would create a disruption, because people already have their (cellular) plans and devices. But when carriers announce they are going to go to LTE in a couple of years down the road, a lot of things can change," he said. "They need to ensure they are supporting their customers in some way."

Deciphering the acronyms

CDMA2000: Code Division Multiple Access. CDMA2000 is the trade name for CDMA air interface standards aimed at 3G requirements, including IS-2000.

EvDO: Evolution Data Only is a high-speed CDMA-based data system. It does not support voice, except as VoIP.

GSM: Global System for Mobile Communications. Both HSPA and LTE are evolutions of GSM technology.

HSPA: High Speed Packet Access. A higher-speed 3.5G evolution of GSM.

HSUPA: High Speed Uplink Packet Access. Complements HSDPA. Rates for initial systems will be about 1Mbps but eventually 5.76Mbps is promised.

HSDPA: High Speed Downlink Packet Access. Provides higher data rates "down" from the network to the mobile at about 1.5Mbps in a 5MHz carrier.

LTE: Long-Term Evolution. A GSM-based competitor to EvDO promising similar data rates.

UMB: Ultra Mobile Broadband. The brand name for a project geared toward improving the CDMA2000 mobile phone standard. Not widely adopted.

WiMAX: Worldwide Interoperability for Microwave Access. A telecom-based radio interface technology that provides wireless data in a variety of ways, from point-to-point links to full mobile cellular access.

Source: www.cnp-wireless.com

Femto: your own personal cell site

Dropped cell calls from home may have you wishing for a cell tower in your own backyard. And we may be getting one step closer to that wish.

There's a new hybrid approach coming in which your cellphone at home would link to your broadband Internet connection—with a strong signal, incurring little or no charges—and away from home would connect over a traditional cellular network.

How? Through the use of a new kind of "personal" cell site called femto.



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"Femto is a little wireless access point carriers will provide. Basically it puts a little tiny bay station in your house," said Mark Tauschek, senior research analyst with London, Ont.-based Info-Tech Research Group.

Femto will use a frequency licensed to your particular carrier. It is similar in concept to a Wi-Fi access point, only for voice rather than data. "When making cellphone calls from home, they go through your Internet connection through a VoIP gateway on the carrier side, and you will pay less for the calls," he said.

"You won't really need your home phone anymore."

There are still a few challenges and limitations with the concept. For one thing, subscribers with femto devices will likely be tied more tightly to their current carrier than they are now. And it isn't clear yet how operators will prevent neighbours from piggybacking onto your services if they have the same carrier. Also, pricing models and amounts are not yet known.

Femto is not widely available anywhere yet, but carriers are conducting trials in the U.S. and Europe. "Pretty much every carrier has a toe in the water," Tauschek said.

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