

With 82 million subscribers TDMA has been a significant success in the US markets, but with CDMA offering easier migration to 3G, has it finally reached the end of the road? Don't write it off just yet, says Tammy Parker

TDMA in the balance

The once verdant TDMA landscape, home to some 82 million subscribers, mainly across the Americas, is proving fertile ground for the ongoing rivalry between supporters of GSM and CDMA 1 migration paths. Both camps have touted early victories as they hope to reap a host of new contracts to expand their geographic bases.

In the days when GSM was solely a European 900MHz product and IS-95 CDMA was not yet available, TDMA was the only digital option ▷

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available at 850MHz for mobile operators in the Americas. TDMA successfully fulfilled its early role of providing a cheap migration to secure, digital networking. But despite efforts to carve a migration path specifically for IS-136 TDMA, in recent years it has become apparent that operators seeking to offer data services and harmonize their technology with other networks worldwide must look beyond TDMA.

'The real question concerns a carrier's long-term growth strategy in terms of being able to put new subscribers on the network and commercialise new services, particularly new data services, be they high-bandwidth applications or low-bandwidth, low-latency applications like messaging technologies. In order to do that, you really have to migrate away from TDMA. TDMA is just not going to cut it,' notes Bryan Prohm, senior analyst with Gartner Dataquest.

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As major TDMA operators prepare to switch technology, smaller TDMA operators will also face the same decisions though perhaps for different reasons.

'The willingness of TDMA manufacturers to keep riding the TDMA bus is going to dissipate over time,' observes Prohm. As leading operators move to other technologies, he says, the remaining TDMA carriers will likely be forced to migrate as well because they will lose existing price advantages in TDMA handsets.

Without a doubt, the GSM camp has made the best initial showing in courting TDMA operators. Mexico's Telcel, Argentina's Telecom Personal, and Russia's Vimpelcom have all committed to the GSM path, according to Pyramid Research.

Furthermore, the decision taken on 30 October 2001 by US operator Cingular Wireless to jump on to the GSM bandwagon added to the tremendous momentum initially created when US TDMA operator AT&T Wireless Services first opted for the GSM route in November 2000. And while AT&T is taking that path with its 1900MHz properties, Cingular is doing so at 1900MHz and 850MHz, with the 850MHz addition bringing a new set of frequencies to GSM's global family. Cingular hopes to serve 50 per cent of its POPs with GSM 850 by the end of 2002, with total GSM coverage slated for year-end 2003.

Cingular also joined AT&T Wireless and VoiceStream Wireless in committing to GPRS and EDGE. Cingular will begin installing EDGE during mid-2002 and hopes to cover its major markets with EDGE by 2004.

However, the GSM route is not the only option available for TDMA operators. That point was driven home exactly one week after Cingular's announcement when Venezuela's Telecommunicaciones Movilnet announced it would pay Lucent Technologies $150 million for a new nationwide CDMA2000 1X network, making Movilnet the first TDMA operator to shift to CDMA2000. Movilnet's 1X network and its existing TDMA network, built in 1996, will co-exist.

Movilnet is owned by Verizon, which also aims to deploy 1X across the US in 2002.

Similarly, other pan-regional and international carriers will carry a lot of clout in the technology decisions facing their TDMA-based subsidiaries in Latin America.

'The strategies operators are taking are mainly being driven by the parent companies,' many of which hope to harmonise their holdings, notes Eduardo Conrado, senior director, marketing operations, Latin America, for Motorola's Global Telecom Solutions Sector.

'I think you're going to get an even split in the region in terms of CDMA and GSM,' Conrado says. For TDMA operators, he adds, 'the environment of the market, the competition that's taking place, is going to dictate how fast the switch takes place.'

So many choices

Different migration tacks being taken by existing TDMA operators reflect the mobile industry's long-time debates over the superiority of opposing digital technologies. Today's migration arguments have the moving target of mobile data capability to contend with, unlike earlier deliberations that focused mainly on voice quality and capacity, as well as economies of scale.

Most pundits recognise that laboratory data speeds for any technology are wildly divergent from the speeds achieved in actual commercial deployments. This applies to all wireless evolutionary paths that TDMA operators face. Regarding 2.5G and 3G technologies, their respective data experiences break down as follows.

GPRS, which has long been claimed to offer speeds of up to 115kbps when all time slots are

used, has routinely been rated at 20 to 30kbps in current real-world deployments. EDGE is touted as offering speeds of 384kbps, but has not yet been commercially deployed.

Rival technology CDMA2000 1X is touted as being capable of more than 144kbps though operators who have deployed the technology in Korea admit to capping speeds at 60 to 80kbps. The CDMA2000 camp claims an upcoming release of 1X will enable speeds of 307kbps, while adding 1X EV-DV technology, still in development, holds the promise of speeds higher than 2Mbps for voice and data on the same channel.

W-CDMA, meanwhile, was first deployed by NTT DoCoMo in Japan. And while that technology is supposed to offer data speeds up to 384kbps, DoCoMo's FOMA network only runs at 64kbps on the uplink.

Of course, the speeds shown in early network iterations are rarely an accurate measure of future performance, particularly as new technological advancements are made and networks are loaded with subscribers.

In the area of voice capacity, CDMA2000 proponents are claiming superiority because their 1X technology doubles the capacity of a regular IS-95 CDMA 1 network. The benefit should ostensibly be four to eight times the efficiency of a more capacity-constrained TDMA network.

Bill Clift, chief technical officer of Cingular Wireless, takes issue with such claims, particularly when it comes to comparisons with EDGE. 'This technology [EDGE] delivers capacity and spectrum efficiency that is competitive with any other technology decision that we might have made. Our vendor partners have made specific commitments to work with us to achieve these capacity levels,' he says.

Dataquest's Prohm feels capacity is not an overarching issue anyway, particularly if operators are not limited in the spectrum they can acquire and have enough capex capability to build out whatever networking they need to get the capacity they want.

One of the hottest areas of contention between technology camps concerns economies of scale. Because 1X is a direct upgrade from CDMA 1 networks, its supporters note 1X will leverage the broad installed base of IS-95 networks. This, they say, is especially true at 850MHz, spectrum in which numerous CDMA 1 networks are already deployed across the Americas. Further, 1X is rapidly being integrated into handsets in IS-95 markets worldwide, thus adding economies on the terminal side.

On the other hand, the worldwide scope of GSM and widespread vendor support makes many consider the GSM upgrade path the most attractive economically. 'Upon placing all of our options on the scale, the weight really clearly shifted to the side of EDGE, GPRS and GSM,' stated Stephen Carter, president and CEO of Cingular Wireless, at the press conference announcing Cingular's migration path. Selling points, Carter explained, include the fact that more than half a billion GSM phones are in use worldwide, accounting for some 70 per cent of the digital wireless market. 'The economies of scale projected forward for this technology in terms of handsets, network infrastructure and applications for customers is beyond compelling,' he says.



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Seeking an EDGE

Cingular and other US operators' focus on EDGE could have worldwide implications. Considered to have been written off in Europe, EDGE is attractive to operators in North America who have not had the option of bidding on new 3G spectrum. Without that additional spectrum, few operators can seriously consider launching W-CDMA in the Americas.

Analysts say that even AT&T Wireless and its partners, which claims to have ample spectrum for W-CDMA deployments in 88 of the 100 largest markets, would benefit from gaining additional spectrum to ensure adequate coverage and capacity. It's notable, however, that the Federal Communications Commission's 8 November decision to immediately ease the urban market cap to 55MHz and completely dissolve all caps in January 2003 could enable operators to conglomerate the spectrum they need for W-CDMA and other 3G technologies.

Latin American operators already have ample spectrum, Conrado notes, which likely is the reason they have shown little interest in EDGE. 'In Latin America, the main focus operators have is getting their 1X and GPRS networks up and running and making them successful,' he says. 'On the EDGE side, we haven't that much excitement in the region.'

Now that Ericsson, Nokia and ▷



Siemens have committed to create EDGE equipment for US operators, with EDGE phones expected by mid to late 2002, they are stepping up marketing of the technology across Europe.

Juha Lappalainen, Nokia's sales director of mobile systems, recently claimed that EDGE would be deployed in Europe by mid-2003. With most potential European customers holding UMTS licences, however, that claim has many analysts scratching their heads. Operators who did not get 3G licences, such as Italy's blu and France's Bouygues Telecom, might be potential candidates but only the latter has made a specific commitment.

Yet operators in North America have very different reasons to going to EDGE than would their European counterparts. 'One of the reasons the GSM/GPRS operators in the US may be so eager to move to EDGE, while no one else in the world seems to be interested in it at all, is because of the very fact that they are going up head-to-head against CDMA 1X,' says Prohm. 'I think that really is the devil in the details.'

Verizon Wireless and Sprint PCS are both planning nationwide 1X roll outs in 2002, pressuring their competitors. Observes Prohm, 'You'd basically have to have a flawless roll out of EDGE to meet the aggressive timetables that are being proferred by the GSM/EDGE proponents in the States in order to compete head-to-head with a full-blown 1X network, be that Sprint, Verizon or someone else.'

If other markets outside the Americas migrate to EDGE, that would make the potential economies of scale more attractive for undecided TDMA operators eyeing that path. Such economies will also be crucial as operators consider whether to use GAIT (GSM/ANSI-136 Interoperability Team) phones as a bridge between their TDMA and GSM properties.

According to Cingular's Carter, GAIT 'allows us to place two bands of TDMA and two bands of GSM technology into the same handset.' Potentially, the ultimate version of such phones may need to include GAIT (TDMA and GSM)/GPRS/EDGE at 850MHz and 1900MHz.

Cingular has slated in March for introduction of its first GAIT phones, with TDMA at 850MHz and 1900MHz and GSM at 1900MHz. GAIT phones with additional 850MHz GSM capability are ready for July availability.

But don't look for GAIT phones to pop up anytime soon in Latin America. Conrado says the expected bulky form factors and likely higher costs will be a detriment in Latin American markets that demand small devices at very low cost.

The jury says?

Despite widespread TDMA operator interest in GSM, financial analysts are not all convinced of the wisdom in such a move. For instance, Cingular has estimated the cost of implementing GSM, GPRS and EDGE in its markets will be between $18 and $19 per POP. That seemingly reasonable figure, however, did not stop Moody's Investors Service from lowering Cingular's long-term debt rating in December 2001, citing in part costs associated with the operator's planned technology migration. Similarly, a September 2001 research report from Merrill Lynch said AT&T Wireless' planned migration to GSM/GPRS/EDGE/W-CDMA technology 'is likely to be a difficult and expensive transition.'

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Yet other pundits are more bullish. A report on TDMA migration paths from Pyramid Research stated: 'GSM should be the preferred migratory path because of its economies of scale, availability of mobile data applications, and clear path forward to 2.5G and 3G networks. Although CDMA technology has many merits – not least that all 3G systems will employ its basic technical principles – it has yet to attain a critical mass of subscribers to compete with GSM.'

With such divergent opinions, industry watchers are sure to keep their scorecards close as supporters of competing technologies try to sow seeds across the changing TDMA scenery. □

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