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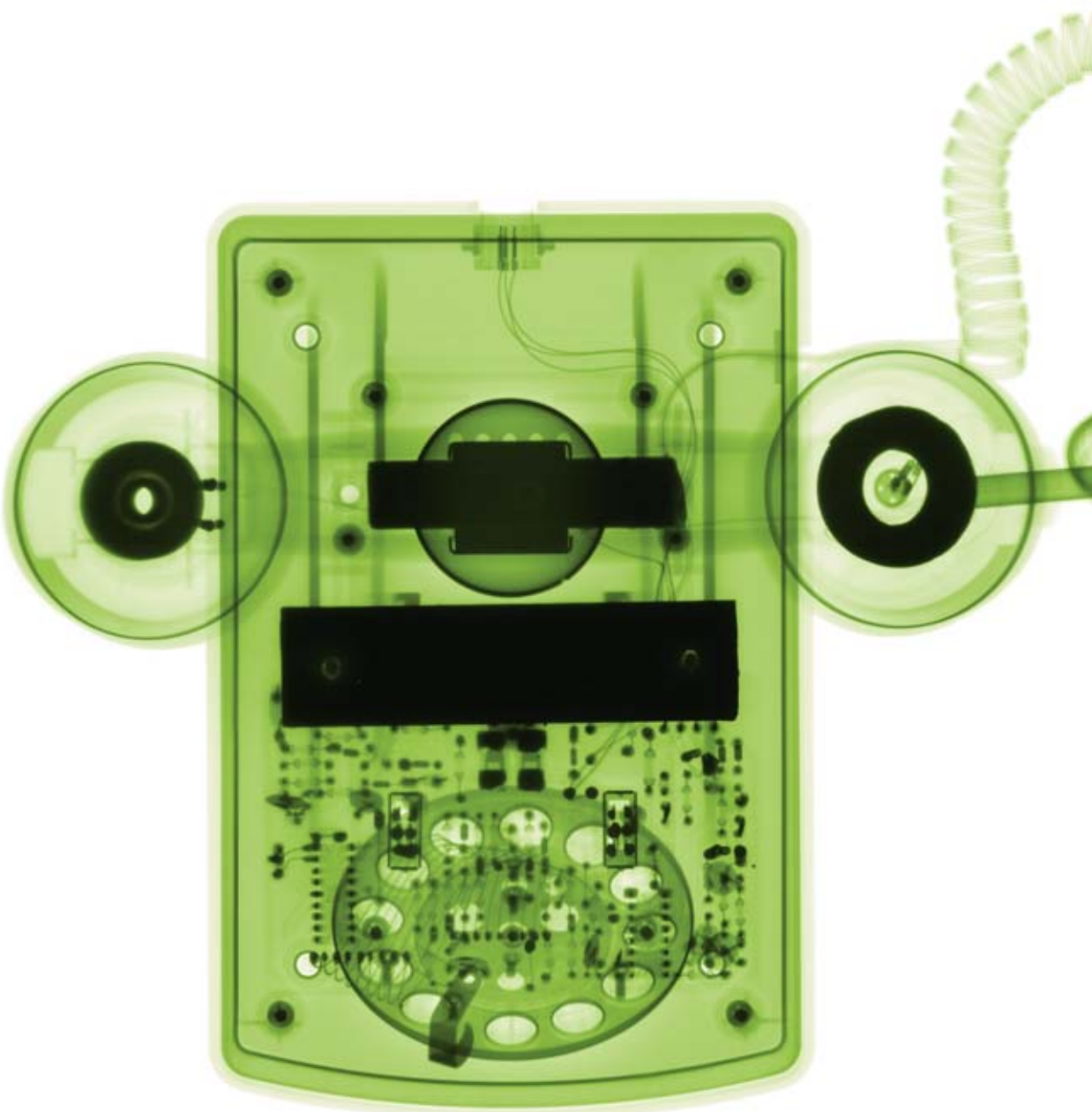
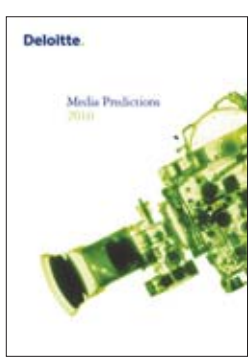
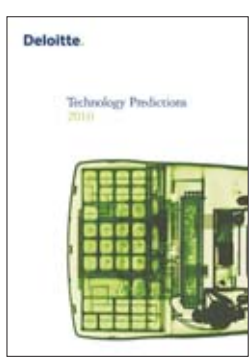
Telecommunications Predictions 2010







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About TMT
The Deloitte Touche Tohmatsu (DTT) Global Technology, Media & Telecommunications (TMT) Industry Group consists of TMT practices organized in the various member firms of DTT. It includes more than 7,000 partners and senior professionals from around the world, dedicated to helping their clients evaluate complex issues, develop fresh approaches to problems, and implement practical solutions.

There are dedicated TMT practices in 45 countries in the Americas, EMEA, and Asia Pacific. DTT's member firms serve 92 percent of the TMT companies in the Fortune Global 500. Clients of Deloitte's member firms' TMT practices include some of the world's top software companies, computer manufacturers, semiconductor foundries, wireless operators, cable companies, advertising agencies, and publishers.

About the research
The 2010 series of predictions has drawn on internal and external inputs including: conversations with TMT companies, contributions from DTT member firms' 7,000 partners and senior practitioners specializing in TMT, discussions with financial and industry analysts, conversations with trade bodies.

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Foreword

Welcome to the 2010 edition of Telecommunications Predictions. This is the ninth year in which the Deloitte Touche Tohmatsu (DTT) Global Technology, Media & Telecommunications (TMT) Industry Group has published its predictions for the TMT sectors.

Predicting always presents fresh challenges – which we are pleased to address. This year's report has been shaped by three in particular.

First, the direction of the global economy. If there was one advantage to making predictions for 2009, it was confirming the consensus view that most major economies were expected to fall into recession. (They did, with a few notable exceptions such as India and China.) In 2010, the picture is considerably more mixed. While it is generally agreed that most economies should recover, there do not appear to be enough shapes or letters available to describe the possible permutations that recovery may take – will it be a U, a V, a W, or a square-root recovery? And a double-dip recession is still possible once the stimulus ends. At the time of writing, governments appeared bullish, corporations more bearish, and economists divergent.

The pace of digitization is another major factor shaping our predictions. The conversion of analog data into digital form first occurred in the telecom sector, and had become less of a challenge or opportunity in recent years. But as the technology and media sectors rush to embrace all things digital and face the new challenge of transporting yottabytes[1] of zeros and ones, the global telecom industry has emerged as the linchpin. Finding a profitable business model while doing so may be even more of a challenge.

Third, the adoption of mobile broadband is accelerating – too quickly, perhaps – despite uncertain economic times. As a result, the entire telecom industry, from equipment makers and carriers to consumers and even regulators, is trying to cope.

Our telecommunications predictions for 2010 are focused on the consequences of technological change, particularly digitization and mobile data, and are shaped by 2010's economic outlook. The topics we address include the growing importance of mobile search for smartphones, the success of VoIP on mobile devices, changes in network technologies and pricing plans to cope with the explosion of data, changing contracts both in terms of uptime and duration, and the sector's focus on reducing its environmental impact while saving money.

I am often asked about our Predictions' track record. We are never likely to be 100 percent correct. However, a focus on pragmatism and an aversion to hype has meant that we are more often right than wrong. We never include a prediction only because it will come true in the next year. Rather, our focus is on identifying potential "black swans" whose impact could have major, strategic ramifications for companies not just in the coming year, but possibly for many years to come.

As a result, each prediction is designed to start or stoke a further conversation – not to stop it. And we trust that the Predictions' launch, expected to take place in over 50 cities around the world in 2010, reaching over 5,000 industry executives, serves precisely this purpose.

I wish you every success for 2010 and beyond.

Jolyon Barker
Global Managing Partner
Technology, Media & Telecommunications

The smartphone becomes a search phone

DTT TMT predicts that in 2010 the smartphone will continue to thrive. Its share of the global mobile market is expected to grow, and it should enjoy solid increases in shipments, units, and dollar value. During the year, debates and headlines about smartphones are likely to concentrate on supremacy among devices, manufacturers, and operating platforms[2].

We believe that the most important battle to be waged in 2010 – leadership in mobile search – may fall outside of the radar screens of both analysts and the press, possibly because revenues from mobile search are expected to come in at a modest $1 to $2 billion[3]. Mobile search providers could end up spending several times that amount in order to strategically position their companies to better exploit future income streams[4]. Existing search engine platforms are likely to acquire additional functionality and capability[5]. Brand new mobile search engines may be launched[6]. Mobile search providers may invest in securing favorable positioning on phones[7]. And a growing range of partners are likely to be signed up as advocates and channels to market for each platform[8].

The enthusiasm over mobile search, whose performance has for many years tended to frustrate rather than delight users[9], will likely be driven by recent improvements and near-term potential. In 2008, just 7 percent of the U.S. mobile market used search[10]. A year later, 40 percent of Japanese phone users used mobile search daily[11]. Also in 2009, smartphone sales overtook portable PCs for the first time, with 180 million units sold, ranking it (by unit sales) as the leading portable computing device[12]. By the end of 2010, search is likely to be one of the five most-used smartphone applications, along with voice, messaging, calendar, and browsing[13]. By 2011, smartphone sales are forecast to exceed all PC sales (mobile and desktop combined), with 400 million shipments[14]. This should encourage PC manufacturers to diversify into smartphones[15]. By 2012, smartphone shipments could pass the half-billion mark[16]. In the same year, search is expected to generate the bulk of the $7.2 billion mobile advertising market[17].

There are concerns that mobile search could be non-additive, serving primarily as a substitute for searches that would otherwise be made from a fixed device. This is probably true for some users. But the impulsive, spontaneous nature of many searches, combined with good-enough mobile search on smartphones, should cause aggregate searches to rise in much the same way that early mobile phones caused the total number of phone calls to increase. We expect that users with both fixed and mobile Internet devices are likely to perform 10 percent more searches than fixed-only Internet users.

By the end of 2010, some aspects of mobile search may be superior to search using a PC. For example, mobile search could not only help you choose where to go for dinner or buy a gift, but also guide you there through integrated GPS navigation[18], turn-by-turn or even step-by-step[19]. The value of this function to advertisers and the providers of such services may prove lucrative.

Bottom line

The fight for preeminence among search providers is likely to be fierce in 2010 and for years to come. In the mid-term, just one or two players may dominate the space[20], but the contest is unlikely to be settled in 2010[21]. But within three years or so, the gap between the leading players and those lower down the food chain may have become extremely hard to bridge.

The central role that search is expected to play in future mobile platforms implies that arrangements to share revenues will likely be key to successful business models[21]. Handset manufacturers and cellular operators are likely to have a powerful influence on the outcome[22]. In 2010, manufacturers and operators may be able to play search platforms off one another, but picking the wrong partner solely on the basis of guaranteed income, for instance, could prove costly in the long run.

The battle over mobile search may also have a bearing on how smartphones are funded. Subsidies on smartphones may be co-funded by operators and search engine platforms. The search subsidy could tip a customer's purchase in favor of a particular model.

For users, a critical area of differentiation is likely to be the user interface[23]. The challenge – and opportunity – for mobile search engine developers is that smartphones are likely to be used in a variety of environments: at home, in the office, traveling, driving, being transported, or walking. Developers need to offer a variety of user interfaces for each context. A range of technologies would need to be integrated – voice recognition[24] for those in charge of vehicles, or visual search – whereby the search would be driven by images, rather than text[25]. Visual search would work well for those on foot. Existing technologies such as touch are likely to undergo constant iteration and improvement[26].

Developers of mobile search platforms should consider how best to adapt search to the unique characteristics of the mobile experience, which include variable network coverage and speeds. Users could be allowed to store up searches, which are only run once the user is back in network coverage. Mobile search should also integrate with searches performed on other platforms, particularly PCs. Saved searches and favorites created on a mobile device should also be made accessible on a user's PC-based search environment.

Search is likely to become increasingly important for application stores, given the rapid proliferation in applications. Developers should consider developing search engine platforms that work within a specific application store as well as across them.

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Mobile VoIP becomes a social network

DTT TMT predicts that in 2010, users and usage of mobile Voice over Internet Protocol (VoIP) should start to evolve from niche to mainstream, thanks to the availability of new services that blend a range of IP-based features around the mobile voice experience. In addition to offering low-cost calls, these services will offer a wide range of functionality including one-to-many calls, broadcast voice mail, and voice-to-text. Users of multifunction mobile VoIP services should reach tens of millions by the end of 2010[27].

Rising adoption of these services could cause a fundamental shift in expectations of what mobile voice can and should do.

VoIP via a mobile phone has been technically possible since the start of the decade, thanks to 3G and WiFi. In the past, it has been marketed mainly as a low-cost service, particularly for international calls[28]. VoIP is able to offer lower costs because calls are carried over the top of an IP-based network – outside the conventional toll-based network[29].

This means that the marginal cost of making a call over VoIP, whether over a fixed or mobile network, is zero if the caller has already made all required investments in devices and data plans.

However, issues such as restrictions on VoIP over 3G in some markets, patchy WiFi availability, the relatively high cost of WiFi-enabled phones, and the falling price of switched mobile telephony, have meant that mobile VoIP revenues have been modest, with turnover estimated at $50 to $100 million in 2009[30]. But within three years, analysts estimate the global mobile VoIP market could be worth over $30 billion[31].

One key supply enabler of mobile VoIP's growth may be a rise in the installed base of WiFi-enabled mobile phones. WiFi will likely be widely used as the preferred medium for the functionality available in mobile VoIP services, and shipments of WiFi-enabled phones should exceed 200 million in 2010[32]. Another enabler is the rise in WiFi hotspots, with public hot spots expected to number a quarter of a million at the start of 2010[33].

Demand for multi-function mobile VoIP is expected to be driven partly by the shifts in communication patterns. Mobile VoIP will be able to accommodate the growing trend of broadcasting to friends, rather than interacting with just one person. Widespread email usage and the more recent rise of social networks have driven the desire to communicate to many people at once. Voice, via mobile or fixed networks, does not readily offer this capability yet – but mobile VoIP can.

Multifunction mobile VoIP can also deliver a range of other functions that consumers have become accustomed to. For example, public Web-based email services offer unlimited storage and search, and mobile VoIP, combined with speech-to-text conversion, could deliver the same.

Mobile VoIP could also offer new services. Consider a system for voicemail storage, in which messages could be stored, searched for, made visual, transcribed, translated, and broadcasted to groups or sent to individuals. Similarly, text and picture messages, voicemails, and call records could all be cataloged by the sender. Incoming calls could be presented not just with the caller's name or number but also with the caller's location, status, and most recent updates. High-fidelity calls at higher prices could also be offered[34].

The quality of some of these services, such as "voice-to-text," may be shaky in 2010[35], but should steadily improve over the midterm. The number and variety of services available should rise steadily as well.

Multifunction mobile VoIP is likely to have its challenges. While some operators and service providers may encourage its use, others may restrict[36] or prohibit it[37]. Voice quality over WiFi is still variable, although improving. WiFi coverage is still far from ubiquitous, and WiFi-to-cellular hand-offs may remain problematic. Preconceptions may present another challenge – for some users, perceptions of WiFi's power consumption may have been sullied by the poor battery life of the first WiFi-enabled phones[38].

The version of mobile VoIP most likely to gain traction in 2010 is the one that does far more than just make conventional phone calls. In the long term, it could change the notion of voice telephony significantly.

Bottom line

Operators should understand the short- and mid-term implications of mobile VoIP. Routing calls over WiFi could reduce demands on the cellular network, catalyze the disappearance of the voice tariff, and reduce overall termination charges for smaller operators in markets with a "calling party pays" regime.

But operators should consider that companies outside the sector developing mobile VoIP applications may not necessarily be after a slice of the $700 billion mobile-voice market[39]. Instead, they could be using the allure of subsidized or free calls to devices to enable the flow of advertising messages, for example[40]. This approach could bolster the device or advertising sector, but would also have a serious impact on the value of the mobile-voice market.

If mobile VoIP results in declining revenues for operators, available investments for the maintenance of current networks could also drop, and funds available for the roll-out of next-generation infrastructure could be threatened. Pricing for data access may have to rise, perhaps by moving to metered bandwidth charges to compensate for the shortfall[41].

Companies that promote multifunction mobile VoIP are likely to include traditional operators – mobile providers looking to move traffic off congested cellular networks, for instance, or, standalone fixed-line carriers looking to provide a form of virtual mobile service[42]. Even classic market disruptors, such as technology companies diversifying their revenue streams, should be considered[43].

Portals such as Yahoo or Facebook could promote mobile VoIP applications as a way to encourage the use of smartphone versions of their websites, giving them a way to keep more eyeballs on their sites and create more loyal communication hubs.

Widening the bottleneck: telecom technology helps decongest the mobile network

DTT TMT predicts that in 2010 telecommunication technologies that make existing wireless networks perform better – hardware, software, and radio-frequency solutions – should experience much stronger growth than overall IT spending. Leading pure-play companies in this area are likely to see year-over-year growth approaching 100 percent, and even an average company is expected to grow by 30-40 percent.

The current consensus forecasts 2010 IT spending growing at about 3.3 percent[44]. Overall, the telecom equipment manufacturing sector is expected to grow at 3.2 percent, with spending on mobile networks growing at roughly 7 percent[45]. This is an improvement compared to the last two years, but it pales when compared to the double-digit growth rates seen in the late 1990s. There are several reasons why we are expecting certain pockets of technology to grow 10 times faster than the broader category of telecom equipment.

Broadband cellular technologies have been deployed for almost a decade, but it wasn't until 2009 that consumers really began to take advantage of the higher wireless speeds. At the start of 2010, there should be about 600 million mobile broadband connections between laptops, netbooks, and smartphones[46]. As a result, global cellular data wireless networks will have gone from underutilization to congestion, the wireless equivalent of traffic jams, in 18 months[47]. But in most of the world, this change in consumer use of mobile broadband was spurred by carriers providing large subsidies on devices and "all you can eat" data plans[48].

As a result, wireless providers are now addressing insufficient network capacity. But because data traffic is largely unmetered, there is no commensurate increase in revenues to pay for the required network upgrades. By 2014, network capacity issues should be dealt with by 4G technologies (Long Term Evolution (LTE) and WiMax), but in most service areas neither of those technologies will be fully deployed in 2010[49]. The challenge for carriers is determining what to do in the interim. And the problem is likely to get much worse as smartphones continue to take market share and new high-bandwidth devices like netTabs[50] become popular.

The short-term solutions are not as simple as one might think. In many areas, the spectrum is already allocated, fully utilized, and costly to purchase[51]. Increasing the power of the radios may not be of much help, nor would increasing the number of cell sites. In dense urban areas the radios are already as tightly packed as they can be, even if more sites could be found and permitted. Even transitional 3G technologies like HSPA+ and HSPA7.2 have limited benefits. Although they increase peak speeds for those in close proximity to the towers, those even slightly further away (more than 500 meters) or inside buildings, can experience a sharp drop-off in speed[52].

Finally, and most importantly, network congestion issues sometimes have less to do with providing very high broadband download rates to a few users. Instead, they often revolve around providing highly variable two-way bandwidth to many mobile users whose usage requirements change from minute to minute. One study found that smartphones generate eight times the network signaling load of a comparable mobile broadband-enabled computer[53].

At the start of 2010, there should be 600 million mobile broadband connections between laptops, netbooks, and smartphones.

The specific sectors we believe will see strong growth in 2010 include hardware and software companies. Hardware markets will include various kinds of backhaul, antenna, femtocell, and depending on regulatory decisions on net neutrality, deep-packet inspection and media management technologies. Software markets include policy management, compression, streaming, and caching technologies[54]. Although not a pure-play, WiFi providers are also likely to grow as a way of moving bandwidth off overstressed cellular networks.

Carriers are likely to embrace any handset or wireless modem technology that is more spectrally and bandwidth efficient.

Finally, there may be continued growth in bandwidth-aware applications. When a website is viewed over a high-speed fixed line, it will have all the "bells and whistles" (pop-up ads, pre-rolls, HD video, rich media, and Flash). However if viewed over a busy network, a "leaner" version of the Web, requiring half the bandwidth, would be served.

Bottom line

Manufacturers of traditional cellular network equipment are unlikely to benefit as much as the pure-play network decongesters. When LTE and WiMax networks are fully rolled out, the big telecom original equipment manufacturers (OEMs) should generate billions of dollars in sales. But in the interim, the technologies that are likely to succeed are either coming from new entrants or are too small in dollar terms to affect materially the top line of multibillion-dollar companies. The overall trend of sustained exponential growth in wireless broadband demand is likely to pull forward the implementation of 4G network builds.

Handset-makers, specifically of smartphones, are part of the problem and potentially part of the solution as they may manufacture some of the devices that "strain" the wireless networks. On the other hand, if they adopt technologies that enable lower network usage relative to their competitors, the carriers might focus promotional activities and subsidies on their devices.

Social networking, cloud computing, and streaming media companies rely on mobile broadband networks that work. But they can help by developing solutions that adapt to fluctuating bandwidth in real time, and by offering stripped-down versions of their products that continue to function, even when the broadband pipe turns narrow.

Wireless carriers are in a difficult predicament. They need to respond to customer needs for speed while trying to manage their usage through techniques that some clients may consider heavy-handed, like metered pricing and traffic management. But heavy spending on technologies to improve the mobile broadband experience may be futile in the short term. Based on evidence to date, if carriers improve mobile bandwidth capacity by an arbitrary X percent, consumers are likely to consume at least two times as much data. In other words, in 2010, any sensible increase in network capacity will probably be more than fully utilized by "data-gulping consumers," leaving carriers poorer, and customers just as unhappy as before.

Paying for what we eat: carriers change data pricing and make regulators happy

DTT TMT predicts that in 2010 North American network operators – both wireless and wireline – will likely move away from "all you can eat" data pricing plans. Instead, some customers will almost certainly be billed for *how much* data they use, and may even be charged for *when* they use it and also *what* kind of data is being used[55].

These new pricing schemes will likely be encouraged by regulators. Tying bandwidth consumption to the cost of providing it will reduce the need for carriers to use other tools to manage traffic, and may render much of the net neutrality issue moot.

The consensus view on North American data pricing has been that the only way to attract subscribers is to offer unmetered data. Moreover, the consensus also suggests that once made, the offer of unmetered data pricing can never be withdrawn without enormous customer backlash[56].

Although the net neutrality debate continues to rage in both Canada and the US, many industry observers believe that carriers are likely to be the biggest losers when the regulators lay down the law[57].

Motivated by a desire for net neutrality, regulators may introduce new rules allowing service providers to move to more usage-based pricing, and simultaneously defuse consumer complaints by observing that the carriers were practically forced to do so[58].

There is a strong need for more rational pricing, especially in the mobile market. Although consumers are signing up for broadband in record numbers, often encouraged by flat-rate pricing, networks are becoming congested and are either running slowly or denying access entirely. Unhappy customers are voicing their displeasure – but seem unwilling to pay more to improve service[59].

This phenomenon is most obvious on smartphone-congested mobile networks, but even high-speed landline broadband is beginning to bump up against capacity – especially as usage patterns shift. Where peak usage once occurred from 6pm to 11pm, it is now two hours shorter, from 7pm to 10pm[60]. The long-time pattern of some super-users remains consistent: 25 percent of all bit consumption is incurred by 1 percent of the users. But unlike past years, this is no longer primarily peer-to-peer (P2P) traffic. P2P is down from 32 percent to 20 percent according to one study, while video and audio streaming is the new traffic leader, up from 13 percent in 2008 to 28 percent in 2009[61].

Broadband providers have historically attempted to stigmatize P2P users as "bandwidth hogs"[62], suggesting that they are unrepresentative of the broader Internet user. They have even hinted that most P2P users are akin to pirates[63]. The service providers argued that they were therefore entitled to use various means to manage this traffic by "shaping" and "throttling" certain users or certain types of traffic[64].

Consumers and regulators alike have argued that these traffic management solutions are violations of net neutrality – effectively discriminating against certain users, and are possibly even a tool for the providers to steer customers away from cheaper services offered by competitors towards similar revenue-generating services offered by the carrier[65].

As 2009 came to a close, both the U.S. Federal Communications Commission (FCC) and the Canadian Radio-television Telecommunications Commission (CRTC) regulators issued draft net neutrality guidelines that, while not identical, were similar[66]. In each jurisdiction, the regulator was willing to admit that wireline broadband providers had the right to occasionally use traffic-shaping tools to manage their network. The Canadian regulator also said that although the draft rules did not yet apply to wireless broadband, they expect to eventually enforce similar rules on mobile, while the U.S. regulator included wireless immediately. However, the key aspect was that any traffic-shaping needed to be transparent to users and only used as the last resort.

In Canada, the regulator explicitly said that "economic measures" (meaning usage-based pricing) should be the first line of defense in managing network congestion. In the U.S., some of the larger carriers' first reaction was to discuss "pricing options" as the only viable way of handling the "inordinate usage" of some of their customers[67].

Although carriers have feared that net neutrality rules would force them to provide services that don't make sense economically, the reality may be that the new rules will make it easier for them to shift customers off the unmetered broadband plans that appear to be breaking their networks.

Bottom line

Moving away from "all you can eat" is only the first step – a key question is what kind of metering will work best. Should charges be similar to water or electricity? Or perhaps more like cell phone bundles?

Many Internet service providers offer tiered service, with various caps on total bits used in a billing period. But, once these caps are exceeded, each additional bit can be prohibitively expensive. These overage charges may make sense from the carrier's perspective as they create an incentive for the consumer to opt for more expensive plans[69]. But consumers argue that this approach is too costly for users and too profitable for carriers[70].
On the other hand, a pure metered "pay per byte used" could dramatically reduce revenues for carriers.

Hardware and software providers are likely to benefit, not only those that track and measure the speeds and bits provided, but also those that allow consumers to monitor their bandwidth consumption in real time – to prevent massive overage charges[71]. In a relatively weak telecom-equipment market, these players could experience much better than average growth rates.

Carriers and handset makers may also need to adjust current sales strategies. Much of the recent growth in broadband subscriptions has come from selling unlimited usage plans, and a move back towards the meter will require a new model, and will likely only work if all providers and device manufacturers cooperate.

The net neutrality debate is primarily a North American issue. Most global wired and wireless providers already have tiered pricing on usage, and therefore have less need for a regulatory incentive to move away from "all you can eat" plans. Also, when carriers do engage in traffic-shaping practices, there seems to be hardly any controversy outside of North America or the UK[72].

Nixing the nines: reliability redefined and reassessed

In 2010, we expect enterprises to become increasingly pragmatic about their need for quality of service in the telecommunications services they acquire. Enterprises are less likely to default to 99.999 percent or "five nines" reliability for all services contracted. They are likely to start determining quality levels on a per-application or per-process level, rather than unthinkingly opting for the highest availability levels across their portfolio of services[73].

A principal driver for this change is cost. A fragile economic recovery this year is likely to keep businesses focused on identifying unnecessary products or services[74]. Some businesses may decide to lower their reliability requirements from five nines, which is equivalent to just five minutes of downtime per year[75]. Moving to "three nines" would mean 525 minutes of downtime. Some enterprises may be comfortable with even fewer nines[76].

Making the move to three nines may appear negligible in percentage terms, but the potential reduction in costs gained by tolerating an occasional failure could be quite significant. The service architecture could be downgraded, off-hour technical support could be reduced, or response times may be relaxed.

Widespread adoption of mobile service has made business users more tolerant of variable call quality, including dropped calls, multiple attempts to obtain a connection, and in recent months, inconsistent levels of data network availability.

Enterprise tolerance of lower service levels will partly be conditioned by a rising failure rate across a range of technologies, and the ability for businesses to continue operating despite this. For example, the migration to VoIP introduced occasional dropped calls or bad connections to a previously failure-proof voice service[77]. Widespread adoption of mobile service has made business users more tolerant of variable call quality, including dropped calls, multiple attempts to obtain a connection, and in recent months, inconsistent levels of data network availability[78].

This conditioning has also been partly driven by the consumer experience. Inconsistent consumer broadband services, with occasional outages lasting over a day, have conditioned some users to surviving without broadband, at least temporarily[79]. And the experience of using the Web has also helped, since only a minority of the world's largest websites has ever attained 99.999 percent[80].

Many consumers' domestic telecommunications and technology set-ups already provide an additional layer of redundancy. Plus, business continuity planning catalyzed by worries about avian and swine flu has made enterprises better prepared for widespread work-from-home arrangements, should the enterprise network fail.

Some businesses' willingness to trade reliability for price has also been demonstrated by their interest in cloud computing, despite extensive (and often exaggerated) press coverage of outages at a limited number of providers[81].

Bottom line
A key requirement for both providers and customers is to understand exactly what is meant, or implied, by service levels.

The telecommunications industry, mainly suppliers and their direct customers, may want to move to a more easily understood commitment. For example, they may select to identify an acceptable number of hours of downtime per period rather than an availability level expressed in the form of decimal points. This approach may make it easier to determine need as well as feasibility. Regarding the latter, providing two-hour repair commitments to sites in rural locations may be nearly impossible to deliver due to travel times. For a customer this may imply paying for a service that could never be delivered.

Service providers should determine how their enterprise clients are likely to perceive the notion of reliability. Some business customers may increasingly value reliability in the form of redundancy, for example in the availability of multiple complementary network infrastructures. Other customers may prefer to focus on latency and be prepared to pay a premium for ever-lower response times.

Executives responsible for procuring services should evaluate the implications of changes to any service level. They need to understand how each will affect internal applications, such as intranets, as well as those that interact with their own customers, such as websites.

As for externally facing sites, such as extranets, the general trend is likely to be towards greater resilience, particularly if sites are supporting business-critical applications such as order-placing or collaboration tools.

IT and telecommunications departments, which are typically responsible for agreeing to service level agreements, should constantly review internal users' requirements and tolerance levels for downtime. Otherwise, agreements could get "gold-plated." Internal users may be able to cope with lengthier downtimes due to the availability of alternative infrastructures: broadband-connected home PCs can be used if office PCs fail, and mobile broadband, or even coffee shops, can substitute for corporate Ethernet connections. Where alternative infrastructures are being used, such as home networks, or public WiFi hotspots, enterprises should ensure that communications remain as safe as they would be in the office.

At the same time, service providers should constantly look for ways to reduce their maintenance costs, such as by using remote maintenance via fixed or mobile telecommunications links, investing in Universal Power Supply (UPS) power protection, where local power infrastructure is poor, or by replacing existing equipment with more reliable hardware.

Contract 2.0: long-term solutions shorten and multiply

In 2010, we expect enterprise demand for telecommunications solutions to rise[82], but contract terms to shorten from about 5 – 10 years to a minimum of about three years[83]. A sustained enterprise focus on costs is likely to stoke demand for solutions. The uncertain economic outlook and a general lessening of loyalty to technology platforms and providers are likely to keep contract lengths short. In a few cases, suppliers and customers may even decide that the most effective way to agree on price would be to revert to pay-per-use.

Best practices in telecommunications and technology procurement have generally favored long-term (up to 10 years) solutions-based contracts rather than pay-per-use billing. This approach usually needs to benefit both parties. For the supplier, long-term contracts enable a steady flow of income. For the customer, it should ensure better quality and lower costs. And for both, it implies a relationship founded on partnership. In 2008, the value of major (worth $1 billion or more) long-term technology or telecommunications contracts signed was $17.1 billion[84].

But even in times of relative economic stability, it has been challenging to form, agree upon, and translate accurately, a contract that can cope with every possible eventuality. The agreement has to be able to cope with, for example, changes to the customer's location and the supplier's points of presence, variations in the size of the customer's employee-base in every location, and arrivals and departures at the boards of both supplier and client. The contract also needs to be flexible enough to respond to changes in technology, some of which can enable new working approaches, such as virtualization, cloud computing and video conferencing. And the contract should be able to cope with a range of exogenous shocks, such as variations in the price of oil[85].

Until the global economy regains a measure of stability, agreeing to terms for longer than three years may simply become too difficult for the majority of deals. Long-term deals may become rarer. Responses to the recession, from suppliers and customers, may prove destabilizing to long-term contracts.

Suppliers may determine that reducing their scope of operations, geographic, functional or otherwise, is essential to improving cash flow, even if this means that existing contracts would no longer be honored[86]. Some customers may contract operations significantly; others may be on the cusp of a wave of acquisitions. Others still may want to make major changes to terms and conditions, perhaps dropping quality of service levels in general, or for selected services. A few companies may even want to move selected processes back on-shore[87]. And in general, customers will be looking to reduce cost at the same time that suppliers are likely to be focused on raising margins[88].

Contract lengths may also be affected by the consumerization of technology and the growing propensity to change suppliers, or even to purchase on a pay-per-use basis. This tendency applied to the solutions market may well imply a desire for shorter-term contracts, and in a few cases may result in reverting back to the tariff.

Bottom line

A failed contract benefits neither supplier nor customer. The cost of litigation for the largest projects can run into hundreds of millions of dollars[89] and can take years to conclude. Both parties should ensure that the contract is sufficiently robust to withstand the additional strains and stresses caused by an uncertain economic backdrop.

Contract terms may either need to be shorter in duration or else designed with built-in flexibility so that they operate like a series of shorter contracts. Robust contracts need to be rooted in reality. The agreement should be for a service that the supplier can realistically deliver, with sufficient margin to make the relationship worthwhile. Driving too hard a deal is unlikely to benefit either party over the long run.

Any contract is likely to suffer from a fundamental tension, such as a supplier's focus on margins versus the client's imperative to reduce costs. Suppliers and clients each have levers that can help them with their respective objectives, but they tend to produce short-term benefits. For example, suppliers can swap the team assigned to each client, deploying the alpha team only during bids, initial contract periods, and renewals. Clients can threaten to renegotiate if demands for extra services or higher quality of service levels are not met. But both approaches could cause resentment and may shift a partnership-based relationship to one riddled by mistrust.

Suppliers looking to increase margins may want to focus on specialization rather than scale. Leading an all-encompassing global solution may offer significant gross revenues, but profits may be eroded away by the strain of a cross-border project and third-party supplier management. Customers may determine that a best-of-breed solution may be more easily delivered by directly managing, rather than outsourcing, relationships with specialist providers.

For a contract to work, both parties must be able to quantify the value for money that a contract provides to either supplier or customer. If, in the absence of quantitative evidence, either signatory believes they are not benefiting from a contract, they may choose to tear up the agreement. If benefits are quantifiable but neither team has an adequate measurement system, tensions may flare.

The line goes leaner. And greener

DTT TMT predicts that in 2010, the global telecommunications sector is likely to focus heavily on reducing direct and indirect CO_2 emissions. On a per-line basis, emissions could fall by an average 10 percent – albeit against a background of increasing numbers of lines[90].

The global telecommunications industry, serving over four billion customers with an average of 1.5 lines each[91], generates 183 million tons of CO_2 annually. This amounts to about 0.7 percent of global emissions[92], a carbon footprint that compares favorably with those of the automotive and aviation sectors.

Operators' focus on reducing emissions will be driven by two key factors, with cost being the common denominator. In developed countries, a primary motivation for making lines lean will be cost *reduction*. In developing countries, where networks are still adding subscribers[93], cost *control* is likely to be the imperative.

In mature telecommunications markets, where mobile broadband is one of the few services experiencing any significant growth, operational efficiency is one of the last major profit levers remaining. A 10 percent reduction in carbon footprint could still deliver tens of millions of dollars of recurrent savings for a large operator[94]. Operators may also factor in the potential cost of carbon credits as an additional incentive to run their networks efficiently.

For fixed-line operators, the long-term strategy for reducing network energy consumption is likely to focus on next-generation, fiber-based networks. These promise lower operational costs relative to today's copper-based networks, with an expected 30 percent to 40 percent reduction in power consumption[95]. This is due to the variable power modes available (copper networks are normally always on), a reduction in the number of switching centers required (although more data centers may be required), and reduced need for heating or air-conditioning as a result of greater temperature tolerances.

Plus, the greater the bandwidth speed that DSL is engineered to deliver, the greater the potential energy savings from switching to fiber. This is because faster speeds over a DSL connection may require an increase in electronic interfaces and a commensurate increase in power consumption[96].

Mobile operators are likely to focus on reducing the cost of their radio network. Power-consumption per base station can reach 1,400 watts[97] and energy costs per base station are estimated at about $3,200 per annum with a carbon footprint of 11 tons of CO_2[98]. The radio network can represent up to 80 percent of an operator's entire electricity consumption[99]. The cost of backup, particularly in developing countries, can be carbon-intensive due to the use of diesel-fuelled generators. Operators in these areas could consider using fuel cells as alternatives[100].

The latest base stations consume up to 50 percent less power and are also said to be more reliable, which translates into fewer site visits[101]. Newer base stations function without external cooling, which reduces power consumption and maintenance overheads, and requires a smaller physical footprint. The absence of air conditioning alone can reduce the carbon footprint by 30 percent[102].

Power and cost efficiencies available from new base stations may prompt some networks to swap out their existing network of base stations[103]. An additional motivation for replacing existing base stations may also be to enable 4G upgrade capability.

Mobile operators may also consider a greater degree of network sharing. Operators' network sharing to date has focused mainly on sharing cell towers, or what is called "passive sharing"[104]. However, regulation permitting, mobile operators could undertake "active sharing" which involves sharing more strategic elements, including antennae and backhaul transmission.

In developing countries, operators are likely to focus on reducing energy costs for base stations located outside of the national electricity grid, which are already growing by an estimated 75,000 per year[105] or 30 percent CAGR[106]. Off-grid base stations' carbon footprints are generated first through their diesel consumption then by the delivery of the diesel to the site, finally by trips taken to maintain each base station. Operators are likely to look at a range of options for reducing each base station's cost base, with renewable energy (most likely a combination of solar and wind), under consideration as an alternative sources of power[107].

Bottom line

While the telecommunications sector's carbon emissions compare favorably with some other sectors, there is still considerable room for improvement. Equipment manufacturers should continue all possible approaches to improving network efficiency. For example, networks are normally powered at all times, even though their usage varies. Most networks are largely idle at night – at these times and other periods of low usage, networks should be powered down[108]. Manufacturers could look to some of the innovations developed to maximize power efficiency in mobile phones and see how these could apply to network components.

Device manufacturers should also continue to strive to reduce emissions caused by their devices. Initiatives such as turning off chargers once batteries are full and setting a single standard for chargers could have a massive impact[109]. Deployment of such innovations to a quarter of the world's mobile users could reduce the power consumption of a billion people. However, the growing use of smartphones may counter some of this progress. Smartphones tend to have larger screens and more powerful processors relative to the voice-centric phones and feature phones they are replacing[110].

Operators with fixed and mobile operations should also consider the merits of shifting voice and data traffic between fixed and mobile networks to reduce overall energy costs. The industry may want to consider how a move to metered broadband usage might discourage excessive network usage. Operators should also evaluate options for reducing emissions generated by maintenance teams. More reliable network technology could translate into fewer site visits. The range of vehicles used in a network operator's fleet could be rationalized to include a greater proportion of smaller vehicles. It may be that most engineers could carry the necessary tools and parts to service most jobs in a compact car, rather than a van.

In addition to reducing internal energy consumption, the mobile industry should remain focused on reducing indirect energy consumption, particularly the amount of energy used when charging phones.

The latest base stations consume up to 50 percent less power and are also said to be more reliable, which translates into fewer site visits.

Notes

The end notes consist mostly of the principal secondary sources used (published articles, press releases, vendor websites and videos). We have provided a compact URL for all sources that are available via the Web. Some of the sources referenced may require a subscription to view. Additional sources of information referenced in the end notes include discussions with vendors, industry analysts, financial analysts and other subject matter experts undertaken specifically as input to this reports. The end notes also include further background on some of the points made in the main body of the text.

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As the technology and media sectors rush to embrace all things digital and face the new challenge of transporting yottabytes of zeros and ones, the global telecom industry has emerged as the linchpin.

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