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BANKING AND 5G IS A THING

WHAT BANKS SHOULD KNOW NOW, AND HOW THEY SHOULD PREPARE

Daniel Latimore
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EXECUTIVE SUMMARY

5G is beginning to roll out around the world. It's 10 to up to 100 times as fast as its predecessor 4G, has higher capacity, and provides lower latency. It can be thought of as fiber over the air, and the bandwidth that it offers promises to cure many ills.

The power of 5G will offer forward-thinking banks the opportunity to improve the customer experience, develop new revenue opportunities, and reduce overall costs while shifting the allocation of those costs within the bank. Use cases are as varied as the places where 5G radio receivers will sit, ranging from improved mobile and video experience, to reduced back office costs for banks that can benefit from centrally maintained software pushed out to edge devices serving as thin clients (Figure 1).

Figure 1: Banking 5G Use Cases with Benefits by Hardware Device



Source: Celent Analysis

Telcos around the world have begun to roll out 5G, and 2020 looks to be the year when deployment goes mainstream. Because there will be a transition period from 4G to 5G, banks have a window to develop their 5G strategy on their own terms if they begin to act soon. Some effects of 5G will be obvious and superficial; others subtle and profound. The time to prepare is now; banks should have 5G on their technology roadmap.

INTRODUCING 5G: WHAT IS IT, AND WHERE DO WE STAND?

5G is the next big thing in mobile. It's going to profoundly affect a wide range of industries, but retail banking is not typically at the top of anyone's list. While the effects on banking may not be as seismic as they are for the Internet of Things, for example, bankers should nevertheless pay attention to 5G; it should have some subtle but significant effects over the next five years.

What follows is not meant to be a technical exposition of 5G. Instead, its aim is to educate retail bankers on the basics of 5G, lay out the implications and potential opportunities of the technology for banking at a high level, and suggest some concrete next steps for bankers to follow.

THE BASICS OF 5G

5G is simply a new set of standards for the next generation of mobile networks. We'll discuss its technical capabilities and how it's being rolled out.

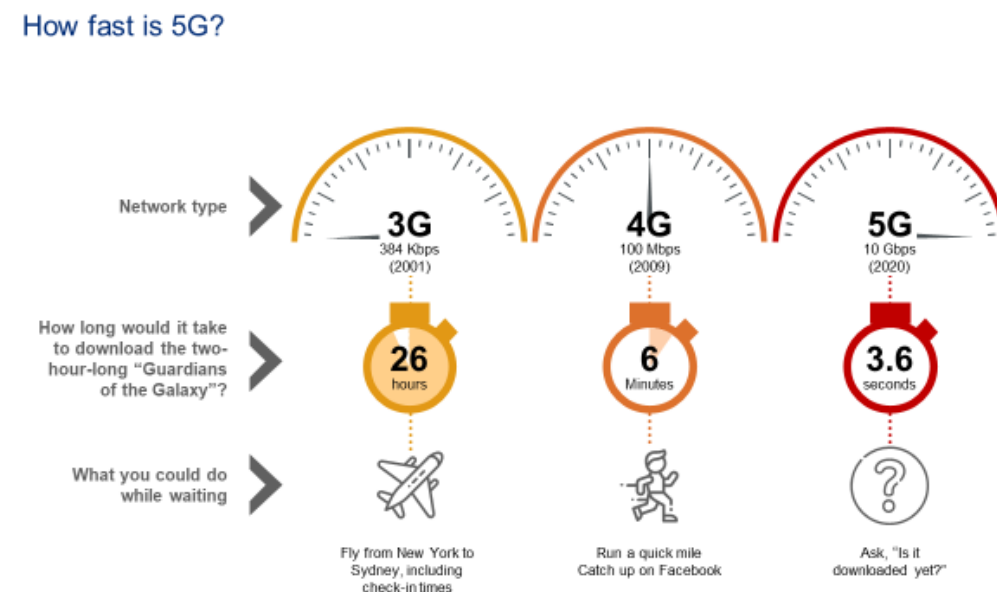
Technical benefits

5G is better than 4G on three critical dimensions: **speed**, **capacity**, and **latency**. If you think of the mobile airwaves as cars on a highway, *speed* is how fast the cars are going. *Capacity* is the size of the highway. Is the road a single lane, or is it an eight-lane superhighway? Finally, *latency* is the time it takes a signal to produce a response. Think about two self-driving cars communicating; high latency will lead to accidents, because there will be unacceptably large lags between communication and action. Low latency is critical to enable the cars to interact in near real time.

Speed

5G is 10 to 100 times as fast as 4G, depending on whether you're measuring peaks or averages. Figure 2 shows its speed relative to prior generations.

Figure 2: 5G Download Speed Relative to Prior Generations



Source: Verizon

Capacity

Improved speed isn't the only benefit that 5G offers, however. With increased *capacity* (think the number of lanes on the highway), many more users can achieve the same speed without slowing each other down. So one person could download several movies simultaneously without degrading speed, or many more people could be connected to the network without degrading performance (causing a traffic jam). Increased capacity reduces congestion.

Latency

The length of time it takes a stimulus to produce a response is measured by latency. A simple example comes from around the home: if you've ever been in a shower where trying to change the temperature has no effect for several seconds, you know how frustrating it can be. You don't know whether the changes you wanted when you turned the knob have had an effect, so then you turn it again, further muddying the situation. Lower latency is better.

In fact, lower latency enables viable *Multi-Access Edge Computing* (MEC), which we'll discuss in more detail below together with *thin clients*. Briefly, reductions in *latency* mean that calculations that need to be performed quickly no longer have to be processed directly on-device, but instead can be sent to a remote processing location (on-premise or in the cloud) with greater processing power, then sent back with little lag. To better understand how this is accomplished, we provide some high-level technical details (that you can skip if you're so inclined).

Technical basics

There are several different types of 5G technology: low-band (which uses some of the same frequencies as 4G), mid-band, and millimeter wave. Each has its benefits and drawbacks, so carriers will use a combination of all three, and receivers will be capable of switching among the frequencies to achieve maximum flexibility.

On the opposite end of the spectrum from 4G (literally), millimeter-wave technology runs at a much higher frequency, and because wavelengths are shorter, antennas can be much smaller. 5G's millimeter-wave spectrum is less cluttered with existing cellular data and its signals are directional (which means they will likely waste much less power). Base stations can support clusters of directionalized antennas, so orders of magnitude more devices can be supported.

There is, of course, a downside to millimeter wave. The biggest is that it works only when there's a direct line of sight between the antenna and the receiver. Millimeter waves can be hampered by concrete, glass, rain, or even humidity, so they travel shorter distances than 4G signals. That means that in 5G millimeter wave buildouts there will be more, albeit smaller, 5G antennas, perhaps even within buildings. When a millimeter wave signal isn't available, devices will use other 5G spectra.

Deployment highlights

5G, like its predecessors, is being rolled out sequentially. It is scheduled to be rolled in 30 major US cities by at least three of the four major carriers in 2019, and many more in 2020.

Every transmitter needs a receiver. Some (expensive) 5G Android phones have been introduced, but Apple doesn't yet have a model. Over time, though, new phones will be rolled out and the price will drop. On the non-phone receiver side, a similar story should play out: the relatively small inventory of routers and hotspots today will expand over time and prices will drop. This will let branches and ATMs connect to 5G networks.

A simple way of thinking about 5G is "fiber over the air." The technology has the potential to solve the last-mile problem for many installations where digging up a street to lay fiber

simply is not economically viable. While this will be a boon to many consumers, bank branches, particularly those without a fat pipe today, should also be the beneficiaries.

5G CAN BE A BIG DEAL FOR THOSE BANKS THAT TAKE ADVANTAGE OF IT

A skeptic would view 5G in the context of banking and think, “Great, now I can have a non-jerky video chat with a banker. Since I never chat with my banker, it’ll make no difference to me.” But the skeptic would be wrong. There are five broad areas where 5G can benefit banks. Three are customer-facing (that is, they’ll improve the customer experience), and two are behind the scenes (where they’ll benefit the bank through greater efficiency or reduced cost).

5G should drive changes in banking as logic shifts from the device to the network. Today’s processor-packed hardware — mobile phones and ATMs — may well become thin clients for banking purposes (from a computing perspective, a thin client is simply a minimally featured hardware device that exists to display the output of calculations performed by a remote server).

CUSTOMER-FACING 5G BENEFITS

As consumers buy 5G-enabled devices, they’ll begin to notice the benefits, first at the infrastructure layer (e.g., “Wow, my movie downloaded so fast” or “That sure is a smooth video chat!”), and later in individual apps. For the apps, we suspect that some will simply be faster with tweaking, while others will, over time, be written to take advantage of 5G’s capabilities. Banks will have the opportunity to use 5G to deliver a better customer experience in at least three areas. As the technology rolls out, we’re sure that others will develop.

Better customer experience

Customer experience is a critical priority for banks today. In fact, Celent maintains that customer experience is *the* differentiating factor as banks compete in an increasingly commoditized word. We believe that 5G can be used to improve three specific areas of customer experience.

- **Instant recommendations / nudges.** Banks and fintechs have been discussing the possibility of providing hyper-contextualized advice for several years. To date, though, it has remained just a possibility, with few if any robust efforts in production at scale that we’re aware of. As the lower latency of 5G kicks in, however, banks will be able to pinpoint a customer’s location virtually instantaneously (with permission, of course!). And now that the phone is a thin client, sending data to a powerful processor, a lot more analysis can be done, leading to better and more insightful recommendations. This opens up the possibility of what Celent describes as Personal Financial Experiences.
- **Simultaneous language translation.** Another task that can take advantage of the remote processing power is simultaneous language translation. American bankers can now be much more helpful and effective to non-fluent English speakers by using simultaneous translation program software.
- **Better video.** While video-banking has yet to gain significant penetration, 5G will certainly improve its performance, removing a hurdle to adoption. Now, if only getting consumers to change their behavior and speak to bankers via video were easier!

BANK BENEFITS

Banks will benefit from delivering a better customer experience over time by increasing retention and share of wallet. There are also a host of benefits that 5G can deliver more directly to banks, some of which relate to how they provide a better customer experience, and some of which simply lead to increased efficiency or lower cost. Another way of looking at the benefits is how they pertain to mobile banking, and how they pertain to the branch and ATM networks.

Benefits to mobile devices and wearables

If the 5G phone over time becomes a thin client, its processor won't need to become continually more powerful, nor will the memory be as much of a factor. Devices will be differentiated on cameras, sensors, and style.

And even if the mobile device doesn't become a totally **thin client**, banks can redesign how they deliver their mobile experiences.

- A bank can have a much more **lightweight app**, at the extreme just being a pointer to remote processing by a server. The perennial debate of native apps vs. responsive design will become moot. The thin device will make a call, that call will be processed remotely, and the output delivered back to the phone, all in the blink of an eye.
- Updates can be rolled out continuously on the back-end; users will all be accessing the **same version** on a server, and the light app itself will have to be updated much less frequently. Lower maintenance costs and total cost of ownership will be a boon to banks.
- This implies that **wearables** will be able to deliver much of the functionality of phones. The input mechanism is the key question mark, but as voice improves it can be that mechanism. The main hurdle will be behavioral: In what instances will someone be able or willing to use their voice to direct their watch or smart glasses?

Benefits to branches / ATMs

Some branches already have fiber connections, but it has to date been impractical or uneconomical for many others. While banks will need to change their behaviors to deliver improved customer experience, no longer will bandwidth / compute time be the limiting factor. "Fiber over the air" can solve the "last-mile" problem for branches located in a 5G footprint. Fiber-like speed opens up three main possibilities.

- Branch personnel can potentially use new technologies to **interact with customers**. "Whisper-bots" are one alternative, and simultaneous language translation is another. For those more remote branches that have video capability to access experts, that experience will be improved.
- **Pattern recognition** can be deployed as the branch has access to increased computing power. That access will make facial recognition much more feasible for those banks that want to deploy it (it's nascent technology, and there are a host of privacy issues associated with it). Foot-traffic analysis for larger banks can be performed essentially instantaneously and compared to remote databases.
- **ATMs**, like mobile, can potentially become **thin clients**. Banks can improve functionality, particularly through increased personalization and contextualization. When more than 40% of US consumers today still don't use their phone to bank, the ATM can be their primary digital experience. Banks can present different experiences to different users; why should a 50-year-old mother have the same screens presented as her 20-year-old son?

Ultimately, it's been said that "bandwidth cures many ills." There will likely be first- and second-order effects that we haven't yet conceived of that take advantage of the better speed, capacity, and latency afforded by 5G.

REAL TIME PAYMENTS

Real time payments is a subject unto itself, with implementation status varying considerably by country. 5G may play a role in improving the process, however. In a complicated payments transaction, many different elements communicate via a daisy-chain of microservices. High latency has the potential to disrupt this delicate balance of relationships; lower latency makes them much more feasible.

PATH FORWARD

5G is coming, but it's not going to arrive everywhere at once. From the consumer side, the widespread introduction of 5G phones will take some time. And from the infrastructure side, the consumer won't notice many of the changes. The good news, then, is that banks have some time to prepare. That said, banks cannot afford to be complacent. 5G will likely affect some of banks' most profitable and demanding customers first, and those who want the latest and greatest digital experiences will want them from their banks as well. Banks should consider six main areas as they develop their 5G strategy.

CONSIDERATIONS

- **Cost models** for the business will shift; spending will likely move from hardware to data. Because these buckets often sit in different parts of the bank, reconciling the shift (and the potential internal political power swings) will require deft change management.
- **Pricing:** If data spending is now going to be much bigger, how will data pricing be structured? Two models sit at ends of a spectrum: today's business 4G, which is typically metered, versus an unlimited data plan for a flat (but presumably substantial) fee. There will of course be hybrids, like an almost-all-you-can-eat plan with caps and surcharges. The jury is out on how this will play out; we suspect there will be a plethora of plans developed according to idiosyncratic needs and negotiating styles that will, over time, coalesce to a smaller basket of uniform, menu-driven plans for banks.
- **Lock-in** is a perennial question. Will a bank commit to a provider for a better deal, or give itself the flexibility to switch out sooner as market conditions change?
- **Enterprise architecture** will likely need to be reexamined as phones, branches, and ATMs become thin clients. Bank technology ecosystems are enormously complicated; figuring out the knock-on effects of 5G throughout these interconnected systems will be difficult.
- The rollout will take time; there will be a period **of coexistence with 4G**. Both will have to be supported for a transition period, and there will be a long tail of 4G users that banks will have to account for (particularly for iOS and Google apps).
- **Security** is an issue for every new technology; 5G will be no different. Although providers are attempting to build in security from the ground up, criminals are clever and motivated. They'll constantly probe for weaknesses; banks will have to develop the expertise themselves and likely partner with outside experts to defend this new attack vector.

WHAT TO DO TO PREPARE

- **Short term:** The next year is the time to learn more about the technology, speak to telecom providers, and develop a strategic plan. Consider use cases and work with providers to develop proofs-of-concept.

- **Medium term:** Consider how to execute on the initial stages of pilots, keeping in mind the considerations above. Learn from other industries and analogize to banking.
- **Longer term:** Deploy at scale to improve customer service, realize efficiencies, and reduce risk.

Banking continues its move to improving customer service while driving down the cost to serve. 5G will be but one element of the many forces that banks will bring to bear in this mission. Its effects range from the obvious and superficial (think faster video) to the subtle and profound (logic shifting from the device to the network; hardware spend shifting to data spend; and different parts of the banks having their budgets shifted).

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For more information please contact info@celent.com or:

Daniel Latimore

dlatimore@celent.com

AMERICAS

USA

99 High Street, 32nd Floor
Boston, MA 02110-2320

Tel.: +1.617.262.3120
Fax: +1.617.262.3121

USA

1166 Avenue of the Americas
New York, NY 10036

Tel.: +1.212.541.8100
Fax: +1.212.541.8957

USA

Four Embarcadero Center, Suite 1100
San Francisco, CA 94111

Tel.: +1.415.743.7900
Fax: +1.415.743.7950

Brazil

Rua Arquiteto Olavo Redig
de Campos, 105
Edifício EZ Tower – Torre B –
26° Andar
São Paulo SP 04711-904

Tel.: +55 11 3878 2000

EUROPE

France

1 Rue Euler
Paris
75008

Tel.: +33.1.45.02.30.00
Fax: +33.1.45.02.30.01

United Kingdom

55 Baker Street
London W1U 8EW

Tel.: +44.20.7333.8333
Fax: +44.20.7333.8334

Italy

Galleria San Babila 4B
Milan 20122

Tel.: +39.02.305.771
Fax: +39.02.303.040.44

Switzerland

Tessinerplatz 5
Zurich 8027

Tel.: +41.44.5533.333

ASIA

Japan

The Imperial Hotel Tower, 13th Floor
1-1-1 Uchisaiwai-cho
Chiyoda-ku, Tokyo 100-0011

Tel: +81.3.3500.3023
Fax: +81.3.3500.3059

Hong Kong

Unit 04, 9th Floor
Central Plaza
19 Harbour Road, Wanchai

Tel.: +852 2301 7500