



# Technology Brief...

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Research, Analysis, Strategy, Insight

## Intel Takes on ARM in Portable PCs

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Intel launched its Lakeview processor family that uses a 3D packaging system it invented called Foveros (see our Technology Flash research report “New chip techniques are needed for the new computing workloads”, 15 December 2018). It enables a full “stacking” of Intel standard, custom and even third party chips in a reduced form factor package with high speed internal interconnect and power management. In the age of miniaturization of computing platforms, anything Intel can do to enable more “svelt” devices is important to its fortunes going forward, especially as it competes with mobile-centric competitors’ ARM-based devices.

Lakeview includes 4 “little” cores and one “big” CPU core, along with Intel GPU and on board memory. In the higher end part, which it designates as a Core i5 class (there is also an i3 designated device), the big CPU and GPU are the same architecture as in its 10th generation core chips, and uses 10nm processing technology. What sets this new offering apart from other Intel chips is its size (12 x 12 mm), and its low power draw of 7W. Intel’s intent with this new product, which will have more derivations coming over the next several months, is to enable new extremely thin and light computers. But what it didn’t say in its announcement is that this is a direct attack at the growing threat of an ARM based Windows PC, in particular through a collaboration between Microsoft and Qualcomm.

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One advantage Intel does have is that its x86 architecture is still the best way to run a Windows machine. Although Microsoft has ported Windows to the ARM platform, its capability to run all early versions (e.g. non-Modern apps, which are still heavily used particularly in enterprises) is problematic. ARM chips may still have a power advantage (e.g., the high end Qualcomm Snapdragon 865 draws only 5 W), but Lakefield’s full Windows 10 capability, including the ability to run the enterprise edition so important to business users, makes it more attractive for business class products. However, what isn’t clear is how the two compare from a Bill of Materials perspective and what the final costs of any devices would be. We assume that Intel intends to be competitive, but it’s also likely that they will use the compatibility advantage to keep their prices somewhat higher than the competition.

Intel is targeting the Lakeview chips squarely at high portability form factors, where its small size and low power requirements are advantageous. This is actually one of the fastest growing segments of the PC market. Its Project Athena notebooks have shown good market penetration, and have reinvigorated the market for high end laptops (e.g., HP Dragonfly). This is also the segment of the market that ARM/Qualcomm are targeting but have so far had limited success.

While the Lakeview chips are no powerhouse when it comes to high end graphics/gaming, given the lack of hyper threading and only one high end CPU, its ability to run single threaded programs, representing the vast majority of traditional business and productivity apps, will make it a capable engine for most users. And the 4 little cores that can be employed in running background tasks as the big core sleeps, means the battery life should be excellent – even equivalent to something like a high end Smartphone. In fact Intel specified a 94% reduction in standby power, allowing a smaller form factor/battery combination. As part of the announcement, Intel indicated that two devices will begin shipping – the Samsung Galaxy Book S in June, and the innovative Lenovo X Fold in the 2nd half of the year.

**Bottom Line:** Lakeview provides Intel a chance to enable its OEMs to really innovate in form factors that were unattainable with earlier generation chips. While most of the new designs will likely center around full Windows 10 machines, there are likely to be some innovate “other” systems, like Chromebooks. When Intel announced its 3D Foveros capability last year, it only hinted at what the capabilities would be. With Lakeview, Intel has now produced a first generation offering that is impressive, with many more iterations of the technology to come.

## Why We Need WiFi 6E

Everyone has come to rely on WiFi, whether at home, in the office or in public places. Yet the ability for traditional WiFi system to keep up with the insatiable demand for more bandwidth supporting richer content has pushed many WiFi systems beyond their limits. Even the newer access points supporting WiFi 5/6 (802.11AC, 802.11AX) have become bogged down with the sheer number of connections and the amount of data being accessed by users who increasingly expect rich media/streaming content. And this is even more of a critical situation where high density connections are utilized, as in public venues and in enterprise/industrial settings.

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The US government recently approved the new WiFi 6E (E for extended) standard, opening up a much wider swath of bandwidth that will substantially enhance the ability of WiFi to handle the increased data flow. WiFi 6E extends the WiFi frequencies from the older 2.5GHz and 5GHz bands into the 6 GHz band where there is less traffic congestion. Further, the 6GHz band adds 7 high capacity 160 MHz channels of bandwidth (or a combination of more channels over smaller bandwidths) compared to just 2 channels of 160MHz on the 5GHz band. The total available WiFi 6E bandwidth of 1.2GHz in the 6GHz band is more than double that of the older 2.4GHz and 5GHz bands combined (320MHz at 5GHz and 100MHz at 2.5GHz). In addition to the increase in available bandwidth, the new channels offer less interference from other commercial applications, especially in the heavily used 2.4GHz band (e.g. microwave ovens, unlicensed radio, Bluetooth, etc., and even close by competing WiFi access points that can interfere).

WiFi6E chipsets have been announced by key suppliers (e.g., Broadcom, Qualcomm) that should make their way into access points available this year from all of the major suppliers (e.g., ASUS, Netgear, Cisco, etc.). Initially they are likely to be premium priced (\$200-\$300+), but like all commodity products will come down over time to be more price competitive with current WiFi6 models (\$100 - \$150). In fact, we expect a significant number of attractively priced access points to be available by the end of 2020.

The bad news is, if you’ve recently updated your access point to WiFi 6, you’ll need

to buy a new device to get to 6E. Also, there are currently no end point devices (e.g., smartphones, tablets, laptops) shipping with WiFi 6E installed. While companies like Qualcomm (the leading supplier of WiFi chips in smartphones and other equipment) have announced the FastConnect mobile chipsets that cover 6E (and of course are backwards compatible), they probably won't make it into smartphones and other devices before end of this year or early next. And as with access points, you will need to obtain a new device if you want to use the 6E capability on your endpoint. Still, we expect many will buy the new WiFi 6E access points in anticipation of upgrading endpoints on the normal upgrade cycle (e.g. approximately 18 months for smartphones, 3 years for PCs).

There is a compelling need for WiFi 6E and we expect to see a fairly rapid adoption in enterprise and large public venues (we expect the consumer market to trail the adoption ramp by 1-2 years). With no interference from older WiFi signals and other shared devices on lower band channels, an abundance of channels to connect to so as to support far more users, a high speed/low latency connection, the capacity for multi-gigabit speeds, and the ability to enable connectivity for thousands of simultaneous users makes 6E it a compelling addition in many environments.

**Bottom Line:** WiFi 6E represents a vast improvement in WiFi connectivity in speed, latency and capacity. It should be implemented in most public access areas as well as in enterprises that need the ability to handle a much larger number of users with high speed, low latency and little to no interference of competing signals. We expect WiFi 6E to become a staple of smart city deployments where high capacity is a requirement, although this will likely take 2-3 years to be prevalent. We expect public venues will be quicker to adopt WiFi 6E given their capacity needs. Enterprises may be laggards, given the slower upgrade cycle we're seeing in WiFi5 devices, but we believe the benefits of WiFi 6E should make upgrading attractive. Organizations should be planning a strategy now to implement WiFi 6E and begin installation within the next 6-12 months to take advantage of the many available enhancements.

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## Google's G-Suite Shoots for the Enterprise

Google's G Suite has been a very popular tool for many years, but other than a few key wins, Google has not been very successful in penetrating the medium to large enterprise market. Indeed, although Google claims 2B users, 140M students and 6M paying businesses use G Suite, compared with Microsoft's 1M companies worldwide using Office and increasingly moving to Office 365, we estimate that Microsoft holds a 75%-85% share of the medium to large enterprise market, where many companies buy thousands to tens of thousands of seats. But Google, invigorated by a new Google Cloud management team, is now aggressively targeting the Microsoft installed base with what might be its most competitive product yet, and is seeing some initial results.

With the move to a more collaborative, remote working environment than pre epidemic, and the fact that this new normal is likely to last indefinitely, Google is targeting Microsoft by claiming a much more integrated approach to workspaces. To fully take advantage of all the capabilities inherent in the Microsoft ecosystem, companies need to purchase various products, such as Office for productivity, Teams for collaboration, and even potentially external products like Slack. This requires users to switch between the various products with multiple instances of apps running. Google's approach to attacking Microsoft is to simplify and integrate all of the needed components in their one interface tool set of G Suite. While this will be an ongoing project for Google, it does give them the advantage of letting users interact with all the tools through “one pane of glass” and one interface.

Microsoft has had momentum in the productivity space for decades, as companies

standardized on Office. Workers who came into the organization were expected to learn Office if they were not already familiar with it. This worked very well as long as we were in a PC centric world. But of course, over the past several years we've moved to a much more SaaS and cloud based environment. With its commanding lead in powering education productivity at the primary and secondary level, there is now a large base of users who are G Suite centric. Google is trying to take advantage of the new class of workers now entering the workforce who are already proficient at the Google tools and do not want to learn a new set of products. With millennials making up 50% or more of the workforce, and much higher than that in newer organizations, companies are beginning to see the advantages of allowing employees to go with their personal preference. Of course Microsoft has countered the move to cloud with its own Office 365 products (renamed to Microsoft 365 to be more inclusive of other components) which are doing quite well, but they do not have the "seeding" presence in education that Google has, giving Google a huge base of users to engage with and to whom G Suite may be a preference.

#### *Enter G Suite Essential*

Google has created G Suite Essentials as an easy entry point for enterprise. Set up can be accomplished without IT involvement if desired. Essentials also includes collaboration tools around the Google Meets products, voice controls, connections with AI capabilities, and capabilities that negate the need for external programs like Slack. Google believes this makes the Essentials suite much more attractive to enterprises than having to purchase disparate products from multiple vendors. Moreover, because of the ease of adoption and the ability for newer users to come on board already familiar with the products, it believes verticals like retail and generally front line workers are prime candidates for the G Suite products. Indeed, Google indicated that Google Meets has powered many providers in telemedicine, and Google Forms has been used to gather information and capture feedback from customers, for use in analysis of products and services.

**Bottom Line:** While we see no immediate large threat to Microsoft's dominance in the productivity space, we do expect that Google's focus on fully integrated and simple to deploy solutions will ultimately allow it to increase its enterprise market share. Its familiarity by new workers and the move in many companies to allowing users a choice in productivity tools, coupled with more reliance on mobility and cross device use gives Google an advantage, particularly in newly forming companies. Finally, with its increased focus on enterprise, Google has signaled that it is serious about this market and will do what it needs to in order to increase its market share and satisfy its customers. A more dynamic market with increased competition in the enterprise productivity space will help all companies and their users longer term.



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*J. Gold Associates provides advisory services, syndicated research, strategic consulting and in-context analysis to help its clients make important technology choices and to enable improved product deployment decisions and go to market strategies. We work with our clients to produce successful new product strategies and deployments through workshops and reviews, business and strategic plan coaching and reviews, assistance in product selection and vendor evaluations, needs analysis, competitive analysis, and ongoing expertise transfer.*

*J. Gold Associates provides its clients with insightful, meaningful and actionable analysis of trends in the computer and technology industries. We have acquired a broad based knowledge of the technology landscape and business deployment requirements, and bring that expertise to bear in our work. We cover the needs of business users in enterprise and SMB markets, plus focus on emerging consumer technologies that will quickly be re-purposed to business use.*

*We can provide your company with a trusted and expert resource to maximize your investments and minimize your risk. Please contact us to see how we can help you.*