

August 6, 2021

Datetimes: August 6, 2021 (Our Tech Conference Starts Monday)

CLOUD AND COMMUNICATIONS

SUMMARY

On 8/2, Microsoft (Outperform) went live and revealed pricing on [Cloud PC](#) (Windows 365), the latest manifestation of our 20-year thesis of "network-centric computing," posited since prior to the existence of the Cloud. There are 12 available configurations, ranging from \$20-to-\$158/month, including a \$4/month discount for Windows 10 Pro users. A typical office user would spend \$41/month, a nominal 17% premium to a comparable Azure Virtual Machine/Desktop (AVD), assuming standard 10-hour workday. This comparison makes generalizations, as Windows 365 is based on flat per user fees, whereas AVD is consumption-based. The nominal premium is within our expectations, and justified by Cloud PC's ease of use, all-you-can eat model, and simplified administration that doesn't require any prior VDI investment or expertise. Converts phone/laptops/monitors into PCs, which Microsoft dubs "hybrid Windows for a hybrid world." (Cont'd p.2).

KEY POINTS

- Very heavy earnings week, with everyone reporting at the same time (links to our Notes on p.2). Strong Cloud Growth was the primary takeaway, but LUMN (Perform) and FSLY (Perform) had weak 2Q21 results, while RNG (Perform) executed well, but saw stock pressure due to long-term competitive/strategic threats like Microsoft above. All three have lingering issues, outlined in our downgrades in the past quarter. On the plus side, companies tied to Cloud (DOCN, NICE, VG, EGHT, NET)—all Outperforms—experienced nice demand tailwind, but getting pricey, with hybrid CCOI (Outperform) in-between.
- NET had a strong 2Q with revenue growth accelerating to 53% Y/Y, solidly beating our estimate. NET is building an edge platform, bundling in compute, storage, security, and networking to help developers/companies build next-gen edge applications, naturally fitting our 22-year thesis of cloud computing.
- Renewed pandemic concerns resulted in more paring Back-to-Office plans, which CCOI flagged. NY waffling on school re-opening. Pfizer unsurprisingly lobbying for third shot while raising vaccine prices +25%. In hindsight, Angela Merkel wins prize for dispassionately racing through entire Kübler-Ross DABDA, predicting way back in March 2020 that 70% of population would contract COVID-19, with no turning back. Digital Transformation here to stay, super-charging Cloud demand.
- Most interesting exchange at Fierce Wireless' 5G Blitz Week conference on Aug. 3 occurred between AT&T's Lee Rudolph, VP Mobility Core, and BT's Mark Henry, Tech Strategy. BT argued that "if you're the incumbent carrier . . . you have scale in network functions, you should build the 5G core and run it," whereas AT&T sounded like it had already gone through that progression, "at it for a few years," and concluded Microsoft can do infrastructure/software "at scale better."
- Chairman Gensler on 8/3 said the SEC will "regulate cryptocurrency markets to the maximum extent possible," calling it rife with "fraud, scams, and abuse." Mr. Gensler taught a course on crypto at MIT. Related, Ethereum just activated a "hard fork," which is expected to stabilize transaction fees and reduce supply of the Ether token.
- We host [Oppenheimer's 24th Annual Technology, Internet & Communications Conference on August 9th to 11th](#). Event includes virtual fireside chats with management and experts. *Please reach out to your OPCO rep.*

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For analyst certification and important disclosures, see the Disclosure Appendix.

Questions and Thoughts

1. How much will Lumen cut its dividend, as strongly hinted by management and by how much? We are assuming a 50–80% reduction that will be re-deployed toward much-needed growth investment. Stock will remain under pressure until after the cut.
2. Does ZM/FIVN make NICE, EGHT, and VG potential consolidation targets?
3. Can the public cloud truly run telecom workloads or do you need a unified telco cloud?
 1. Would DOX be an attractive tuck-in for hyperscalers looking to ramp their telco presence?
4. What is behind the fattening of companies' quarterly reports? Shakespeare wrote, "Brevity is the soul of wit"—does one need 80 pages of disclosures? In comparison, the US Constitution is four pages.
5. At what point does non-GAAP metrics lose relevance? We are seeing companies reporting pro forma expenses that exclude most costs for various debatable reasons.

Highlighted Oppenheimer Reports

CHTR 2Q21 Follow-up: Strong Execution Led by Broadband; Competition with Wireless in Focus. [Note Here](#).

AKAM 2Q21: Solid Quarter Led by Breadth of Security Products, Maintain Outperform. [Note Here](#)

RNG 2Q21: Very Strong Quarter, ARR and Partnerships Ramping as Expected, But Competition/Valuation Remain Concerns. [Note Here](#)

LUMN Signals Dividend Cut After Weak 2Q21 Results and \$7.5B ILEC Sale. [Note Here](#)

VG 2Q21: Beat & Raise Underpinned by API Strength, Successfully Executing Go-To-Market Strategy. [Note Here](#)

CCOI 2Q21: In-Line 2Q21 Results; Third Consecutive Quarter of Organic Growth Improvement. [Note Here](#)

FSLY 2Q21: Weak Quarter and Guide, Lowering Estimates, Stock Likely Pressured Until YE. [Note Here](#)

EGHT FY1Q22: Strong Quarter, New Management Dramatically Improving Product and Go to Market. [Note Here](#)

DOCN 2Q21 Was Very Strong, Management Execution and Strong Cloud Demand Drove Upside. [Note Here](#)

NICE 2Q21: Beat-and-Raise Quarter; Cloud Transition Continues with Upside in Digital and Larger Enterprises. [Note Here](#)

NET 2Q21: Very Strong Results; Raising Ests.~3% and Price Target 30% to \$130. [Note Here](#)

Microsoft Cloud PC (cont'd from p.1)

We agree, and as written in our white paper, business communications is converging with enterprise IT over the Cloud creating a winner-take-all, new virtual workplace, which we predict MSFT will dominate. Cloud PC, as well as last month's introduction of Windows 11, and its integration of Teams, establishes it as the de facto standard for the virtual workplace.

Ultimately, Microsoft, Amazon, and Google will continuously migrate from core data centers to the edge, and eventually to consumer devices end-to-end, which is behind the recent developments with DISH/AWS and T/Azure, as the Cloud ate Telecom.

Cloud PC is currently only available to businesses, but we expect it to expand to consumers, and for Microsoft to start offering thin client devices similar to Chromebooks. Data is the new gold, becoming more valuable and collected, can train AI models, and increase network effects.

Specifically to Cloud PC, we can envision this segment eventually adding \$100B to Microsoft's revenue assuming 100–150M penetration vs. 1.3B existing Windows installed base, and Windows 365 will also enable adjacencies and expand the TAM into Apple and Android domains being O/S agnostic.

Major News This Week

Ondas (Outperform) on August 5 completed its acquisition of American Robotics, which we view favorably. American Robotics has first-mover advantage being approved by the FAA to operate its

drones without a human on-site, and employs a very accretive recurring business model that benefits from the substantial price umbrella advantage against piloted drone services costing ten times as much. A/R had recently disclosed that it received a purchase order from a Fortune 100 Oil and Gas Company, consistent with previous guidance. Ondas CEO Brock disclosed that, "In the six months since receiving its FAA approvals, American Robotics has increased business development activity in key industrial sectors by 80 percent."

VZ Revives and Increases Its Broken Phone Promo to a Whopping \$1,300: On August 3, VZ re-launched its broken phone trade-in offer originally made available in April. New and existing customers adding a new smartphone line can get up to \$800 off with a select trade-in and select Unlimited plans. New customers can also get up to \$500 to help cover their costs to switch. This compares to the original deal of \$1,000 in April. **OPCO:** As we expected, VZ is now responding to losing flowshare with more aggressive promos.

DigitalBridge Building Datacenters "Everywhere": The company cited high multiples to acquire existing assets of 26x EBITDA for datacenters and 28x for euro towers, which are more than 3x replacement costs, for its decision to ramp construction vs. M&A. Management was very methodical in explaining, citing its Salt Lake City datacenter built for 10x EBITDA vs. take-private value of 26x. Like EQIX, DBRG is also placing heavy emphasis on ESG for social, and possible funding reasons. The company is deploying most of its capital to Hyperscale and Edge, where it is "super-bullish." These comments were made in conjunction with DigitalBridge's strong 2Q21 results on August 5. Of course having extremely low interest rates drives more infrastructural builds and eventually oversupply.

Senate debating \$65B broadband stimulus legislation this week: details could change, but currently: 1) requires providers to offer download speeds of at least 100 Mbit/s and upload speeds of at least 20 Mbit/s, 2) providers must offer low-cost option, but details unclear, 3) the legislation mentions digital redlining, but doesn't "provide explicit prohibitions," and 4) sets aside billions of dollars for low-income Americans via the FCC's Emergency Broadband Benefit (EBB) program.

Casa Systems Hints that Cable Network Upgrade Activity Is Picking Up: On July 30, Casa Systems said that upgrade activity around new cable network projects is starting to rise. A large portion of the activity for hybrid fiber/coax (HFC) networks is using high-split upstream upgrades and virtualization technologies. Casa said it's seeing some North American operators expand the upstream spectrum band to 5MHz-204MHz, up from 5MHz-42MHz on DOCSIS networks. **OPCO:** The upgrades coincide with demand for improvements in upstream performance amid COVID-19.

How Amazon Is Using High-Tech Cameras (big brother?) to Rate Driver Safety, good for Digital Infrastructure: On August 2, The Information published an article stating that they viewed confidential documents showing how Amazon is using video cameras in delivery vans to collect safety data about drivers that can affect the profits of the independent companies that employ them. The data can be used to determine whether drivers keep their jobs. For example, Amazon dings drivers who tailgate for 10 seconds or more with violations. These cameras, using AI, can also note safety violations when drivers blow through stop signs and perform illegal U-turns. According to these documents, running a red light is equal to ten infractions. **OPCO:** This data is likely stored onboard and downloaded on WiFi, but if 5G costs come down this information could be real time.

Dish Launching Postpaid Offer Next Year, Comments on MVNO Deals: On August, 2, Dish announced its preparing to introduce a new brand next year that will offer postpaid wireless services, as expected. The goal is to give its top prepaid customers (9M subs total) an option to upgrade to postpaid. Separately, Stephen Stokols, who oversees Dish's wireless brands, said the company doesn't necessarily want to replace TMUS with T regarding the MVNO deal. "The intent is to straddle the two. The intent is to have two networks. That's not abnormal for an MVNO of our size," Stokols said. **OPCO:** Smart strategy, particularly if they can roam on the highest quality or lowest cost network at any given moment or on their own. The carriers will likely try to compete for these subs. As for the MVNO topic, the deal is positive for T and gives Dish optionality.

SBA Sees Tower Activity Accelerate from Dish: On August 3, 2021, SBA commented that tower activity from Dish is increasing in the form of new leases. Dish is expected to turn on its network in Las Vegas in the next few months. Separately, it has seen a step function change from VZ.

ERIC Loses Share with China Mobile, as Expected: The *WSJ* reported August 3 that China Mobile awarded in July 5.4% of its latest 5G-equipment tenders (~\$6B) to non-Chinese suppliers, down from 11% in its previous round in 2020. ERIC, which after winning all of that 11% last year, fell to 1.9% this round. Huawei was awarded 60.5% vs. 57.7% last year and ZTE won 31.2% vs. 28.9% last year. Related, countries that have enacted or are considering restrictions against Huawei comprise 60%-plus of the world's \$35B cellular-equipment market, according to Dell'Oro Group. **OPCO:** Outside of China

ERIC and NOK are winning half of their potential deals from wireless carriers switching their equipment suppliers due to "political reasons."

TMUS Plans to Shut Down Sprint's LTE Network by June 30, 2022: On August 4, TMUS confirmed to Light Reading that it will shut down the Sprint LTE network by June 30, 2022. TMUS previously disclosed it will shutter Sprint's 3G CDMA network on January 1, 2022. An unspecified portion of Dish's Boost Mobile customers still rely on Sprint's CDMA network. **OPCO:** This could cause a higher churn event for Dish.

Rakuten Plans to Acquire Virtualized Open RAN Vendor Altiostar: On August 4, Rakuten announced it plans to purchase Altiostar for \$1B. Rakuten had previously invested in Altiostar. The acquisition provides Rakuten with a reduced cost of operations, as it is now essentially paying itself for key software components, as well as a revenue stream from Altiostar provided solutions for other network operators. Interestingly, Altiostar is a vendor for Dish, Bharti Airtel, and Telefonica.

Mastec reported 2Q earnings with record 18-month backlog as of June 30, 2021, of \$9.2 billion, up \$1.3 billion sequentially. The digital infrastructure construction company saw record segment backlog in Communications, Clean Energy and Infrastructure and Electrical Transmission. Backlog was up 13% yoy and 17 sequentially. However, 2Q21 Communications revenue and EBITDA was actually down YOY. **OPCO:** The results suggest very strong CAPX trends for 5G, positive for our cloud infrastructure names.

DataDog reported earnings, highlights include an accelerated pace of YoY growth (+66.8% vs. +51.3% in 1Q21), record new customer additions, and strong net retention of >130%. Datadog's results topped consensus (\$233.5M/\$0.09 vs. \$212.5M/ \$0.03E) with sales +66.8% YoY. **OPCO:** The strong earnings results reflect strong demand for cloud as witnessed by our cloud universe.

FT reported 8/5 that AAPL will install "neuralMatch" to American iPhones that will automatically and continuously scan your phone through machine learning for child porn, alerting law enforcement after human verification. Concern is Apple will eventually be pressured by other governments to expand distributed bulk surveillance to other areas for political retaliation, which is inevitable, and the dark side of Cloud.

Recent OpCo White Papers

C-Band Auction Over, Technology/Competition Driving Up Spectrum Values. TMUS has shown the industry the radical improvements of 5G operating on a large chunk of mid-band spectrum, enabling a wireless quad-play service and making spectrum more valuable. TMUS is years ahead of the competition; this has driven up C-Band spectrum cost to ~\$94B, versus our \$50B estimate. We see VZ and T playing both offense and defense in this once-in-a-generation auction. We are lowering EPS estimates for VZ/T/CCI as a result, and lowering CCI's price target from \$195 to \$170. We expect VZ/T to spend ~\$40B/\$20B. Carriers won't generate revenue from C-Band for a few years, and costs are increasing. Positively, wireless has now adopted cloud technology that will drive a more horizontal and innovative supply chain, driving the convergence of wireless/wireline/cloud, new enterprise capabilities, and a viable quad-play service. This report looks at the drivers of this industry transformation and auction impacts. [Note Here](#)

Virtual Workplace White Paper: Communications and Applications Converge. Business communications is converging with enterprise IT over the cloud, creating a winner-take-all, new virtual workplace. Teams is a once-in-a-decade new service/ platform that should win the race to serving a billion global virtual knowledge workers. We expect difficult-to-imagine services to evolve, which are sure to include AR, AI, and Quantum Compute. This trend will expand the overall enterprise communications market and drive greater cloud/bandwidth usage. Teams, the dominant virtual workplace platform, has seen subscribers surge 10x in 1.5 years. Its platform enables network effects with partners and leverages its enormous Cloud, Applications, and Distribution infrastructure, creating a positive flywheel. COVID-19 has accelerated this process by several years, and we see very strong growth in 2021 for Cloud Communications and Productivity Software as a whole. MSFT, EGHT, and VG should continue to outperform the market. [Note here.](#)

Blockchain White Paper: Token-Based Apps Drive New Collaborative Services. Bitcoin has kick-started the infrastructure development that has enabled new blockchain-based applications, particularly in finance and logistics supported by tokens. These applications automate trust and with Tokens have created new community-based applications that were here-to-fore not possible, digital banking and farm-to-table food being two among dozens of others. We believe this will ultimately lead to a more distributed

compute environment driving demand for key suppliers AKAM, MSFT, AWS, and EQIX to banking, payments, asset securitizations, and supply chain management, etc. We will focus on the investment potentials and impacts of Blockchain at our November 19th Virtual Blockchain Conference, as well as the developing ecosystem that could make blockchain a trillion-dollar market in the next decade. [Note Here.](#)

5G White Paper: Expect Stronger Revenue, CAPX, and Cell Site Growth. 5G will increase wireless capacity 10x and reduce latency by 1/10th, while lowering operating expenses. 5G will drive wireless/wireline/cloud convergence and Fog as well as consolidation. The wireless addressable market should double to \$150B, driven by: 1) fixed wireless; 2) IoT/enterprise networks; and 3) higher usage/quality. We see a 10%-plus pickup in annual CAPX spending (excluding a potential \$80B in Federal broadband stimulus) and a doubling of cell site growth, helped by TMUS/S/ DISH. However, COVID-19 has caused new permitting and construction delays, short term. Other COVID-19 impacts are likely to last six months and could lower ARPU's, and, if last longer, CAPX. Regardless, 5G should accelerate wireless growth to 3% Y/Y in 2021, up from 1%. We detail each carriers' wireless strategy, with VZ the most aggressive. [Note Here.](#)

Cloud Asset Utilization Whitepaper: It encapsulates our 20-year investment recommendations and more importantly how to make money over the next 20. Our approach has been to focus on companies that have unique assets that benefit from cloud growth, which is shifting to FOG/5G. These compute/network shifts have historically created major investment opportunities. We see GOOG, EGHT, FSLY, VZ, and a potential Dish/FANG partnership as well positioned in this shift. The best companies have unique assets and very low marginal costs on incremental revenues. This can take the form of infrastructure (AMT/EQIX/FSLY/VZ) software that leverages the cloud for provisioning, distribution, and sales (EGHT), or lowers sales costs through upselling multiple products. [Note Here.](#)

OTT the Third TV Wave—Catalyst for Cloud/Wireless Infrastructure: We believe that time-shifted/-delayed content is a dramatically better service than legacy TV, at half the price. Subscribers have better and more content that can be viewed anywhere at anytime. We see new technologies (VR/AR/5G/interactivity) as further improving the experience, particularly for betting, social interaction, and new user-created content from better smartphone cameras/connectivity. In the next six years, four billion global customers will be able to view over-the-top (OTT) services on LTE smartphones, in our scenario, up from 1.3 billion currently. OTT "eyeball time" per subscriber should double, driving OTT volumes up 5x within six years. New streaming services will weigh on legacy cable/satellite TV, for which we expect subscriber count to decline ~4% per year. Sports will become the only service watched on live TV, we believe, and will slow the transition but not prevent it. [Note Here.](#)

Cloud Set to Drive a New "Roaring 20s" Defined by Big Productivity Improvements: The cloud is the most important technology in our lifetimes. It is enabling IoT to collect data; blockchain to secure it; and AI, AV, Robotics, and Genomics to create powerful new services. Every industry and segment of society are set to be radically altered from a combination of one or more of these technologies and dozens of smaller ones. We highlight the impacts to financial services and the transportation industry in this report. The cloud itself is evolving to meet the needs of these new technologies by becoming globally meshed to the edge, or "fog." This suite of technologies greatly improves predictive capabilities in almost every industry/service for the first time ever and likely will drive \$10 trillion plus in global market value in the next decade. [Note Here.](#)

Artificial Intelligence: Driving the Next Century of Technology. Artificial intelligence is set to drive 25% of global GDP growth in the next decade. Hyperscale internet companies will dominate AI, with their \$200B in cloud-related revenue (\$900B in total revenue) and \$100B in combined cloud R&D/CAPX, all doubling in the next five years, we estimate. We focus in this white paper on the \$50B in the enterprise public cloud market (AWS, AZURE, GCP) vs. the \$150B consumer cloud market that FB, GOOG, NFLX, and AMZN have used to develop AI and that is now being applied to enterprise. Enterprise cloud migration will now accelerate. Our thesis for the past seven years on cloud is that the incremental operating leverage is and will remain very high, as it is for wireless carriers/infrastructure. [Note Here.](#)

Stock prices of other companies mentioned in this report (as of 8/5/2021):

Dish Networks (DISH-NASDAQ, \$41.84, Not Covered)

Pfizer (PFE-NYSE, \$45.06, Not Covered)

BT Group (BTGOF-OTCMKTS, \$2.34, Not Covered)

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Colony Capital (DBRG-NYSE, \$6.98, Not Covered)
Casa Systems (CASA-NASDAQ, \$7.08, Not Covered)
Ericsson (ERIC-NASDAQ, \$11.54, Not Covered)
Nokia (NOK-NYSE, \$6.19 Not Covered)
Rakuten (RKUNY-OTCMKTS, \$12.38, Not Covered)
MasTec (MTZ-NYSE, \$100.41, Not Covered)

Exhibit 1: OPCO 24th Annual Virtual Technology, Internet & Communications Conference Schedule



Monday, August 9, 2021

Agenda as of 8/5/21

	Track 1	Track 2	Track 3	Track 4	Track 5
12:25 PM - 1:05 PM			Verizon (VZ)		
1:15 PM - 1:55 PM		Valens*	Akoustis (AKTS)	DialPad*	
2:05 PM - 2:45 PM	CloudBees*		Anterix (ATEX)	Frontdoor (FTDR)	
2:55 PM - 3:35 PM	Live Tiles (LVT)	eGain (EGAN)	Navitas*		
3:45 PM - 4:25 PM	Zix (ZIX)	OSI Systems (OSIS)	Ondas (ONDS)	Resonant (RESN)	Salesloft*
4:35 PM - 5:15 PM	Outfront Media (OUT)			Klaviyo*	

1x1 Meetings Only
 ASML (ASML)
 Points International (PCOM)
 Progress Software (PRGS)

*Private Company

Exhibit 2: OPCO 24th Annual Virtual Technology, Internet & Communications Conference Schedule Continued

Tuesday, August 10, 2021

	Track 1	Track 2	Track 3	Track 4	Track 5	Track 6
8:15 AM - 8:55 AM	Redix Labs*	BlueCity Holdings (BLCT)	Akamai (AKAM)	NCR (NCR)	Angi (ANGI)	Applan (APPN)
9:05 AM - 9:45 AM	AT&T (T)					
9:55 AM - 10:35 AM	Fastly*	Luna Innovations (LUNA)	NICE (NICE)	Amyris (AMRS)	Knowles (KN)	Black Knight (BKI)
10:45 AM - 11:25 AM	Ping Identity (PING)	Redfin (RDFN)	Cogent Communications (CCOI)	Sprout Social (SPT)	Insight Enterprises (NSIT)	Turtle Beach (HEAR)
11:35 AM - 12:15 PM	Fortinet (FTNT)	Enphase Energy (ENPH)	RingCentral (RNG)	Inception*	Diebold Nixdorf (DBD)	POET Technologies (POET)
12:25 PM - 1:05 PM	DataStax*	Blade (BLDE)	Zendesk (ZEN)	Cloudflare (NET)	PROS (PRO)	EverQuote (EVER)
1:15 PM - 1:55 PM		Itron (ITRI)	Impinj (PI)	GoPro (GPRO)	Brightcove (BCOV)	Amdocs (DOX)
2:05 PM - 2:45 PM	Skybox*	Hannon Armstrong (HASI)	Cirrus Logic (CRUS)	Iterable*	OneStream Software*	Oracle (ORCL)
2:55 PM - 3:35 PM	Recorded Future*	Quotient Technology (QUOT)	Achronix*	Vonage (VG)	Paycom (PAYC)	Vimeo (VMEQ)
3:45 PM - 4:25 PM	Egnyte*	Sonder*	Ambature*	Interlink Electronics (LINK)	SEI (SEIC)	CSG (CSGS)
4:35 PM - 5:15 PM	InterDigital (IDCC)	Lantronix (LTRX)	Transphorm (TGAN)	Pendo*	Benchmark Electronics (BHE)	Workhuman*

- 1x1 Meetings Only**
- Ateryx (AYX)
 - Arista Networks (ANET)
 - Blackberry (BB)
 - Groupon (GRPN)
 - Juniper Networks (JNPR)
 - LendingTree (TREE)
 - Match (MTCN)
 - Radware (RDWR)
 - SAP (SAP)
 - Silicon Motion (SIMO)
 - Visa (V)

*Private Company

Exhibit 3: OPCO 24th Annual Virtual Technology, Internet & Communications Conference Schedule Continued

Wednesday, August 11, 2021

	Track 1	Track 2	Track 3	Track 4	Track 5	Track 6
8:15 AM - 8:55 AM	Pegasystems (PEGA)	Boqii Holdings (BQ)	Perlon (PERI)	Transcat (TRNS)	Airspan*	Digital Turbine (APPS)
9:05 AM - 9:45 AM	Druva*	Compass (COMP)	Intrado*	Yext (YEXT)	Euronet (EETF)	Avature*
9:55 AM - 10:35 AM	Vectra*	Lemonade (LMND)	Veeco (VECO)	Unity Software (U)	Yalla Group (YALA)	Ribbon (RBBN)
10:45 AM - 11:25 AM	Illumio*	Boxed*	Nayax (NYAX)	Qualtrics (XM)		Universal Display (OLED)
11:35 AM - 12:15 PM		SimilarWeb (SMWB)	Monolithic Power Systems (MPWR)	Zeta Global (ZETA)	Avaya (AVYA)	CEVA (CEVA)
12:25 PM - 1:05 PM	Arctic Wolf*	Roman Health Ventures*	RF Industries (RFIL)	KORE Wireless*	Sunrun (RUN)	Nanosys*
1:15 PM - 1:55 PM	Absolute (ABST)	tuboTV (FUBO)	8x8 (EGHT)	Quantum (QMQO)	Veritone (VERI)	Porch (PRCH)
2:05 PM - 2:45 PM	CircleCI*	3D Glass Solutions*	Cambium Networks (CMBM)	Locus Robotics*		NextNav*
2:55 PM - 3:35 PM	ScienceLogic*		DigitalOcean (DOCN)	Emburse*	MaxLinear (MXL)	
3:45 PM - 4:25 PM	Extreme Networks (EXTR)	Iteris (ITI)		TalkDesk*	Cornerstone OnDemand (CSOD)	Taboola (TBLA)
4:35 PM - 5:15 PM	Kulicke & Soffa (KLIC)	T-Mobile (TMUS)	Kaleyra (KLR)	HighRadius*	Enovix*	

- 1x1 Meetings Only
- Amkor Technology (AMKR)
- Atlassian (TEAM)
- Automattic*
- CalAmp (CAMP)
- Check Point Software (CHKP)
- Datadog (DDOG)
- Jfrog (FROG)
- SiriusXM (SIRI)
- ST Microelectronics (STM)
- Synaptics (SYNA)
- The Trade Desk (TTD)
- Twilio (TWLO)
- Vacasa (VCSA)
- Verra Mobility (VRRM)

*Private Company

Exhibit 4: Pricebox as of August 5, 2021

		Tim Horan, CFA 212-667-8137 Timothy.Horan@opco.com			Noah Herman 212-667-7119 Noah.Herman@opco.com			Edward Yang 212-667-8459 Edward.Yang@opco.com			Operating EPS		P/E Multiple On Rel. 2022E To EPS S&P	5 yr. estim. To 2022E EPS Grwth.	Firm Value to 2022E EBITDA		2022E FCF Yield	2022E Net Debt/ EBITDA	Div. Yield %			
											2022E	2021E			\$ Amt.	% YOY				\$ Amt.	% YOY	2022E
Rating	Price 8/5	2020	YTD	Market Cap. (Mil.)	Firm Value (Mil.)	2022E Revs (Mil.)	'22E Rev. Mult.	2021E Revs (Mil.)	2022E \$ Amt.	2021E % YOY	2022E \$ Amt.	2021E % YOY	2022E EPS	2021E S&P	5 yr. estim. To 2022E EPS Grwth.	2022E EBITDA	2021E Multiple	2022E FCF Yield	2022E Net Debt/ EBITDA	Div. Yield %		
Cloud Services																						
Cloudflare (NET)	Outperform	\$121	345%	60%	37,160	36,517	830	44.0x	615	0.02	NM	(0.10)	NM	NM	NM	50%	87	420.2x	(0.0%)	NM	0.0%	
DigitalOcean (DOCN)	Outperform	\$57	--	--	6,135	5,557	555	10.0x	427	0.50	108%	0.24	NM	114.9x	532%	50%	183	30.5x	0.6%	NM	0.0%	
Fastly (FSLY)	Perform	\$40	335%	(54%)	4,604	4,606	415	11.1x	346	(0.51)	NM	(0.57)	NM	NM	NM	NM	(29)	50%	(1.7%)	NM	0.0%	
Microsoft (MSFT) (d)	Outperform	\$290	41%	30%	2,194,851	2,136,090	193,247	11.1x	168,088	8.95	11%	8.05	38%	32.3x	150%	9%	###	21.1x	2.8%	NM	0.8%	
Rackspace Technologies (RXT)	Outperform	\$17	--	(10%)	3,616	7,330	3,480	2.1x	3,053	0.95	1%	0.94	13%	18.0x	84%	13%	724	10.1x	7.8%	5.1x	0.0%	
Cloud Software & Applications																						
8x8 (EGHT) (a)(d)	Outperform	\$26	88%	(26%)	2,811	2,974	758	3.9x	627	0.27	286%	0.07	NM	94.7x	439%	65%	45	65.9x	(0.4%)	3.6x	0.0%	
Amdocs (DOX)	Outperform	\$76	(2%)	7%	9,738	9,394	4,617	2.0x	4,306	5.46	13%	4.84	9%	13.9x	65%	9%	1,042	9.0x	8.3%	NM	1.9%	
Digital Turbine (APPS) (a)(d)	Outperform	\$66	693%	16%	6,762	6,966	1,489	4.7x	1,145	2.65	60%	1.66	124%	24.8x	115%	50%	283	24.6x	4.1%	0.7x	0.0%	
eGain (EGAN) (a)(d)	Perform	\$12	49%	(3%)	375	322	101	3.2x	87	0.36	38%	0.26	18%	32.0x	148%	37%	13	23.9x	3.5%	NM	0.0%	
Kalerya (KLR)	Outperform	\$10	16%	1%	401	529	395	1.3x	261	0.09	NM	(0.32)	NM	110.3x	511%	50%	49	10.9x	7.6%	2.6x	0.0%	
NICE (NICE)	Outperform	\$282	83%	(1%)	18,756	17,961	2,073	8.7x	1,860	7.01	9%	6.43	13%	40.2x	186%	11%	771	23.3x	3.7%	NM	0.0%	
Radware (RDWR)	Outperform	\$32	8%	15%	1,522	1,087	294	3.7x	272	0.80	10%	0.73	14%	40.0x	185%	10%	50	21.8x	2.5%	NM	0.0%	
RingCentral (RNG)	Perform	\$250	125%	(34%)	23,212	24,257	1,984	12.2x	1,555	1.68	29%	1.30	33%	148.7x	689%	27%	333	72.9x	0.7%	3.1x	0.0%	
Verint Systemts Inc. (VRNT)	Outperform	\$43	21%	25%	3,235	3,675	932	3.9x	868	2.81	26%	2.23	(2%)	15.2x	70%	7%	273	13.5x	7.3%	0.0x	0.0%	
Vonage (VG)	Outperform	\$15	74%	16%	3,881	4,404	1,559	2.8x	1,391	0.30	58%	0.19	12%	49.8x	230%	20%	224	19.6x	2.0%	2.3x	0.0%	
Carriers & Infrastructure																						
Akamai (AKAM)	Outperform	\$113	22%	8%	18,649	18,009	3,811	4.7x	3,453	6.48	14%	5.67	9%	17.5x	81%	13%	1,715	10.5x	5.1%	NM	0.0%	
American Tower (AMT) (c)	Outperform	\$283	(2%)	26%	127,908	161,564	10,189	15.9x	9,215	5.56	9%	5.12	26%	50.9x	236%	13%	6,538	24.7x	3.8%	5.1x	1.9%	
AT&T Classic (T)	Perform	\$28	(26%)	(3%)	201,168	350,365	151,322	2.3x	165,602	3.19	1%	3.15	(1%)	8.8x	41%	0%	49,179	7.1x	11.8%	3.0x	7.4%	
AT&T Pro Forma (T)	Perform	\$22	--	--	158,400	264,330	114,763	2.3x	--	--	--	--	--	--	--	--	46,405	5.7x	11.6%	2.3x	5.1%	
Charter (CHTR)	Perform	\$770	36%	16%	153,272	239,525	54,484	4.4x	51,450	28.20	35%	20.93	35%	27.3x	126%	9%	22,075	10.9x	6.0%	3.9x	0.0%	
Comcast (CMCSA)	Outperform	\$58	17%	11%	272,156	360,919	121,579	3.0x	114,006	3.71	23%	3.01	15%	15.7x	73%	7%	38,909	9.3x	7.5%	2.3x	1.7%	
Cogent Comm. (CCOI)	Outperform	\$75	(9%)	26%	3,490	4,260	626	6.8x	595	1.43	10%	1.30	100%	52.8x	244%	10%	252	16.9x	2.5%	3.1x	4.2%	
Crown Castle (CCI) (c)	Outperform	\$194	12%	22%	84,396	104,142	6,788	15.3x	6,313	3.14	9%	2.87	25%	61.9x	287%	9%	4,086	25.5x	3.9%	4.8x	2.7%	
Equinix (EQIX) (c)	Outperform	\$831	22%	16%	74,842	86,291	7,215	12.0x	6,641	7.17	19%	6.05	3%	115.8x	536%	10%	3,453	25.0x	3.7%	3.3x	1.4%	
Lumen Technologies (LUMN)	Perform	\$12	(26%)	21%	12,876	43,110	18,612	2.3x	19,794	1.21	(22%)	1.56	8%	9.7x	45%	-5%	7,807	5.5x	20.7%	3.9x	8.5%	
Lumen Pro Forma (LUMN) (e)	Perform	\$12	--	--	12,876	32,274	14,773	2.2x	16,494	0.83	--	--	--	14.2x	66%	0%	5,866	5.5x	10.4%	3.3x	1.7%	
Ondas (ONDS)	Outperform	\$8	(48%)	(17%)	352	300	60	5.0x	21	0.21	NM	(0.19)	NM	37.0x	172%	140%	12	24.8x	(0.9%)	NM	0.0%	
T-Mobile US (TMUS)	Outperform	\$142	72%	5%	177,940	245,588	84,730	2.9x	81,481	5.21	21%	4.30	(3%)	27.2x	126%	22%	26,809	9.2x	8.2%	2.5x	0.0%	
Verizon (VZ)	Perform	\$55	(4%)	(6%)	229,108	376,368	138,451	2.7x	137,926	5.36	1%	5.31	8%	10.3x	48%	2%	49,981	7.5x	8.5%	2.9x	4.6%	
Other																						
Alphabet (GOOG) (b)	Outperform	\$2,739	31%	56%	1,868,056	1,749,236	275,353	6.4x	236,139	95.82	8%	88.38	51%	28.6x	132%	15%	105,621	16.6x	3.8%	NM	0.0%	
Alice USA (ATUS)	--	\$29	39%	(23%)	13,945	38,853	10,311	3.8x	10,079	2.41	16%	2.08	178%	12.2x	56%	--	4,679	8.3x	13.2%	5.3x	0.0%	
Amazon (AMZN) (b)	Outperform	\$3,376	76%	4%	1,731,883	1,718,429	603,230	2.8x	489,988	95.26	31%	72.59	21%	35.4x	164%	15%	98,682	17.4x	3.2%	NM	0.0%	
Applovin (APP)	Outperform	\$63	--	(21%)	22,641	24,518	3,249	7.5x	2,677	0.64	120%	0.29	NM	98.5x	456%	39%	930	26.4x	3.2%	1.6x	0.0%	
Crexendo (CXDO)	--	\$6	63%	(13%)	111	97	30	3.2x	22	0.15	46%	0.10	(79%)	39.5x	183%	--	4	22.3x	3.6%	NM	0.0%	
CSG Systems (CSGS)	--	\$46	(13%)	2%	1,478	1,623	959	1.7x	954	3.26	1%	3.23	4%	14.1x	65%	--	218	7.4x	10.1%	0.7x	2.2%	
DISH (DISH)	--	\$42	(9%)	29%	26,517	38,502	17,475	2.2x	17,732	2.74	(20%)	3.42	13%	15.2x	71%	--	3,283	11.7x	(1.7%)	3.7x	0.0%	
Digital Realty Trust (DLR) (c)	--	\$156	17%	12%	45,105	60,674	4,656	13.0x	4,357	1.47	(27%)	2.01	101%	106.1x	492%	--	2,517	24.1x	4.2%	5.8x	3.0%	
Five9 (FIVN)	--	\$208	166%	19%	13,957	14,096	650	21.7x	551	1.19	31%	0.91	(8%)	174.7x	809%	--	118	119.2x	0.5%	1.2x	0.0%	
Trade Desk (TTD)	Outperform	\$83	208%	4%	41,517	41,120	1,461	28.1x	1,139	0.75	18%	0.64	(7%)	111.4x	516%	8%	509	80.7x	0.8%	NM	0.0%	
Twilio (TWLO) (b)	Outperform	\$377	244%	11%	63,033	58,573	3,316	17.7x	2,535	0.10	NM	(0.18)	NM	NM	NM	--	285	205.6x	0.0%	NM	0.0%	
Unity Software (U)	Outperform	\$110	--	(28%)	30,439	28,927	1,301	22.2x	1,012	(0.14)	NM	(0.34)	NM	NM	NM	35%	6	4528.1x	(0.3%)	NM	0.0%	
Zoom Communications (ZM) (b)(d)	Perform	\$399	396%	18%	118,858	114,613	4,840	23.7x	4,012	4.69	1%	4.63	39%	84.9x	393%	--	1,714	66.9x	1.5%	NM	0.0%	
Avg. Return Cloud & Comm. Services																						
REIT Index				88%																		
S&P 500 (Consensus)				16%																		
		\$381	(11%)	24%																		
		\$4,429	16%	18%																		
										205.12	11%	184.04	33%	21.6x	--	7%					1.4%	

Notes:
 *Stock price results presented should not and cannot be viewed as an indicator of future performance.
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 (A) EGHT, APPS, EGAN C'Y21+FY22, C'Y22+FY23; (B) Either co-covered or by Other Opco Analyst; (C) REITs using AFFO yield vs. FCF yield; (D) Not on calendar year; (E) LUMN pro forma Latam & ILEC; 23E estimates, assumes 20c dividend.
 Source: Oppenheimer & Co. estimates and company reports.

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Stock Prices as of August 6, 2021

Comcast (CMCSA - NASDAQ, \$58.34, OUTPERFORM)
 American Tower Corp. (AMT - NYSE, \$282.76, OUTPERFORM)
 Amazon.Com, Inc. (AMZN - NASDAQ, \$3,375.99, OUTPERFORM)
 Crown Castle International (CCI - NYSE, \$194.46, OUTPERFORM)
 Charter Communications, Inc. (CHTR - NASDAQ, \$769.91, PERFORM)
 Equinix Inc. (EQIX - NASDAQ, \$830.62, OUTPERFORM)
 Alphabet Inc. (GOOG - NASDAQ, \$2,738.80, OUTPERFORM)
 Microsoft Corporation (MSFT - NASDAQ, \$289.52, OUTPERFORM)
 Verizon (VZ - NYSE, \$55.30, PERFORM)
 Vonage Holdings Corp. (VG - NYSE, \$14.93, OUTPERFORM)
 AT&T, Inc. (T - NYSE, \$27.94, PERFORM)
 8x8 Inc. (EGHT - NYSE, \$25.57, OUTPERFORM)
 Fastly, Inc. (FSLY - NYSE, \$39.93, PERFORM)
 RingCentral (RNG - NYSE, \$249.87, PERFORM)
 Twilio, Inc. (TWLO - NYSE, \$377.08, OUTPERFORM)
 Cogent Communications (CCOI - NASDAQ, \$75.49, OUTPERFORM)
 Digital Turbine, Inc. (APPS - NASDAQ, \$65.65, OUTPERFORM)
 Snowflake Inc. (SNOW - NYSE, \$276.99, OUTPERFORM)
 Facebook, Inc. (FB - NASDAQ, \$362.97, OUTPERFORM)
 Netflix, Inc. (NFLX - NASDAQ, \$524.89, OUTPERFORM)
 Cambium Networks (CMBM - NASDAQ, \$41.87, OUTPERFORM)
 Lumen Technologies (LUMN - NYSE, \$11.78, PERFORM)
 CME Group Inc. (CME - NASDAQ, \$208.25, PERFORM)
 Goldman Sachs Group (GS - NYSE, \$384.30, OUTPERFORM)
 Intel Corp. (INTC - NASDAQ, \$53.89, PERFORM)
 Zoom Video Communications (ZM - NASDAQ, \$398.68, PERFORM)

Apple Inc. (AAPL - NASDAQ, \$147.06, OUTPERFORM)
 T-Mobile (TMUS - NASDAQ, \$141.93, OUTPERFORM)
 Ceragon Networks Ltd. (CRNT - NASDAQ, \$3.99, OUTPERFORM)
 Ondas Holdings Inc. (ONDS - NASDAQ, \$7.78, OUTPERFORM)
 QuickLogic Corporation (QUIK - NASDAQ, \$5.20, OUTPERFORM)
 CEVA Inc. (CEVA - NASDAQ, \$49.83, OUTPERFORM)
 Marvell Technology Group (MRVL - NASDAQ, \$61.05, OUTPERFORM)
 UPS (UPS - NYSE, \$190.42, OUTPERFORM)
 Oracle Corporation (ORCL - NASDAQ, \$89.43, PERFORM)
 Walmart Inc. (WMT - NYSE, \$145.49, OUTPERFORM)
 Verint Systems (VRNT - OTC, \$42.74, OUTPERFORM)
 Radware Ltd. (RDWR - NASDAQ, \$31.98, OUTPERFORM)
 Amdocs Ltd. (DOX - NYSE, \$76.05, OUTPERFORM)
 Cloudflare (NET - NYSE, \$121.46, OUTPERFORM)
 NICE LTD. (NICE - OTC, \$282.04, OUTPERFORM)
 QUALCOMM Incorporated (QCOM - NASDAQ, \$146.83, PERFORM)
 Tesla, Inc. (TSLA - NASDAQ, \$714.63, OUTPERFORM)
 eGain Corporation (EGAN - NASDAQ, \$11.51, PERFORM)
 Rackspace Technologies (RXT - NASDAQ, \$17.13, OUTPERFORM)
 Kaleyra, Inc. (KLR - NYSE American, \$9.93, OUTPERFORM)
 Corning Inc. (GLW - NYSE, \$40.89, OUTPERFORM)
 DraftKings, Inc. (DKNG - NASDAQ, \$50.48, OUTPERFORM)
 Unity Software Inc. (U - NYSE, \$110.26, OUTPERFORM)
 AppLovin Corp. (APP - NASDAQ, \$63.25, OUTPERFORM)
 DigitalOcean, Inc. (DOCN - NYSE, \$57.44, OUTPERFORM)
 The Trade Desk, Inc. (TTD - NASDAQ, \$83.38, OUTPERFORM)
 Morgan Stanley (MS - NYSE, \$97.83, OUTPERFORM)
 Salesforce.com (CRM - NYSE, \$250.56, OUTPERFORM)
 Roku, Inc. (ROKU - NASDAQ, \$403.48, OUTPERFORM)
 Electronic Arts Inc. (EA - NASDAQ, \$136.87, OUTPERFORM)
 Shopify Inc. (SHOP - NYSE, \$1,545.55, OUTPERFORM)
 Cisco Systems (CSCO - NASDAQ, \$55.76, OUTPERFORM)
 McDonald's Corporation (MCD - NYSE, \$236.42, OUTPERFORM)
 Akamai Technologies (AKAM - NASDAQ, \$113.38, OUTPERFORM)

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Rating	IB Serv/Past 12 Mos.			
	Count	Percent	Count	Percent
OUTPERFORM [O]	473	70.18	256	54.12
PERFORM [P]	201	29.82	75	37.31
UNDERPERFORM [U]	0	0.00	0	0.00

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