

# CLOUD COMPUTING REPRESENTS A MASSIVE MARKET WITHIN TECHNOLOGY TODAY

August 2020

The cloud computing space has been generating massive amounts of attention. From a growth perspective, this makes sense<sup>1</sup>:

- + Software-as-a-Service (SaaS) companies crossed an annual revenue run rate of \$100 billion in 2019. The enterprise SaaS vendor market share was led by Microsoft, Salesforce, Adobe, SAP and Oracle. What is notable is that SaaS revenue accounts for just 20% of the overall enterprise software market, so there is a lot of further room to grow.
- + Infrastructure-as-a-Service (IaaS) companies crossed an annual revenue run rate of \$100 billion in 2019. Amazon Web Services (AWS) continues to dominate this portion of the market, but Microsoft Azure has been gaining ground. On Microsoft's 22 July 2020 earnings release, it was stated that their commercial cloud operation is achieving annual revenues of \$50 billion<sup>2</sup>.
- + One of the statistics that we find most exciting is that, across all enterprises, 94% already use a cloud service. It is estimated that cloud software will represent more than 50% of all enterprise software by 2025 and more than 80% of all enterprise software by 2030.

## SOFTWARE IS EATING THE WORLD (AND CLOUD IS EATING SOFTWARE)

In August of 2011, Marc Andreessen, a prominent Silicon Valley venture capitalist, wrote the phrase "software is eating the world" within a Wall Street Journal article<sup>3</sup>. Even then, now roughly 9 years ago, the case was clear that companies in Silicon Valley were relying less and less on delivering a physical "product" and more and more on delivering some type of software over the internet.

A particular trend that we find exciting regards large, established companies changing their business models and shifting to the cloud. In fact, we would challenge anyone reading this to think of a software company today that does not use a cloud-based delivery model. There are important benefits for the customer and the software company.

<sup>1</sup> Source: Deeter et al. "State of the Cloud 2020." [Bessemer Venture Partners](#). April 2020.

<sup>2</sup> Source: Tilley, Aaron. "Microsoft Revenue Surges though Cloud Growth Slows." [WSJ](#). 22 July 2020.

<sup>3</sup> Source: Andreessen, Marc. "Why Software is Eating the World." [Wall Street Journal](#). 20 August 2011.

- + The **customer** does not pay as large an up-front cost and instead can choose to subscribe to software that will be used over time. Sometimes, payments can even be tied to usage.
- + The **software company** receives more regular revenue streams based on subscriptions instead of needing to convince customers to continually buy new versions of products, and also discourages the use of free or hacked versions of the software.

## HOW TO BUILD A CLOUD INVESTMENT STRATEGY

Whenever one is building a strategy to capture a potential megatrend, such as cloud computing, there are important considerations:

- 1 **Purity of exposure:** Megatrends are not sectors, so there usually is not an established field that one can use within a database to “filter out all the companies” that fit into that paradigm. Therefore, there needs to be a credible, sustainable process taken to both build the initial set of company exposures and then continue to ensure that the overall strategy stays true to the actual megatrend and does not migrate into being a different strategy.
- 2 **Differentiation from Existing Competitors or Benchmarks:** It is a simple matter to find a “tech” strategy available at an inexpensive price. The S&P 500 Information Technology, MSCI World Information Technology and Nasdaq 100 Indices are three prominent examples. Additionally, there are very few exciting megatrends where there is only a single index or strategy aiming to provide exposure to them—the nature of the excitement around these potentially disruptive technologies is that they attract attention. Some strategies focus on algorithmic or “rules-based” approaches to selecting and weighting companies, whereas others bring in expert judgement to help with the company selection process.
- 3 **Flexibility & Expertise to Evolve as the Megatrend Evolves:** With most megatrends, the hope amongst investors is to access transformative growth. That means the nature of underlying companies and business models can evolve quickly. On the one hand, an investor may not want the strategy to migrate away from the specified megatrend, but at the same time, if the trend itself evolves in a certain direction, it could make sense to evolve with it and exhibit the proper degree of flexibility.

Unfortunately, as is often the case in investing, there are not “right” or “wrong” answers when faced with these considerations, but rather an importance of understanding the decision process and the trade-offs faced.

## COMPARISON OF EXISTING INDICES AIMED TO GAIN EXPOSURE TO CLOUD COMPUTING

From a high level, there is the:

- + **BVP Nasdaq Emerging Cloud Index:** Nasdaq is partnered with Bessemer Venture Partners (BVP) to benefit from the expertise that BVP has built up over decades of analysing cloud-based businesses.
- + **ISE CTA Cloud Computing Index:** ISE is partnered with the Consumer Technology Association (CTA) to benefit from CTA's expertise within the analysis of technology companies.
- + **Solactive Cloud Technology Index:** Solactive references an algorithm that utilises natural language processing techniques to select and rank the companies deemed to have the appropriate levels of exposure to cloud computing. Methodology documents do not reference an external partner with either cloud computing or technology company expertise.

In what follows, we include descriptions of some of the most critical methodology details for each of these indices. Importantly, the full details would be properly found within the respective methodology documents created by each of the index providers.

### BVP Nasdaq Emerging Cloud Index<sup>4</sup>

Bessemer Venture Partners (BVP) is a firm with expertise in cloud-based software companies, and that has built an impressive track record in making early stage investments within its venture capital portfolio. As such, their expert guidance is central to the methodology of this particular index:

- + **Industry:** BVP controls the degree of purity of exposure to cloud-based businesses by directly analysing the revenue the security issuer derives from business-oriented software products. These products must be provided to customers through a cloud delivery model or have a cloud economic model behind their value proposition.
- + **Revenue Growth:** BVP is driving exposure to higher revenue growth companies, requiring revenue growth of at least 15% for the last two full fiscal years for new constituents, and requiring existing constituents to have delivered at least 7% revenue growth in one of the last two fiscal years.

Index constituents are equally-weighted, and the rebalancing process that guides the selection (or deletion) of companies occurs semi-annually in February and in August.

### ISE CTA Cloud Computing Index<sup>5</sup>

The Consumer Technology Association (CTA) classifies companies as being in cloud computing, and additionally classifies them further into one of three broad categories:

- + **Infrastructure-as-a-Service (IaaS):** Companies that deliver cloud computing infrastructure—Servers, Storage & Networks—as an on-demand service.
- + **Platform-as-a-Service (PaaS):** Companies that deliver a platform for the creation of software in the form of virtualisation, middleware, and/or operating systems, which is then delivered over the internet..
- + **Software-as-a-Service (SaaS):** Companies that deliver software applications over the internet, enabling other companies to conduct their operations using the applications.

The evaluation process is run on a quarterly basis, specifically in March, June, September and December. Based on CTA's above classifications, each company is defined as operating within IaaS, PaaS, or SaaS. Interestingly, a company can be operating in more than one—or even in all 3—categories.

The critical point is that IaaS receives three times the emphasis as SaaS and PaaS receives two times the emphasis as SaaS. The Index weighting is designed such that:

- + Each company receives IaaS Score, a PaaS Score and a SaaS Score of either 0 (no involvement in the category) or 1 (involvement in the category).
- + Those scores are then used to compute each company's Cloud Score:  
Cloud Score = 3 x IaaS Score + 2 x PaaS Score + 1 x SaaS Score.
- + Finally, each company receives a weight equal to its score divided by the sum of the scores of all the index companies scores. Which basically means that each company receives a weight out of a set of six different possible weights.

The approach is therefore modelled after a modified equal-weighted approach where the structure of a company's involvement in cloud computing is the key variable influencing the weight within the index. There is a 4.5% single security cap applied in order to mitigate the risk of large exposure to any single company. If more than 80 companies initially qualify for membership, the approach will rank the securities within only the SaaS category and only the top companies will be included such that the total number of companies in the index equals 80.

<sup>4</sup> Source: BVP Nasdaq Emerging Cloud Index Methodology, updated as of October 2018..

<sup>5</sup> Source: ISE CTA Cloud Computing Index Methodology, updated as of July 2019.

## Solactive Cloud Technology Index<sup>6</sup>

### Selection Process

A natural language processing algorithm is used to screen companies through publicly available information, such as financial websites, search engines or company publications. Using keywords that describe the index theme, the algorithm identifies companies that have or are expected to have a significant exposure to the field of cloud computing.

The algorithm then ranks these companies according to the frequency with which the company is referenced in relation to the specific keywords. Companies are reviewed to ensure relevance to the index theme based on business operations, and companies that do not have relevant business exposure to the index are removed at this stage. Remaining companies are then re-ranked and the top 50 companies are determined as the final constituents.

### Weighting Process

On each selection day, the constituents are weighted according to their free float market capitalisation, subject to the following constraints:

- + The maximum weight of a stock is 4.0%.
- + The minimum weight of a stock is 0.2%.
- + Any excess weight that results from implementing these constraints is redistributed proportionally.

Now, while examining methodology documents is useful and important, looking at some key characteristics that result from these processes can be even more informative. Due to data access, at times it is possible to reference Index-related data and at other times it is a necessity to use data that references a fund that has as its stated investment objective the tracking of that underlying Index. Figure 1 explicitly makes this connection clear between the Indices and the funds that track them.

**FIGURE 1: INDICES & FUNDS FOCUSED ON THE CLOUD COMPUTING MEGATREND**

Fund Name	Fund Ticker	Fund Inception Date	Fund Expense Ratio	Fund Underlying Index
WisdomTree Cloud Computing UCITS ETF	WCLD	06-Sep-19	0.40%	BVP Nasdaq Emerging Cloud Index
First Trust Cloud Computing UCITS ETF	FSKY	28-Dec-18	0.60%	ISE CTA Cloud Computing Index
HAN-GINS Cloud Technology UCITS ETF	SKYY	10-Oct-18	0.59%	Solactive Cloud Technology Index

Source: Bloomberg

### ILLUSTRATION 1: TOP 10 HOLDINGS

By virtue of the last decade, investors worldwide have become more familiar with a certain set of companies. Amazon, Alphabet (Google's Parent), Microsoft, and Apple now each represent a trillion USD in market cap by themselves<sup>7</sup>. While there is no question that some of these firms are major players in cloud computing, they are also major holdings across many, MANY investment strategies and can be accessed individually with ease. To illustrate the point<sup>8</sup>:

<sup>6</sup> Source: Index Guideline: Solactive Cloud Technology Index, vers. 1.1, 7 August 2018.

<sup>7</sup> Source: Bloomberg, with data as of 31 July 2020.

<sup>8</sup> Source for Bullets is Bloomberg, with data as of 31 July 2020.

- + In the MSCI World Information Technology Index, Apple represented 19.77% and Microsoft represented 15.74%. For those in search of Amazon, it would be 27.2% in the MSCI World Consumer Discretionary Index, and for those in search of Alphabet, it would be in the MSCI World Communication Services Index with a weight above 23%, accessed in two different share classes.
- + For those “annoyed” by the apparent difficulty set by some of the more recent GICS Sector reclassifications, the Nasdaq 100 Index represents an approach that includes all these companies within a single index.

The bottom line is this—investors do not need a strategy focused on the cloud computing megatrend to find these companies, as they have represented influential positions in most global and US benchmarks over the past decade.

In Figure 2, it is clear that:

- + The WisdomTree Cloud Computing UCITS ETF did not have any of the massive companies in the trillion US dollar market cap club within its top 10 positions.
- + The First Trust Cloud Computing UCITS ETF had exposure to Microsoft, Amazon and Alphabet within its top 10 positions. These companies do operate significantly within cloud computing, but as we mentioned, they can be found in many investment strategies.
- + The HAN-GINS Cloud Technology UCITS ETF had exposure to Microsoft, Amazon, Alphabet and Apple, with Apple and Amazon in the top 10 as of 31 July 2020.
- + It was also notable that Alibaba was included as a significant position within both the First Trust Cloud Computing UCITS ETF and HAN-GINS Cloud Technology UCITS ETF.

FIGURE 2: COMPARISON OF TOP 10 HOLDINGS, AS OF 31 JULY 2020

WisdomTree Cloud Computing UCITS ETF		First Trust Cloud Computing UCITS ETF		HAN-GINS Cloud Technology UCITS ETF	
Company Name	Weight	Company Name	Weight	Company Name	Weight
FASTLY INC - CLASS A	5.60%	AMAZON.COM INC	4.67%	TWILIO INC - A	4.78%
ZOOM VIDEO COMMUNICATIONS-A	3.35%	ALIBABA GROUP HOLDING-SP ADR	4.36%	SAP SE	4.35%
DOCUSIGN INC	3.28%	MICROSOFT CORP	4.03%	APPLE INC	4.35%
ZSCALER INC	3.19%	FASTLY INC - CLASS A	4.03%	AMAZON.COM INC	4.30%
TWILIO INC - A	3.02%	ALPHABET INC-CL A	3.74%	ALIBABA GROUP HOLDING-SP ADR	4.22%
WIX.COM LTD	2.85%	ORACLE CORP	3.71%	EQUINIX INC	4.21%
DATADOG INC - CLASS A	2.76%	ARISTA NETWORKS INC	3.34%	NVIDIA CORP	4.17%
CLOUDFLARE INC - CLASS A	2.66%	VMWARE INC-CLASS A	3.23%	SPLUNK INC	4.07%
SHOPIFY INC - CLASS A	2.61%	MONGODB INC	2.96%	CISCO SYSTEMS INC	3.89%
2U INC	2.56%	CENTURYLINK INC	2.95%	SALESFORCE.COM INC	3.86%
Total of Top 10	31.89%	Total of Top 10	37.02%	Total of Top 10	42.19%

Source: Bloomberg, with data accessed through the PORT function, so holdings data access through other sources may differ slightly. **Historical performance is not an indication of future performance and any investments may go down in value.**

**Illustration 2: Quantifying Positions Common with S&P 500 Information Technology, MSCI World Information Technology and Nasdaq 100 Indices.**

We can take the analysis a step further than the mere visual of the top 10 positions—we can look across the entire strategies at all the holdings and ask a few simple questions:

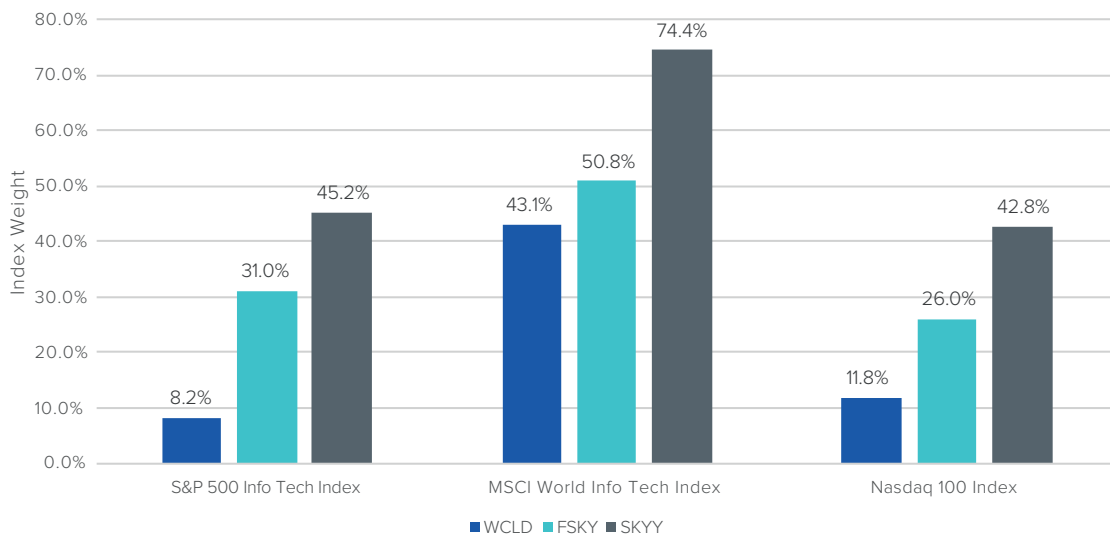
<sup>9</sup> Source: Bloomberg, with data as of 31 January 2020.

- 1 What is the weight in the strategy in stocks that are also in the S&P 500 Information Technology Index?
- 2 What is the weight in the strategy in stocks that are also in the MSCI World Information Technology Index?
- 3 What is the weight in the strategy in stocks that are also in the Nasdaq 100 Index?

We see the answers in Figure 3.

- + SKYY had the highest exposures to companies that were in the three aforementioned indices.
- + WCLD had the lowest exposures, and was therefore the most different, from the three aforementioned indices.
- + The point is not whether it is good or bad to have these positions within these indices, but rather that the more similar a strategy is to these indices, the bigger question should be if it represents a differentiated, “megatrend” approach and not another “tech benchmark.”

**FIGURE 3: WEIGHT IN STOCKS REPRESENTED IN COMMON “TECH BENCHMARKS”, AS OF 31 JULY 2020**



Source: Bloomberg, with data from the PORT function, so holdings data access through other sources may differ slightly. **Historical performance is not an indication of future performance and any investments may go down in value.**

**Illustration 3: Market Capitalisation Size Exposure**

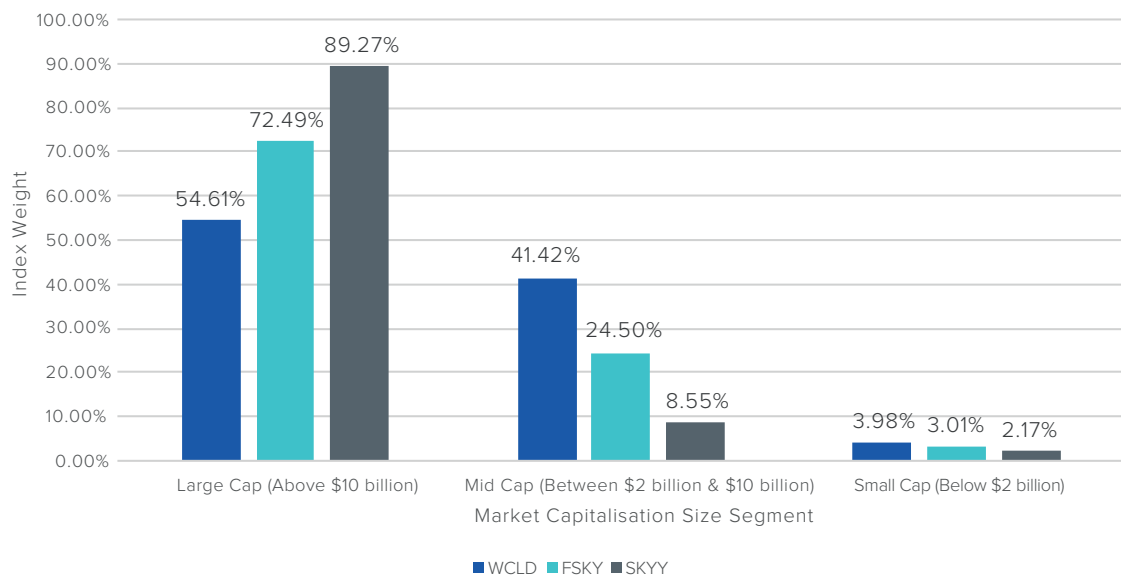
Within a given strategy, exposure to large cap, mid cap and small cap stocks can indicate a lot about the underlying construction. For example:

- + A market capitalisation-weighted approach should push more weight into large companies, whereas an equally-weighted approach could tend to show as more exposed to mid caps and small caps.
- + Market capitalisation is also a proxy in many ways for how established or mature companies are, with larger firms having defined their business models and customer bases and smaller companies existing at an earlier stage in their respective life cycles.

Within Figure 4, some of these factors immediately become clear.

- + WCLD is tracking the BVP Nasdaq Emerging Cloud Index, which is an equally-weighted approach. This can tend to push more weight into the mid cap and small cap parts of the market capitalisation size spectrum. The Index is also focused solely on companies that derive most of their revenues from a cloud-based business model. Since this represents a new and growing trend, many of these firms are newer and may not have market capitalisations in the tens or hundreds of billions, measured in terms of US dollars.
- + FSKY is tracking the ISE CTA Cloud Computing Index. The weights of companies in this index are determined based on classifications CTA is making about the type of cloud business model each company represents. Sometimes, this might place big weight in larger firms, but other times this might tilt more toward mid caps or small caps.
- + SKYY is tracking the Solactive Cloud Technology Index, which is weighted on the basis of market capitalisation. It is no accident that this approach had the largest exposure to the largest companies.

**FIGURE 4: MARKET CAPITALISATION SIZE EXPOSURES, AS OF 31 JULY 2020**



Source: Bloomberg, with data from the PORT function, so holdings data accessed through other sources may differ slightly. **Historical performance is not an indication of future performance and any investments may go down in value.**

**Illustration 3: The Quintessential Question in Cloud Computing Today—Sales Growth vs. Valuation**

When evaluating less mature businesses, sometimes it is more useful to look at Sales trends rather than earnings trends. In the cloud space, there can frequently be high initial costs to make customers aware that new platforms and types of software exist. However, these companies also benefit from the stickiness of subscription revenues. Additionally, it is important to be familiar with some of the functions that these platforms help with:

- + Cloud companies that provide software to help with accounting or taxes, such as a business that needs to collect certain amounts of sales tax, would tend not to see massive cancellations due to economic conditions. Taxes are necessary under all growth conditions, and the alternatives such as hiring more people to complete the task are usually not as cost-effective in the long run.
- + Cloud companies that provide help with cybersecurity give Chief Technology Officers a certain piece of mind, and there could be career risks associated with cancelling the service and increasing the risk of a future security breach, should one occur.
- + Once Human Resources professionals go through the process to roll out cloud-based software to help employees with payroll and benefits, it is difficult to imagine going back to more manual or more “people-heavy” approaches.

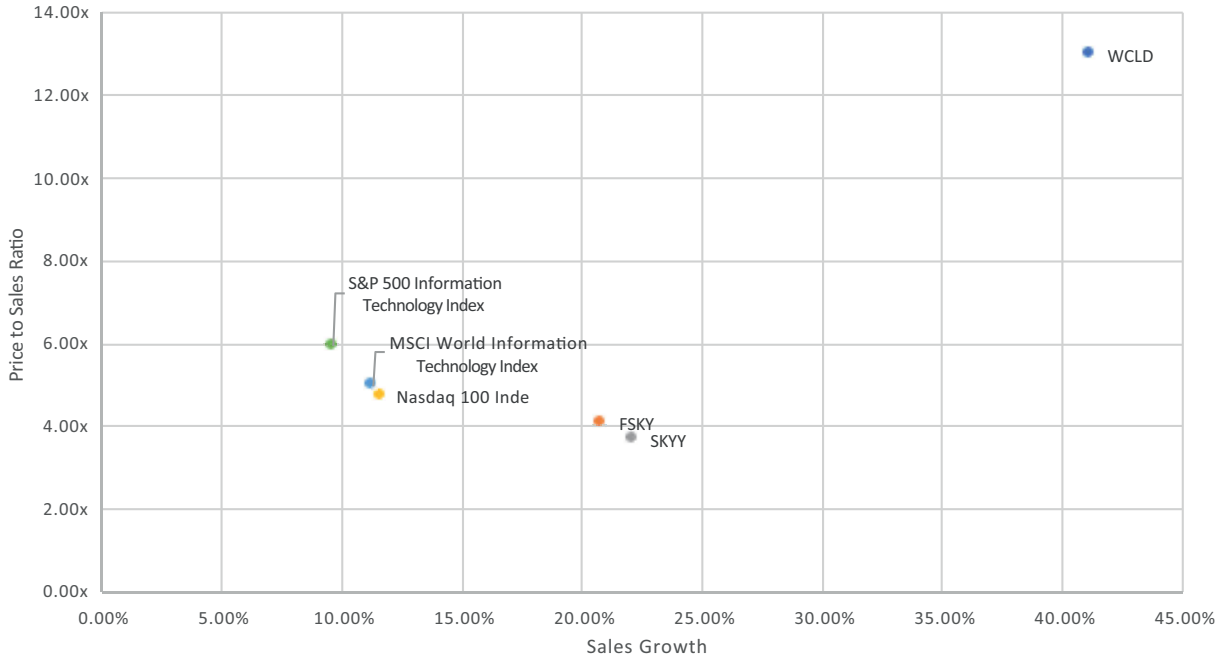
These are only a few examples of solutions that cloud-based software companies currently provide. The key to remember is that it may be initially challenging to become well known and trusted enough for customers to adopt their services, but, once the services are adopted, this is not a single purchase type of situation. There is an ongoing customer life span that could tend toward multiple years in length.

In Figure 5, we illustrate the weighted average sales growth figures of the different strategies along with some broader technology benchmarks. This is measured along the horizontal axis. We then measure valuation, on a price-to-sales ratio basis, on the vertical axis.

- + WCLD is tracking the returns of the BVP Nasdaq Emerging Cloud Index, and this index is screening constituents for minimum levels of revenue growth during each semi-annual rebalancing. When a characteristic like revenue is screened for, it is natural that this can manifest itself in terms of a higher measurement as compared to other strategies that do not specifically screen in the same manner. The weighted average growth in year-over-year revenues was greater than 40%, when measured as of 31 July 2020. This was significantly higher than any of the other strategies shown within Figure 5.
- + FSKY is tracking the returns of the ISE CTA Cloud Computing Index. While this index doesn't have explicit sales growth metrics in its screening process, it is focused on companies with cloud-based business models and would benefit if cloud-based models were leading to faster sales growth than more traditional technology business models.
- + Similarly, SKYY is tracking the Solactive Cloud Technology Index, also accessing cloud-focused companies, just in a different manner. Both strategies had similar weighted average year-over-year revenue growth, in between 20% and 25%.
- + The standard benchmarks had clustered weighted-average year-over-year revenue growth around the 10-12% level. There was a wide dispersion in valuation. The three standard benchmark indices plus FSKY and SKYY had price to sales ratio valued in the 4.00x to 6.00x range, roughly speaking. WCLD exhibited a price to sales ratio value above 12.0x. The dramatically different valuation plus the dramatically different year-over-year revenue growth is another way to indicate the highly differentiated nature of WCLD when thinking of it compared to the other strategies shown.



FIGURE 5: COMPARISON OF WEIGHTED AVERAGE SALES GROWTH VS VALUATION, AS OF 31 JULY 2020



Source: Bloomberg, with sales growth measured on a year-over-year basis as of the most recent company filings, accessed as of 31 July 2020. Price to sales ratio is the weighted harmonic average of the price to sales ratios for the underlying constituents of each strategy shown. Fundamentals are accessed through the PORT function, and so may differ slightly from fundamentals accessed through other sources. **Historical performance is not an indication of future performance and any investments may go down in value.**

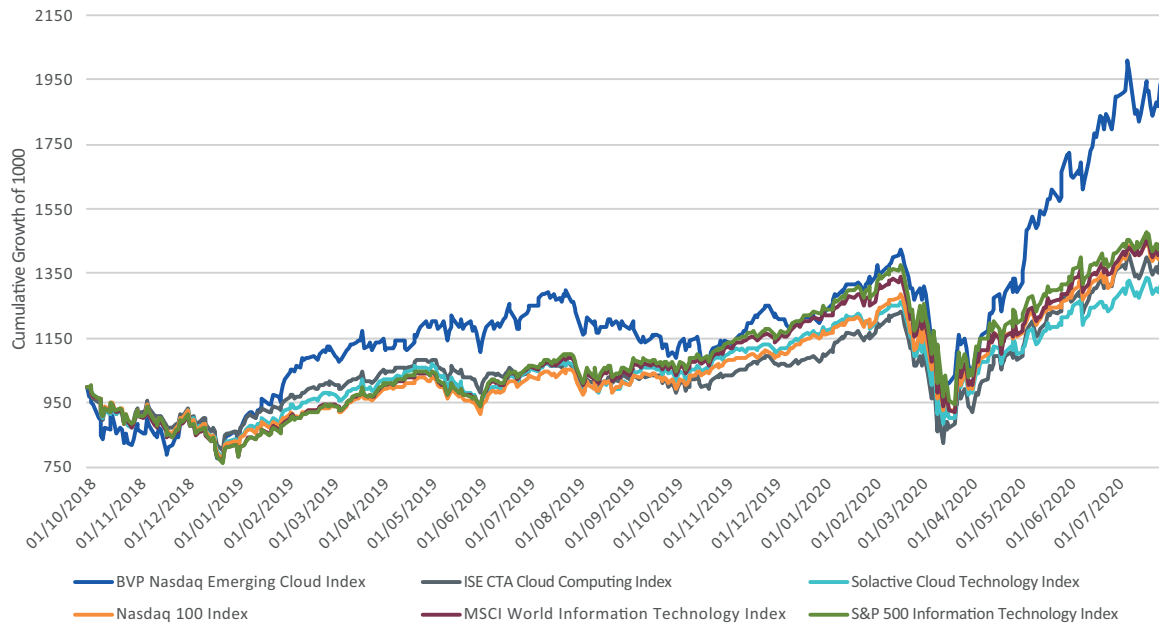
**Comparison of Live Index Performance**

The BVP Nasdaq Emerging Cloud Index began live calculation on 2 October 2018, representing the newest of all the indices shown in the following figures. Given the juxtaposition of a remarkably strong environment for “tech” stocks in 2019 with the fast drawdown catalysed by the Covid-19 Pandemic, live performance can actually indicate important information. Additionally, the remarkable initial recovery in equity prices after 23 March 2020 created another noteworthy point of comparison.

In Figure 6a:

- + One result of the differences that we observed in Figures 2, 3, 4 and 5 led the BVP Nasdaq Emerging Cloud Index to exhibit very different performance results than the other indices. This was particularly pronounced during the recent market rally.
- + Both the ISE CTA Cloud Computing and Solactive Cloud Technology Indices exhibited higher correlation and more similarity of returns relative to the major market benchmarks shown.

FIGURE 6A: CUMULATIVE GROWTH OF 1000 FOR SPECIFIED INDICES (2 OCTOBER 2018 TO 31 JULY 2020)



Source: Bloomberg. Period start of 2 October 2018 refers to start of live calculation for the BVP Nasdaq Emerging Cloud Index. Returns are measured in US dollar terms, with dividends assumed to be reinvested on a net basis. **Historical performance is not an indication of future performance and any investments may go down in value.**

In Figure 6b:

- + 2019 was characterised as a very strong year for some of the major benchmarks—particularly the MSCI World Information Technology and S&P 500 Information Technology Indices.
- + The BVP Nasdaq Emerging Cloud Index, interestingly, did not exhibit the most severe downdraft during the height of the Covid-19 Pandemic concerns impacting the price behaviour of global equities.
- + Many have cited the strong attention placed on Cloud Computing as many employees were “working from home” after March 2020. The pure-play nature of the BVP Nasdaq Emerging Cloud Index plus its predominant focus on ‘Software-as-a-Service’ companies contributed to very different returns during the Covid-19 Initial Market Recovery.

FIGURE 6B: INDEX RETURNS OVER SPECIFIED PERIODS

Index Name	Longest Period of Live History	2019 Year	Covid-19 Downturn	Covid-19 Initial Market Recovery	YTD 2020
BVP Nasdaq Emerging Cloud Index	45.01%	40.18%	-27.37%	91.07%	63.87%
ISE CTA Cloud Computing Index	20.38%	25.75%	-28.17%	58.70%	29.72%
Solactive Cloud Technology Index	16.79%	39.45%	-28.19%	46.73%	14.00%
Nasdaq 100 Index	22.26%	38.99%	-27.86%	55.96%	25.35%
MSCI World Information Technology Index	22.92%	47.55%	-31.31%	58.68%	20.56%
S&P 500 Information Technology Index	24.27%	49.61%	-31.17%	57.15%	21.16%

Source: Bloomberg. Longest Period of Live History refers to 2 October 2018 to 31 July 2020. 2019 Year refers to 31 December 2018 to 31 December 2019. Covid-19 Downturn refers to 19 February 2020 to 23 March 2020. Covid-19 Initial Market Recovery refers to 23 March 2020 to 31 July 2020. Returns are calculated in US dollar terms, with dividends assumed to be reinvested on a net basis. All returns are cumulative, except for the period of longer than one year, the "Longest Period of Live History", which is shown on an annualised basis. **Historical performance is not an indication of future performance and any investments may go down in value.**

#### CLOUD COMPUTING FOR THE NEXT DECADE OF PERFORMANCE?

The Information Technology sector has been so strong for such a long period that many people may not remember the decade from 1999 to 2009 when it was the worst sector within the Russell 3000 Index in terms of contribution to the overall return. Energy was the best—and energy has shifted to the worst contributing sector for the period from 2009 to 2019. Markets are characterised by such shifts, but we recognise the difficulty of predicting them accurately ahead of time.

It is possible that technology will have an important role to play in economic growth from 2019 to 2029, but that the same types of technologies that drove growth in the prior decade will not necessarily maintain the same relative strength. Maybe this decade will be characterised by businesses and consumers shifting their model of software usage from being hardware-based to cloud-based, in which case a cloud focused strategy could be an interesting transition away from a more traditional, market capitalisation-weighted Information Technology sector benchmark.

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