

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, D.C. 20549

Form 10-K

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2018

Commission file number: 001-34675



SS&C TECHNOLOGIES HOLDINGS, INC.

(Exact name of Registrant as Specified in Its Charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

71-0987913
(I.R.S. Employer
Identification No.)

80 Lamberton Road
Windsor, CT 06095
(Address of Principal Executive Offices, Including Zip Code)
860-298-4500
(Registrant's Telephone Number, Including Area Code)

Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, \$0.01 par value per share	The Nasdaq Global Select Market

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
	(Do not check if a smaller reporting company)	Emerging growth company	<input type="checkbox"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

As of June 30, 2018, the aggregate market value of the registrant's common stock held by non-affiliates was \$10,769,794,898 based on the closing sale price per share of the registrant's common stock on The Nasdaq Global Select Market on such date.

There were 251,626,214 shares of the registrant's common stock outstanding as of February 22, 2019.

DOCUMENTS INCORPORATED BY REFERENCE:

Part III of this annual report on Form 10-K incorporates by reference certain information from the registrant's definitive proxy statement for the 2019 annual meeting of stockholders, which the registrant intends to file pursuant to Regulation 14A with the Securities and Exchange Commission not later than 120 days after the registrant's fiscal year end of December 31, 2018. With the exception of the sections of the definitive proxy statement specifically incorporated herein by reference, the definitive proxy statement is not deemed to be filed as part of this annual report on Form 10-K.

SS&C TECHNOLOGIES HOLDINGS, INC.
ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2018
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Explanatory Note

On June 24, 2016, SS&C Technologies Holdings, Inc. completed a two-for-one stock split, effected in the form of a stock dividend. All share and per share amounts (other than for our Class A non-voting common stock which, as described herein, had been converted to shares of our common stock prior to the two-for-one stock split) have been retroactively restated for all periods presented to reflect the stock split.

FORWARD-LOOKING INFORMATION

Certain statements contained in this annual report constitute forward-looking statements for purposes of the safe harbor provisions under the Private Securities Litigation Reform Act of 1995. Forward-looking statements include statements concerning plans, objectives, goals, strategies, expectations, intentions, projections, developments, future events, performance, underlying assumptions, and other statements that are other than statements of historical facts. Without limiting the foregoing, the words “believes”, “anticipates”, “plans”, “expects”, “estimates”, “projects”, “forecasts”, “may”, “assume”, “intend”, “will”, “continue”, “opportunity”, “predict”, “potential”, “future”, “guarantee”, “likely”, “target”, “indicate”, “would”, “could” and “should” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements are accompanied by such words. Such statements reflect management’s best judgment based on factors currently known but are subject to risks and uncertainties, which could cause actual results to differ materially from those anticipated. Such risks and uncertainties include, but are not limited to, the state of the economy and the financial services industry and other industries in which our clients operate, our ability to realize anticipated benefits from its acquisitions, including Intralinks, Inc., Eze Software and DST Systems, Inc., the effect of customer consolidation on demand for our products and services, the increasing focus of our business on the hedge fund industry, the variability of revenue as a result of activity in the securities markets, the ability to retain and attract clients, fluctuations in customer demand for our products and services, the intensity of competition with respect to our products and services, the exposure to litigation and other claims, terrorist activities and other catastrophic events, disruptions, attacks or failures affecting our software-enabled services, risks associated with our foreign operations, privacy concerns relating to the collection and storage of personal information, evolving regulations and increased scrutiny from regulators, our ability to protect intellectual property assets and litigation regarding intellectual property rights, delays in product development, investment decisions concerning cash balances, regulatory and tax risks, risks associated with our joint ventures, changes in accounting standards, risks related to our substantial indebtedness, and the market price of our stock prevailing from time to time. The factors discussed under “Item 1A. Risk Factors”, among others, could cause actual results to differ materially from those indicated by forward-looking statements made herein and presented elsewhere by management from time to time. You should not place undue reliance on any such forward-looking statements. Forward-looking statements speak only as of the date on which they are made and, except to the extent required by applicable securities laws, we undertake no obligation to update or revise any forward-looking statements.

The following are some of our registered trademarks and/or service marks in the U.S. and/or in other countries: ADVENT, ADVENT CORPORATE ACTIONS, ADVENT CUSTODIAL DATA, ADVENT ONDEMAND, ADVENT PORTFOLIO EXCHANGE, BLUEDOOR, ADVENT REVENUE CENTER, ADVISORWARE, ALL-STAR FUNDS, ALPS, AWD, AXYS, BENEFIX, BLACK DIAMOND, CAREANALYZER, CARESTEPP, DBC, DEAL MACROS, DEAL WORKSHEETS, DST, DSTHS, DST HEALTH SOLUTIONS, DST PHARMACY SOLUTIONS, DST SYSTEMS, EXETER, EZE, EZE CASTLE, EZE ECLIPSE, FAN, FAN MAIL, FIXLINK, FUNDRUNNER, GENEVA, GLOBEOP, GLOBEOP HEDGE FUND INDEX, GOREC, GORISK, HITRUST, INFOSTEPP, INTRALINKS, LIBERTY ALL-STAR FUNDS, MARGINMAN, MAXIMIS, MOXY, PACER, PAGES, PAS, PORTIA, PORTPRO, PRO-JECT, POWERSTEPP, REALTICK, RECON, ROLLOVER CENTRAL, RXFOCUS, SKYLINE, SYNCOVA, SYLVAN, TA2000, TAMALE, TAMALE RMS, TRAC, TRADETHRU, TRADEWARE, VISION, WALLETSARE, and ZOOLOGIC. SS&C Technologies Holdings, Inc. and/or its subsidiaries in the U.S. and/or in other countries have trademark or service mark rights to certain other names and marks other than those referred to in this annual report.

SS&C Technologies Holdings, Inc., or “SS&C Holdings,” is our top-level holding company. SS&C Technologies, Inc., or “SS&C,” is our primary operating company and a wholly-owned subsidiary of SS&C Technologies Holdings, Inc. “We,” “us,” “our” and the “Company” mean SS&C Technologies Holdings, Inc. and its consolidated subsidiaries, including SS&C.

Unless context otherwise requires, references to our “common stock” includes both shares of our common stock and shares of our Class A non-voting common stock, all outstanding shares of which were converted into shares of our common stock in 2016.

PART I

ITEM 1. BUSINESS

Overview

SS&C is a global provider of software and software-enabled services to thousands of clients, principally within the institutional asset and wealth management, alternative investment management, healthcare, brokerage, retirement, financial advisory and financial institutions vertical markets. In addition, our clients include commercial lenders, private equity real estate investment trusts (“REITs”), corporate treasury groups, insurance companies, pension funds, municipal finance groups and real estate property managers.

We are a leading provider of mission-critical, sophisticated software-enabled services that allow financial services providers to automate complex business processes. Our portfolio of software products and rapidly deployable software-enabled services allows our clients to automate and integrate front-office functions such as trading and modeling, middle-office functions such as portfolio management and reporting, and back-office functions such as accounting, transfer agency, compliance, regulatory services, performance measurement, reconciliation, reporting, processing and clearing. Our solutions enable our clients to focus on core operations, better monitor and manage investment performance and risk, improve operating efficiency and reduce operating costs. We provide our solutions globally to thousands of clients, principally within the institutional asset and wealth management, alternative investment management, brokerage, retirement, financial advisory and financial institutions vertical markets. Our clients include commercial lenders, real estate investment trusts (“REITs”), corporate treasury groups, insurance companies, pension funds, municipal finance groups and real estate property managers.

In addition, we provide solutions to the healthcare industry including pharmacy, healthcare administration and health outcomes optimization solutions to satisfy their information processing, quality of care, cost management and payment integrity needs. Our healthcare solutions include claims adjudication, benefit management, care management, and business intelligence services.

We provide the global financial services industry and healthcare industry with a broad range of software-enabled services, which consist of software-enabled outsourcing services and subscription-based on-demand cloud solutions that are managed and hosted at our facilities, and specialized software products, which are deployed at our clients’ facilities. Our software-enabled services, which combine the strengths of our proprietary software with our domain expertise, enable our clients to contract with us to provide many of their mission-critical and complex business processes. For example, we utilize our software to deliver comprehensive fund administration services to alternative and traditional asset managers, including fund manager services, transfer agency services, funds-of-funds services, tax processing and accounting. We offer clients the flexibility to choose from multiple software delivery options, including on-premise applications and hosted, multi-tenant or dedicated applications. Additionally, we provide clients with targeted, blended solutions based on a combination of software and software-enabled services. We believe that our software-enabled services provide superior client support and an attractive alternative to clients that do not wish to install, manage and maintain complicated financial software.

Our business model is characterized by substantial contractually recurring revenues and significant cash flow. We generate revenues primarily through our high-value software-enabled services. Our software-enabled services are generally provided under contracts with initial terms of one to five years that require monthly or quarterly payments and are subject to automatic annual renewal at the end of the initial term unless terminated by either party. We also generate revenues by licensing our software to clients through either perpetual or term licenses and by selling maintenance services. Maintenance services are generally provided under annually renewable contracts. Our pricing typically scales as a function of our clients’ assets under management, the complexity of asset classes managed, the volume of transactions, and the level of service the client requires.

Our contractually recurring revenue model helps us minimize fluctuations in revenues and cash flows and enhances our ability to manage costs. Our contractually recurring revenues, which include our software-enabled services and maintenance and term licenses revenues, represented 97% of total revenues in the year ended December 31, 2018. We have experienced average revenue retention rates in each of the last five years of greater than 90% on our software-enabled services and maintenance and term licenses contracts for our core enterprise products. We believe that the high value-added nature of our products and services has enabled us to maintain our high revenue retention rates.

We generated revenues of \$3,421.1 million for the year ended December 31, 2018 as compared to revenues of \$1,675.3 million for the year ended December 31, 2017. In 2018, we generated 75% of our revenues from clients in North America and 25% from clients outside North America. Our revenues are highly diversified, with our largest client in 2018 accounting for less than 5% of our

revenues. Additional financial information, including geographic information, is available in our Consolidated Financial Statements and Note 11 to our Consolidated Financial Statements.

Our Industry

We serve a number of vertical markets within the financial services and healthcare industries. Clients include alternative investment funds, investment management firms, individual and government sponsored health plans, healthcare providers, institutional and retail asset managers, insurance companies, registered investment advisors (“RIAs”), wealth managers, banks and brokerage firms. We believe that financial services and healthcare providers will increasingly turn to IT solutions, provided by an independent vendor, as a result of economic challenges and heightened regulatory requirements. Financial services firms are in a search for more risk-averse business strategies, simplified regulatory compliance, and full service solutions provided by a single vendor. As a result, we believe the financial services industry will continue to invest in IT and outsourcing solutions.

Market Trends

The demand for our products and services comes from a number of distinct sources: new formation in asset and wealth management, and health industries, new business lines and combinations of business lines at existing clients, replacement of legacy in-house operations and competitor systems and expansion of our existing client relationships. Underlying these demand drivers are several industry trends, including:

- *Diversification of Business Lines and Product Proliferation.* As investment managers look to grow through diversified offerings (alternatives, real estate, and private equity) in global markets, they need their technology investments and servicing partners to be long-lived and deliver a return on their investment for different types of businesses models. Our scalable solutions empower client growth while diversifying their product offering.
- *Regulatory changes.* Our clients must comply with rules, regulations, directives, and standards from governmental and self-regulating organizations. Our clients rely on us to navigate new requirements and facilitate compliance in today’s dynamic and evolving regulatory environment. We are uniquely positioned in our ability to interpret regulations and impact to clients and to implement technology solutions. We expect regulatory changes to increase the complexity of compliance and the demand for our products and services and motivate clients to develop systems infrastructure and research management processes to comply with regulatory requirements.
- *Technological paradigm shift.* Evaluating the implications of new technologies is a challenge for our clients. By combining institutional grade quality with cutting edge technology, SS&C helps apply the right solutions to help grow our client’s business more efficiently. Many of our clients are faced with internal digital transformation projects or external threats from emerging tech disrupter competition. As a result, clients are investing in new technology to help expand profit margins and offer new products. New technology incorporating artificial intelligence (“AI”), including machine learning and Robotic Process Automation (“RPA”) are gaining traction in the financial technology industry. We believe that these next generation tools will increase efficiency, reduce errors, and enable complex financial record keeping without human intervention. Overall, we continue to see increasing migration to the cloud to achieve operational scalability and lower fixed costs.
- *Increased demands for transparency, efficiency, and risk management.* Firms continue to focus on operational risk, resulting from discoveries of fraud and mismanagement during the 2008-2009 U.S. financial crisis and concerns regarding transparency and counterparty exposure. This continued focus has led investment management firms to strive to provide investment data accurately, institutionalize investment operations, and automate their investment process. On the wealth management and advisory sides of our business, we have seen further evolution of the relationship between the end client and a firm, with investors demanding transparency and a customized client experience. We expect that wealth managers will need to become familiar with their clients’ preferences for account access and communication and cater to them. Finally, both institutional and individual investors, faced with increasingly competitive low-fee and automated options, are pushing investment managers for greater efficiencies and lower fees.
- *Aging population and more sophisticated healthcare solutions.* An aging population, with an average of 10,000 individuals turning 65 years of age per day in the United States in 2018; increased regulatory oversight and changing business models, as seen in value-based payment constructs; the prevalence of data and demand for data security; utilization of data and analytics to drive outcomes; a continued drive towards outsourcing as a way to manage costs and better position for growth – all are contributing to an evolving landscape.

Competitive Strengths

The following are our core strengths that we believe enable us to differentiate ourselves in the markets we serve:

Enhanced capability through software ownership.

We use our proprietary software products and infrastructure to provide our software-enabled services, strengthening our overall operating margins and providing a competitive advantage. Because we primarily use our own proprietary software in the execution of our software-enabled services and generally own and control our products' source code, we can quickly identify and deploy product improvements and respond to client feedback, enhancing the competitiveness of our software and software-enabled service offerings. This continuous feedback process provides us with a significant advantage over many of our competitors, specifically those software competitors that do not provide a comparable model and therefore do not have the same level of hands-on experience with their products.

Global industry leader with strong market position focused on software and software-enabled services for the financial and healthcare industries.

We are a global business providing a broad portfolio of software products and software-enabled services and have over 190 offices worldwide. As of December 31, 2018, we had over 20,000 development, service and support professionals with significant expertise across the industries that we serve and a deep working knowledge of our clients' businesses. We provide highly flexible, scalable and cost-effective solutions that enable our clients to track complex securities, better employ sophisticated investment strategies, scale efficiently and meet evolving regulatory requirements. We believe our product and service offerings position us as a leader within the specific verticals of the financial services software and services market in which we compete. Our products and services allow our clients to automate and integrate their front-office, middle-office and back-office functions, thus enabling straight-through processing that increases productivity and reduces costs.

Trusted provider to our highly diversified and growing client base.

By providing mission-critical, reliable software products and services for over 30 years, we have become a trusted provider to the financial services industry. We have developed a large and growing installed base within multiple segments of the financial services industry. Our clients include some of the largest and most well-recognized firms in the financial services industry. We believe that our high-quality products and superior services have led to long-term client relationships, some of which date from our earliest days of operations. Our strong client relationships, coupled with the fact that many of our current clients use our products for a relatively small portion of their total funds and investment vehicles under management, provide us with a significant opportunity to sell additional solutions to our existing clients and drive future revenue growth at lower cost.

Largest Alternative Fund administration services fund administrator and mutual fund transfer agent

The third-party service providers that participate in the alternative investment market include fund managers, auditors, fund administrators, attorneys, custodians and prime brokers. Each provider performs a valuable function with the intention of providing transparency of the fund's assets and the valuation of those assets. Conflicts of interest may arise when the above parties attempt to provide more than one of these services. The industry is increasingly recognizing these conflicts and, as a result, seeking independent fund administrators such as SS&C.

SS&C is currently the largest fund administrator for alternative investment managers, including hedge funds, private equity, real assets, and fund of funds. As the largest third party mutual fund transfer agent we offer the advantage of significant leverage from a scale and investment perspective. Our highly tenured staff of industry experts allow us to deliver consistent service excellence to the asset management customers we service. The fact we are operating our own proprietary software to deliver these services allows us to ensure all aspects of our offering are optimized to deliver cost effective, accurate solutions.

As a publically traded company, our clients and prospects have access to our 10-Qs and 10-Ks filed with the SEC, giving them transparency into our overall financial strength.

Experienced management team with strong integrating and operating track record.

Our senior management team has a track record of operational excellence and an average of more than 20 years of experience in the software and financial services and healthcare industries, and a proven ability to acquire and integrate complementary businesses, as demonstrated by the 53 businesses we have acquired since 1995. By leveraging our domain expertise and knowledge, we have developed, and continue to improve, our mission-critical software products and services to enable our clients to overcome the complexities inherent in their businesses. All of our senior executives are compensated based upon our financial success.

Business Strategies

Our strategy is to continue to deliver compelling solutions and value propositions to our customers in the software and software-enabled services market. The following are key elements to our strategy for achieving this objective:

Build upon and extend our leadership position in software and software-enabled services in the financial services and healthcare industries.

Since our founding in 1986, we have focused on building substantial financial services domain expertise through close working relationships with our clients. We have developed a deep knowledge base that enables us to respond to our clients' most complex financial, accounting, actuarial, tax and regulatory needs. We intend to maintain and enhance our technological leadership by using our domain expertise to build valuable new software-enabled services and solutions, continuing to invest in internal development and opportunistically acquiring products and services that address the highly specialized needs of the financial services industry.

Our internal product development team works closely with marketing, sales, and client service personnel to ensure that product evolution reflects developments in the marketplace and trends in client requirements. In addition, we intend to continue to develop our products in a cost-effective manner by leveraging common components across product families. We believe that we enjoy a competitive advantage because we can address the investment and healthcare management needs of high-end clients by providing industry-tested products and services, including cloud-based services and related mobility platforms that meet global market demands and enable our clients to automate and integrate functions for improved productivity, compliance, reduced manual intervention, and bottom-line savings.

SS&C's products are sold to a diverse group of clients from niche players in the financial services and healthcare industries to the largest institutions in the world. Furthermore, we believe our client base represents a fraction of the total number of financial services providers globally. We believe there is opportunity to grow our client base over time as our products become more widely adopted. We believe we also have an opportunity to capitalize on the increasing adoption of outsourcing mission-critical operations by financial services providers as they continue to replace inadequate legacy solutions and custom in-house solutions that are inflexible and costly to maintain. Our software-enabled services revenues increased from \$956.8 million for the year ended December 31, 2016 to \$2,798.9 million for the year ended December 31, 2018.

Capitalize on longer-term secular growth trends in financial services and healthcare industries.

With our global footprint and best-in-class product offerings, we aim to capture a significant share of the IT spend of alternative asset, institutional and retail asset managers, wealth managers, and healthcare industries through leveraging the deeply embedded service offering we provide and outdistancing the competition. We expect regulatory changes to increase the complexity of compliance and the demand for our products and services, as well as motivate clients to develop infrastructure and research management processes to mitigate regulatory exposure. We plan to benefit from the growing software spend in the increasingly complex and more highly regulated financial services and healthcare landscape.

Continue to capitalize on acquisitions of complementary businesses and technologies.

We intend to continue to employ a highly disciplined and focused acquisition strategy to broaden and enhance our product and service offerings, expand our intellectual property portfolio, add new clients and supplement our internal development efforts. We believe our acquisitions have been an extension of our research and development effort that has enabled us to purchase proven products and remove the uncertainties associated with software development projects. We will seek to opportunistically acquire, at reasonable valuations, businesses, products and technologies in our existing or complementary vertical markets that will enable us to better satisfy our clients' rigorous and evolving needs. We have a proven ability to integrate complementary businesses as demonstrated by the 53 businesses we have acquired since 1995. Our experienced senior management team leads a rigorous evaluation of our targets to ensure that they satisfy our product or service needs and will successfully integrate with our business while meeting our targeted financial goals. As a result, our acquisitions have contributed marketable products or services that have added to our revenues. Through the broad reach of our direct sales force and our large installed client base, we believe we can market these acquired products and services to a large number of prospective clients. Additionally, we have been able to improve the operational performance and profitability of our acquired businesses, creating significant value for our stockholders.

Strengthen our international presence.

We believe that there is a significant market opportunity to provide software and services to financial services providers outside North America. In the year ended December 31, 2018, we generated 25% of our revenues from clients outside North America. We are building our international operations in order to increase our sales outside North America. We plan to continue to expand our international market presence by leveraging our existing software products and software-enabled services. We also plan to leverage our growing presence in the Asia Pacific region as a result of recent acquisitions. Over the last three years, revenue from the Asia Pacific region has increased 61.8% to \$145.8 million. We believe this region presents a compelling growth opportunity.

Increase profitability through margin expansion.

We expect to drive increased margins through delivering innovative end-to-end solutions that provide significant value to customers and warrant premium pricing. We have significant scale with best-in-class solutions and software-enabled services across the delivery spectrum, which we believe, combined with a diversified service offering and client base, drives stable revenues and increased operating leverage. Our operating flexibility allows us to scale our costs based on client demands.

Our Acquisitions

As mentioned above, we intend to continue to employ a highly disciplined and focused acquisition strategy. Our past acquisitions have enabled us to expand our product and service offerings into new markets or client bases within the financial services industry. The addition of new products and services has also enabled us to market other products and services to acquired client bases. We believe our acquisitions have been an extension of our research and development effort and have enabled us to add to our product and service offerings without incurring the uncertainties sometimes associated with software development projects.

Since 1995, we have acquired 53 businesses within our industry. These acquisitions have contributed marketable products and services, which have added to our revenues and earnings. We have generally been able to improve the operating performance and profitability of our acquired businesses. We seek to reduce the costs of the acquired businesses by consolidating sales and marketing efforts and by eliminating redundant administrative tasks and research and development expenses. In many cases, we have also been able to increase revenues generated by acquired products and services by leveraging our existing products and services, larger sales capabilities and client base.

We generally seek to acquire companies that satisfy our financial metrics, including expected return on investment. Through our acquisitions, we seek companies that:

- provide complementary products or services in the financial services industries;
- possess proven technology and an established client base that will provide a source of ongoing revenue and to whom we may be able to sell existing products and services;
- expand our intellectual property portfolio to complement our business;
- address a highly specialized problem or a market niche in the financial services and healthcare industries;
- expand our global reach into strategic geographic markets; and
- have solutions that lend themselves to being delivered as software-enabled services.

We believe, based on our experience, that there are numerous solution providers addressing highly particularized financial services needs or providing specialized services that would meet our disciplined acquisition criteria.

Acquisitions are discussed further in *Liquidity and Capital Resources* and in Note 7 to our Consolidated Financial Statements. The following table provides a list of the most substantial acquisitions we have made since 2010 (in millions):

<u>Acquisition Date</u>	<u>Acquired Business</u>	<u>Contract Purchase Price</u>	<u>Acquired Capabilities, Products and Services</u>
December 2010	TimeShareWare	\$ 30.5	Added shared ownership property management platform to real estate offering
May 2012	Thomson Reuters' PORTIA Business	\$ 170.0	Added portfolio management software and outsourcing services for institutional managers
June 2012	GlobeOp Financial Services S.A.	\$ 834.4	Expanded fund administration services in hedge fund and other asset management sectors
November 2014	DST Global Solutions	\$ 95.0	Added investment management software and services
July 2015	Advent Software, Inc.	\$ 2,600.0	Expanded global investment management software and services
September 2015	Varden Technologies	\$ 25.0	Added cloud-based client and advisor communication solutions for investment firms
November 2015	Primatics Financial	\$ 116.0	Added cloud-based integrated risk, compliance and finance solution for the banking industry
March 2016	Citigroup's Alternative Investor Service	\$ 425.0	Expanded fund administration services in hedge fund and private equity sectors
December 2016	Wells Fargo's Global Funds Service	\$ 75.1	Expanded fund administration services in hedge fund and private equity sectors
December 2016	Conifer Financial Services, LLC	\$ 88.5	Expanded fund administration services in hedge fund and other asset management sectors
October 2017	CommonWealth Fund Services Ltd.	\$ 16.4	Expanded fund administration services in hedge fund and private equity sectors
April 2018	DST Systems, Inc.	\$ 5,400.0	Provided additional scale and breadth across institutional and retail asset management, alternatives, wealth management, and healthcare sectors
June 2018	CACEIS North America	\$ 20.0	Expanded fund administration services in hedge fund and private equity sectors
October 2018	Eze Software Group, LLC	\$ 1,450.0	Strengthened SS&C's front to back office technology
November 2018	Intralinks Holdings, Inc.	\$ 1,500.0	Increased key account footprint and adds cloud-based virtual data rooms and secure collaboration solutions for SS&C's banking and alternative clients

Products and Services

Our products and services allow professionals in the financial services and healthcare industries to automate complex business processes and are instrumental in helping our clients manage significant information processing requirements. Our solutions enable our clients to focus on core operations, better monitor and manage business performance and risk, improve operating efficiency and reduce operating costs. Our portfolio of products and software-enabled services allows our clients to automate and integrate front-office functions such as trading and modeling, middle-office functions such as portfolio management and reporting, and back-office functions such as accounting, performance measurement, reconciliation, reporting, processing and clearing, and compliance and tax reporting. Our healthcare solutions include claims adjudication, benefit management, care management, and business intelligence solutions.

Software-enabled Services

- **SS&C GlobeOp** – Named “Best Global Hedge Fund Administrator” of 2018 by Hedgeweek, SS&C GlobeOp serves a worldwide clientele of hedge funds, private equity funds, fund of funds, real asset funds, managed accounts, family office and undertakings for collective investments in transferable securities (“UCITS”), with more than \$1.6 trillion in assets under administration. SS&C provides a full suite of comprehensive capabilities, including but not limited to: global regulatory compliance reporting, tax reporting, risk reporting, net asset value (“NAV”) calculations, valuation services, daily reconciliation of cash and security balances, full investor and transfer agency services, and automated support of post-trade activities. Under SS&C GlobeOp, SS&C Direct provides similar middle and back office outsourcing services and application hosting to institutional asset managers, insurance companies and real estate investment trusts.
- **DST Financial Services** – Utilizing proprietary software applications (including TA 2000, TRAC systems, FAST platform, Bluedoor and Percana), we offer our clients information processing solutions to support direct and intermediary sales of mutual funds, alternative investments, retirement plans and participant accounting and recordkeeping for wealth

management . This includes transaction processing; account opening and maintenance; reconciliation of trades, positions and cash; corporate actions; regulatory reporting and compliance functions; and tax reporting. We also support full reporting to investors for confirmations, statements and tax forms, web access, and electronic delivery of documents. We also offer similar investor and policyholder administration and technology services in Canada, Ireland and Luxembourg through our joint venture IFDS L.P. utilizing its iFAST platform.

- **Black Diamond Wealth Platform** – Black Diamond offers independent advisors, wealth managers, independent broker dealers (“IBDs”), and aggregators an innovative and dynamic portfolio management and reporting solution delivered through an easy-to-use, feature-rich web-based application. As a cloud-based product offering, advisors can access Black Diamond's customizable portfolio management and reporting online from anywhere, anytime without the need to maintain costly technology infrastructures. Black Diamond also provides outsourced daily reconciliation and data management services so firms can focus their efforts on servicing clients and growing their business rather than managing complex back office functions.
- **Advent Outsourcing Services** – Advent Outsourcing services provides a full spectrum of tailored options to our clients’ specific needs, from cloud-delivered technology to co-sourcing specific workflows to full outsourcing of operational processes including data management services such as full account aggregation, daily portfolio reconciliation, corporate actions processing and reference data management. Advent OnDemand is the pre-configured SaaS delivery of one of Advent's asset management solutions hosted by Advent without managed outsourced operational processes.
- **Advent Data Solutions** – Advent Data Solutions consists of a variety of data offerings provided to clients in an automated manner and format needed. These solutions include:
 - **Advent Custodial Data** which provides account level information from a firm’s custodian(s) through a single, secure connection to a data network managed by Advent. Using Advent Custodial Data, firms can reconcile positions, transactions and cash activity on an exceptions-only basis, or firms can post data directly into their portfolio accounting system.
 - **Advent Corporate Actions** which delivers reports on all corporate actions that affect a clients’ portfolios and provides staff with reliable transaction instructions.
 - **Advent Portfolio Data** which extends the delivery of account level data for reconciliation and other workflows from global custodians and counterparties.
 - **Advent Market Data** which is a single, cloud-based platform with connectivity to several leading global market data sources, allowing clients to acquire critical data for managing portfolios.
- **ALPS Asset Management Services** – ALPS is a comprehensive suite of asset servicing, distribution solutions and asset management for open-end mutual funds, closed-end funds, exchange-traded funds and alternative investment funds. Focusing on the needs of small- to medium-sized funds that require a broad set of customizable services, we provide compliance, creative services, medallion distribution, fund administration, fund accounting, legal, tax administration, transfer agency and asset management services. Our distribution services range from consulting to active wholesaling and marketing, including closed-end funds initial public offering launch platform services. We also offer products designed to assist clients in meeting the expanding needs associated with distributing U.S. investment products through financial intermediaries. We serve as the asset manager to proprietary open-end mutual funds, closed-end funds and exchange-traded funds through active management and through the utilization of sub-advisors and index providers. Additionally, we offer data analytics and consulting services in the U.S. to help our clients gain actionable insights into the needs and preferences of their customers.
- **Virtual Data Rooms (Intralinks)** – Intralinks Virtual Data Rooms (“VDR’s”), are designed for the mergers and acquisitions (M&A), alternative investments, and capital markets communities. The Intralinks VDR is a rich SaaS application providing a secure, customizable environment for deal makers to exchange sensitive documents and information. Within M&A the VDR is primarily used for sharing content during due diligence. For alternative investments, VDR’s are used to facilitate fundraising and fund reporting. Customers working in debt capital markets use VDR’s for managing the lifecycle of financing deals.
- **Healthcare Services**
 - **Pharmacy Solutions** – We use our proprietary software applications, supporting technology and enhanced clinical expertise to provide pharmacy health management solutions supporting commercial, Medicaid and Medicare Part D

plans. These services include pharmacy claims administration, pharmacy network solutions, government programs administration, formulary and rebate management, trend control and quality compliance programs, member services, and discount drug card programs.

- **Healthcare Administration** – We use our proprietary software applications to provide medical claim administration services and health plan compliance and revenue integrity services for payers and providers in the domestic healthcare industry. Healthcare administration services are offered on a software license, remote and business process outsourcing (“BPO”) basis. Our solutions, combined with our health outcomes optimization solutions described below, are offered as stand-alone component solutions to complement health plans, existing operations or systems, or as an integrated core administration package of solutions.
- **Health Outcomes Optimization** – We provide health outcomes optimization solutions through the use of our integrated care management and population health analytics applications and professional services for health plans and providers in the domestic healthcare industry. Our Integrated Care Management solution is a real-time, intuitive, workflow-driven solution suite that assists clients to improve member outcomes and manage costs. In addition to our proprietary systems, we are the exclusive distributor of Johns Hopkins’ Adjusted Clinical Groups (“ACG”), a patient classification system developed by Johns Hopkins University. The ACG System is a software tool that provides health plans the ability to easily identify their at-risk population and stratify them into the optimal care management program.

Software license, maintenance and related

- **Portfolio Accounting Software** – We provide comprehensive, integrated software solutions that help our clients streamline operations and accelerate global accounting processes. Our portfolio accounting solutions provide seamless front-to-back office integration, with the flexibility to meet the unique accounting needs of our customers and virtually unlimited scalability to accommodate growth. Our fund accounting solutions meet the challenges of high-volume, global fund managers with support for complex, multi-asset class and multi-currency strategies. We also have solutions catered to insurance accounting and commercial, consumer, and residential loan accounting.
 - **Geneva** – Geneva is a global portfolio management platform designed to meet the real-time needs of global asset managers, hedge funds, prime brokers, fund administrators, private equity firms and family offices worldwide. Geneva integrates all phases of the investment management process – portfolio management, reconciliation and light trade capture and risk capabilities. Its “main memory” database offers more accurate and flexible reporting, and eliminates batch processing and time-consuming error corrections. Geneva enables firms to grow into new markets, deliver greater operational efficiencies, enhance investor service, process high trade volumes across multiple securities, improve compliance and security, and lower operating costs and risks.
 - **Advent Portfolio Exchange** – Advent Portfolio Exchange (“APX”) is a comprehensive portfolio management solution for asset managers and wealth managers worldwide, which integrates the front-office functions of prospecting, marketing, customer relationship management and internal business management with the back office operations of portfolio accounting, performance measurement and reporting. It allows firms to manage both high-net-worth and institutional clients through a comprehensive range of capabilities, including customized reporting, automated report packaging, and performance analytics. APX can be deployed locally as well as hosted in the cloud.
 - **Axys** – Axys is a turnkey portfolio management and reporting system for small to mid-size investment management organizations. Axys provides investment professionals with broad portfolio accounting functionality on a variety of investment instruments, including equities, fixed income, mutual funds and cash. By using Axys, clients have a timely decision support tool with immediate access to portfolio holdings, asset allocation, realized and unrealized gains and losses, actual and projected income and other data including performance measurement and flexible reporting.
 - **Global Wealth Platform (“GWP”)** – GWP is our comprehensive, cloud-based solution that enables wealth managers to manage the entire investment process on a single platform, leveraging a single database. GWP bridges the front-, middle-, and back-offices and ensures consistency of data across all phases of the investment process. This solution simplifies the management of complex investment strategies with support of all asset classes and multicurrency capabilities in one system, and the automation and integration eliminates offline workarounds and manual processes.

- *HiPortfolio* – HiPortfolio is an investment accounting and asset servicing solution for third party administrators, asset managers, and insurance firms in over 35 countries. With broad instrument coverage and multi-currency capabilities, HiPortfolio allows our clients to manage the full transaction lifecycle, from trade capture, investment accounting and fund administration, through cash management, reconciliation, corporate actions processing, unit pricing and taxation, to performance measurement and attribution.
- *PORTIA* – PORTIA is a comprehensive, middle-to-back office investment operations platform that encompasses portfolio accounting, fund accounting, performance measurement and attribution, reconciliation and client reporting for your global assets. Firms of all types around the world rely on PORTIA to track day-to-day portfolio activity, with visibility across all transactions and positions. Its modular design and open architecture allow for a high level of customization and easy integration with other systems. With flexible deployment operations, PORTIA can be installed on-premise, hosted in the cloud or fully outsourced to reduce your IT footprint and overhead.
- *CAMRA* – CAMRA is a portfolio accounting solution tailored to the needs of insurance investment operations. Its multi-currency, multi-instrument portfolio accounting supports complex securities, sophisticated investment strategies, multi-currency investment management, multiple-bases accounting, and global tax and regulatory processing requirements such as generally accepted accounting percentages (“GAAP”) and Schedule D.

- ***Portfolio Management Software***

- *SS&C Singularity* – Our first smart investment operations and accounting system – a cloud-based solution designed to support the operating model of financial institutions. Empowered by embedded disruptive technologies including artificial intelligence, machine learning, robotic process automation, intelligent workflow optimization, and advanced predictive analytics, Singularity can drive significant cost savings and continuous operational improvements for our clients.
- *Performance and Performance Attribution (Sylvan, Insight)* – SS&C’s performance measurement, attribution and composite management platforms that streamline the calculation and reporting of performance while enabling our clients to analyze the sources of return. It supports multiple attribution methodologies, customized benchmarking and composite management. We provide full support for industry-mandated GIPS performance reporting standards.
- *Reporting (Vision FI)* – SS&C Vision FI (Financial Insights) is a comprehensive, end-to-end solution for designing, producing and distributing client communications. It enables financial organizations to create high-quality reports in a matter of minutes. The system enables our customers to deliver information to clients through their preferred channels, whether that’s print, email or online through a customizable portal.
- *Reconciliation (Recon)* – SS&C’s Recon is a highly scalable reconciliation and exception management system that gives our customers more control over the accounting lifecycle, including account, cash and position reconciliations. With data translation, and rules-based matching and superior investigative tools, Recon streamlines operational efficiency delivering full visibility into cash, holdings, transactions, trial balances and security masters.

- ***Trading Software***

- *Order Management (Moxy, Eze OMS)* – SS&C’s trade order management systems provide centralized platforms for making and managing trade order decisions quickly and confidently. The platforms have built-in connectivity between asset managers and multiple brokers, counterparties, custodians, and trading venues, and give our clients control and visibility across the entire trading process, from asset allocation through settlement.
- *Execution Management (Eze EMS)* – SS&C’s multi-broker execution management system is a high-speed cloud-based platform that provides traders with centralized access to aggregated liquidity for trade execution, critical trading data and insight for making fast and informed decisions, and the tools necessary to dynamically manage positions, portfolios, and trading risk across global equity, futures, and options markets.

- **Digital Process Automation**

- *AWD* – AWD is our digital process automation product suite, encompassing intelligent automation, business process management, content management, case management, outbound communications and a low code development platform. AWD is deployed globally in many industries, including asset management, life insurance, variable annuities, healthcare, property and casualty insurance, banking and wealth management. The AWD value proposition combines the core software with our global professional services organization and secure private cloud application hosting.

- **Banking and Lending Solutions**

- *EVOLV* – EVOLV is a comprehensive, cloud-based, end-to-end accounting solution for financial institutions that integrates and automates all risk and finance processes relating to a loan portfolio, from data capture to back-end reporting and analytics. It streamlines loan accounting, increases efficiency, assures data integrity, and strengthens compliance.
- *Precision LM* – Precision LM is a single database application that provides comprehensive commercial loan management from initial request to final disposition. Precision LM manages all aspects of our clients’ loan process – pre-qualifying loan requests, processing applications, commitment processing, loan disposition, servicing and accounting.

- **Research, Analytics, and Training**

- *Tamale RMS* – Tamale RMS is a purpose-built research management solution, enabling investment analysts and portfolio managers to organize an escalating volume of research data and apply it more effectively in due diligence. It is a centralized repository for capturing, organizing, and sharing every piece of research received or created.
- *Research, Analytics and Consulting* - SS&C’s Research, Analytics and Consulting (RAC) group helps leading companies in the financial services industry manage data, gain insight, and ignite change in their business. Through effective use of advanced analytics, research, and distribution intelligence technologies, SS&C RAC enables business to better understand, predict, and optimize key business factors impacting their asset growth and profitability.
- *Learning Institute* – The SS&C Learning Institute is an education, training and research organization dedicated to the enrichment of investment management professionals and those seeking careers in financial services. Our digital library, instructor-led classes and blended programs are used by many of the world’s leading wealth management firms, investment banks, insurance companies, hedge funds, commercial banks and other asset management companies. In addition, the SS&C Learning Institute offers customized learning paths to enhance the business and finance programs of colleges and universities.

Professional services

We offer a range of professional services to assist clients. Professional services consist of consulting and implementation services, including the initial installation of systems, conversion of historical data and ongoing training and support. Our in-house consulting teams work closely with the client to ensure the smooth transition and operation of our systems. Our consulting teams have a broad range of experience in the financial services industry and include certified public accountants, chartered financial analysts, mathematicians and IT professionals from the asset management, real estate, investment, insurance, hedge fund, municipal finance, banking, and healthcare industries. We believe our commitment to professional services facilitates the adoption of our software products across our target markets. For the year ended December 31, 2018, revenues from professional services represented 2% of total revenues.

Product support

We believe a close and active service and support relationship is important to enhancing client satisfaction and furnishes an important source of information regarding evolving client issues. We provide our larger clients with a dedicated client support team whose primary responsibility is to answer questions and provide solutions to address ongoing needs. Direct telephone support is provided during extended business hours, and additional hours are available during peak periods. We distribute content-rich, periodic

blogs and thought leadership targeted at clients and prospects in each of our vertical and geographic markets . We supplement our service and support activities with comprehensive training. Training options include regularly hosted classroom and online instruction, *SS&C Learning Institute* , and online client seminars, or “webinars,” that address current, often technical, issues in the financial services industry.

We periodically make maintenance releases of licensed software available to our clients, as well as regulatory updates (generally during the fourth quarter, on a when and if available basis), to meet industry reporting obligations and other processing requirements.

Clients

Our global financial services and healthcare clients require a full range of information management and analysis on a timely and flexible basis. Our financial services clients include multinational banks, retail banks and credit unions, hedge funds, private equity funds, funds of funds and family offices, institutional and retail asset managers, insurance companies and pension funds, municipal finance groups, brokers/dealers, financial exchanges, commercial lenders, real estate lenders and property managers. Our healthcare clients include health insurance companies, health plans, and benefits administrators. Our clients include many of the largest and most well-recognized firms in the financial services and healthcare industries. During the year ended December 31, 2018, our top 10 clients represented approximately 16% of total revenues, with no single client accounting for more than 5% of total revenues.

Sales and Marketing

We believe a direct sales organization is essential to the successful implementation of our business strategy, given the complexity and importance of the operations and information managed by our products, the extensive regulatory and reporting requirements of each industry, and the unique dynamics of each vertical market. Our dedicated direct sales and support personnel are located in various sales offices worldwide and routinely undergo product and sales training. We also use telemarketing to support sales of our real estate property management products and work through alliance partners that sell our software-enabled services to their correspondent banking clients.

Our marketing personnel have extensive experience in marketing to the financial services and healthcare industries and are responsible for identifying market trends, evaluating and developing marketing opportunities, generating client leads and providing sales support. Our marketing activities focus on cost-effective means of reaching current and potential clients, including:

- Providing content-rich, periodic blogs and thought leadership targeted at clients and prospects in each of our vertical and geographic markets;
- publishing and distributing thought leadership white papers or articles to appropriate press outlets;
- hosting regular product-focused webinars;
- attending seminars and symposiums;
- participating in trade shows, hosted events, and speaking engagements; and
- delivering e-marketing campaigns.

This strategy achieves lower marketing costs, more direct contacts with actual and potential clients, increased marketing leads, distribution of more up-to-date marketing information and an improved ability to measure marketing initiatives.

The marketing department also supports the sales force with appropriate and relevant materials, including brochures and fact sheets, for use during the sales process.

Product Development and Engineering

We believe we must introduce new products and offer product innovation on a regular basis to maintain our competitive advantage. To meet these goals, we use multidisciplinary teams of highly trained personnel and leverage this expertise across all product lines. We have invested heavily in developing a comprehensive product analysis process to ensure a high degree of product functionality and quality. Maintaining and improving the integrity, quality and functionality of existing products is the responsibility of individual product managers. Product engineering management efforts focus on enterprise-wide strategies, implementing best-practice technology regimens, maximizing resources and mapping out an integration plan for our entire umbrella of products as well as third-party products. For the years ended December 31, 2018, 2017 and 2016, our research and development expenses were \$318.2 million, \$153.3 million and \$152.7 million, respectively. In addition, we have made significant investments in intellectual property through our acquisitions.

Our research and development engineers work closely with our marketing and support personnel to ensure that product evolution reflects developments in the marketplace and trends in client requirements. We have generally issued a major release of our core products during the second or third quarter of each fiscal year, which includes both functional and technical enhancements. We also provide an annual release typically in the fourth quarter to reflect evolving regulatory changes in time to meet clients' year-end reporting requirements.

Competition

The market for the software and services we provide is competitive, rapidly evolving and highly sensitive to new product introductions and marketing efforts by industry participants, although high conversion costs can create barriers to adoption of new products or technologies. The market is fragmented and served by both large-scale firms with broad offerings as well as firms that target only local markets or specific types of clients. We also face competition from information systems developed and serviced internally by the IT departments of large financial services and healthcare firms. We believe that we generally compete effectively as to the factors identified for each market below, although some of our existing competitors and potential competitors have substantially greater financial, technical, distribution and marketing resources than we have and may offer products with different functions or features that are more attractive to potential customers than our offerings.

Alternative Investments: In our alternative investments market, we compete with multiple vendors that may be categorized into two groups, the first consists of independent specialized administration providers, which are generally smaller than us, and the second includes prime brokerage and other financial services firms offering fund administration services. Major competitors in this market include CITCO Group and State Street. The key competitive factors in marketing software and services to the alternative investment industry are the need for independent fund administration, features and adaptability of the software, level and quality of customer support, level of software development expertise and total cost of ownership. Our strengths in this market are our expertise, our independence, our transparency, our ability to deliver functionality by multiple methods and our technology, including the ownership of our own software.

Asset Management: In our asset management market, we compete with a variety of other vendors depending on client characteristics such as size, type, location, computing environment and functionality requirements. Competitors in this market range from larger providers of integrated portfolio management systems and outsourcing services, such as BNY Mellon Financial to smaller providers of specialized applications and technologies such as StatPro, Empower, and others. We also compete with internal processing and IT departments of our clients and prospective clients. The key competitive factors in marketing asset management solutions are the reliability, accuracy, timeliness and reporting of processed information to internal and external customers, features and adaptability of the software, level and quality of customer support, level of software development expertise and return on investment. Our strengths in this market are our technology, our ability to deliver functionality by multiple delivery methods and our ability to provide cost-effective solutions for clients.

Healthcare: In our healthcare markets, our competition focuses on pharmacy and medical claims processing, benefit management, care management, business process outsourcing, business intelligence, and analytics. We compete with other third-party providers such as United Health/OptumRx and Magellan, and companies that perform their services in-house with licensed or internally developed systems and processes. We believe that we compete effectively in the market due to our ongoing investment in our products and the development of new products to meet the evolving business requirements of our clients. Our competitors' healthcare administration and health outcomes optimization solutions are primarily based on complete replacement of a payer's core system. We believe that a component application approach shifts the focus away from core application replacement to one in which clients have more alternatives for modernization of the business operation. With a component approach, health payer clients can still choose core application replacement if warranted, or adopt component applications that address only those areas of the business that offer the most opportunity for improvement for the client, resulting in protection of the client's current IT investment and less disruption to its business operation.

Insurance and Pension Funds: In our insurance and pension funds market, we compete with a variety of vendors depending on client characteristics such as size, type, location, computing environment and functionality requirements. Competitors in this market range from large providers of portfolio management systems, such as State Street (Princeton Financial Systems) and FIS, to smaller providers of specialized applications and services.

We also compete with outsourcers, as well as the internal processing and information technology departments of our clients and prospective clients. The key competitive factors in marketing insurance and pension plan systems are the accuracy, timeliness and reporting of processed information provided to internal and external clients, features and adaptability of the software, level and quality of customer support, economies of scale and return on investment. Our strengths in this market are our years of experience, our top-

tier clients, our ability to provide solutions by multiple delivery methods, our cost-effective and customizable solutions and our expertise.

Financial Advisor: We define the advisory market as independent and regional broker-dealers, wealth managers, trust companies, advisory firms, and registered investment advisers. We compete with a variety of vendors, which are generally smaller firms focused solely on the advisory market. Our competitors include Envestnet, Orion, Addepar, SEI's wealth management platform, and custodians such as Charles Schwab, Fidelity, and Raymond James. Our strengths in this market are our premier platforms with flexible and on-demand delivery models, and complementary products and services.

Real Estate Property Management: In our real estate property management market, we compete with numerous software vendors consisting of smaller specialized real estate property management solution providers and larger property management software vendors with more dedicated resources than our real estate property management business, such as Yardi Systems. The key competitive factors in marketing property management and timeshare systems are the features and adaptability of the software, level of quality and customer support, degree of responsiveness and overall net cost. Our strengths in this market are the quality of our software and our reputation with our clients.

Financial Institutions: In our financial institutions market, there are multiple software and services vendors that are either smaller providers of specialized applications and technologies or larger providers of enterprise systems, such as FIS and Misys. We also compete with outsourcers as well as the internal processing and IT departments of our clients and prospective clients. The key competitive factors in marketing financial institution software and services include accuracy and timeliness of processed information provided to clients, features and adaptability of the software, level and quality of customer support, level of software development expertise, total cost of ownership and return on investment. Our strengths in this market include our flexible technology platform and our ability to provide integrated solutions for our clients.

Commercial Lending: In our commercial lending market, we compete with a variety of other vendors depending on client characteristics such as size, type, location and functional requirements. Competitors in this market range from large competitors whose principal businesses are not in the loan management business, such as PNC Financial Services (Midland Loan Services) and McCracken Financial Solutions Corporation, to smaller providers of specialized applications and technologies. The key competitive factors in marketing commercial lending solutions are the accuracy, timeliness and reporting of processed information provided to customers, level of software development expertise, level and quality of customer support and features and adaptability of the software. Our strength in this market is our ability to provide both broadly diversified and customizable solutions to our clients.

Financial Markets: In our financial markets, our competition falls into two categories — the internal development organizations within financial enterprises and specialized financial vendors. The key competitive factors in marketing financial markets technology solutions are a proven track record of delivering high quality solutions, level of responsiveness and overall net cost. Our strengths in this market are a successful track record of delivering solutions and our reputation with our clients.

Proprietary Rights

We rely on a combination of trade secret, copyright, trademark and patent law, nondisclosure agreements and technical measures to protect our proprietary technology. We have registered trademarks for many of our products and will continue to evaluate the registration of additional trademarks as appropriate. We generally enter into confidentiality and/or license agreements with our employees, distributors, clients and potential clients. We seek to protect our software, documentation and other written materials under trade secret and copyright laws, which afford limited protection. These efforts may be insufficient to prevent third-parties from asserting intellectual property rights in our technology. Furthermore, it may be possible for unauthorized third-parties to copy portions of our products or to reverse engineer or otherwise obtain and use proprietary information, and third-parties may assert ownership rights in our proprietary technology. For additional risks relating to our proprietary technology, please see "Risk Factors — Risks "Relating to Our Business". If we are unable to protect our proprietary technology and other confidential information, our success and our ability to compete will be subject to various risks, such as third-party infringement claims, unauthorized use of our technology, disclosure of our proprietary information or inability to license technology from third-parties.

Rapid technological change characterizes the software development industry. We believe factors such as the technological and creative skills of our personnel, new product developments, frequent product enhancements, name recognition and reliable service and support are more important to establishing and maintaining a leadership position than legal protections of our technology.

Employees

As of December 31, 2018, we had over 22,600 full-time employees, consisting of approximately:

- 2,800 employees in research and development;
- 17,100 employees in consulting and services;
- 1,000 employees in sales and marketing;
- 300 employees in client support; and
- 1,400 employees in finance and administration.

As of December 31, 2018, approximately 11,500 of our employees were in our international operations. No employee is covered by any collective bargaining agreement. We believe that we have good relations with our employees.

Additional Information

We were incorporated in Delaware in July 2005, as the successor to a corporation originally formed in Connecticut in March 1986. Our principal executive offices are located at 80 Lamberton Road, Windsor, Connecticut 06095, and the telephone number of our principal executive offices is (860) 298-4500.

Our website address is www.ssctech.com. We make available, free of charge, on our website our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, Proxy Statements for the annual stockholder meetings and amendments thereto that we have filed or furnished with the SEC, as soon as reasonably practicable after we electronically file them with the SEC. The same information is available in print to any stockholder who submits a written request to our Investor Relations department. We are not, however, including the information contained on our website, or information that may be accessed through links on our website, as part of, or incorporating such information by reference into, this annual report on Form 10-K. The SEC maintains an internet site at www.sec.gov that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC.

ITEM 1A. RISK FACTORS

You should carefully consider the following risk factors, in addition to other information included in this annual report on Form 10-K and the other reports we submit to the SEC. If any of the following risks occur, it could materially affect our business, operating results, cash flows and financial condition and possibly lead to a decline in our stock price. The risks and uncertainties described below are those that we have identified as material, but are not the only risks and uncertainties facing us. Our business is also subject to general risks and uncertainties that affect many other companies. Additional risks and uncertainties not currently known to us or that we currently believe are not material may also impair our business, operating results, cash flows and financial condition.

Risks Relating to Our Business

Our business is greatly affected by changes in the state of the general economy and the financial markets, and uncertainty in the general economy, the financial services industry or other industries in which our clients operate could disproportionately affect the demand for our products and services.

We derive our revenues from the delivery of products and services to clients primarily in the financial services and healthcare industries. Demand for our products and services among companies in those industries could decline for many reasons. If demand for our products or services decreases or if any of the industries we serve decline, our business and our operating results could be adversely affected.

In 2008-09, the global economy experienced a significant recession, severe disruptions in the credit markets, increased uncertainty about economic, political, global trade and market conditions, and periods of heightened volatility in a variety of financial and other markets, including commodity prices and currency rates, all of which had experienced a material and adverse effect at that time on those markets and on client activity levels. While the U.S. economy recovered from the recession, the recovery may not be sustainable for any specific period of time, and the economy could slip back into recession. Our clients include a range of organizations in the financial services industry whose success is linked to the health of the economy generally and of the financial markets specifically. Unfavorable or uncertain economic conditions, economic instability or economic downturns could: (i) cause our clients or prospective clients to cancel, reduce or delay planned expenditures for our products and services; (ii) impair our clients' ability to pay for products they have purchased; or (iii) cause our clients to process fewer transactions through our software-enabled services, renegotiate their contracts with us, move their IT solutions in-house, switch to lower-priced solutions offered by our

competitors or exit the industry. Fluctuations in the value of assets under our clients' management could also adversely affect our revenues because pricing in many of our agreements is adjusted based on assets under management. We cannot predict the occurrence, timing or duration of any economic downturn, generally, or in the markets in which our businesses operate. Turbulence in the U.S. and international markets, renewed concern about the strength and sustainability of a recovery and prolonged declines in business consumer spending could materially adversely affect our business, results of operations and financial condition, and the liquidity and financial condition of our clients.

In addition, any other events that adversely affect our clients' businesses, rates of growth or numbers of clients they serve could decrease demand for our products and services and the number of transactions we process. Events that could adversely affect our clients' businesses include decreased demand for our clients' products and services, adverse conditions in our clients' markets or adverse economic conditions generally. We may be unsuccessful in predicting the needs of changing industries and whether potential clients will accept our products or services. We also may invest in technology or infrastructure for specific clients and not realize additional revenue from such investments. If trends or events do not occur as we expect, our business could be negatively impacted.

We may not achieve the anticipated benefits from our acquisitions and may face difficulties in integrating our acquisitions.

We have acquired and intend in the future to acquire companies, products or technologies that we believe could complement or expand our business, augment our market coverage, enhance our technical capabilities or otherwise offer growth opportunities. For example, in 2018 we consummated our acquisitions of DST, CACEIS, Eze and Intralinks. However, acquisitions could subject us to contingent or unknown liabilities, and we may have to incur debt or severance liabilities or write off investments, infrastructure costs or other assets. Our success is also dependent on our ability to complete the integration of the operations of acquired businesses in an efficient and effective manner, which may be difficult to accomplish in the rapidly changing financial services software and services industry. We may not realize the benefits we anticipate from acquisitions, such as lower costs, increased revenues, synergies and growth opportunities, or we may realize such benefits more slowly than anticipated, due to our inability to:

- combine operations, facilities and differing firm cultures;
- maintain employee morale or retain the clients or employees of acquired entities;
- generate market demand for new products and services;
- coordinate geographically dispersed operations and successfully adapt to the complexities of international operations, including compliance with laws, rules and regulations in multiple jurisdictions;
- integrate the technical teams of acquired companies within our organization; or
- incorporate acquired technologies, products and services into our current and future product and service lines.

The process of integrating the operations of acquired companies could disrupt our ongoing operations, divert management from day-to-day responsibilities, increase our expenses and harm our business, results of operations and financial condition. Acquisitions may also place a significant strain on our administrative, operational, financial and other resources. In addition, certain of our acquisitions have generated disputes with stockholders or management of acquired companies or other claimants that have required the expenditure of our resources to address or have led to litigation; any such disputes may reduce the value we hope to realize from our acquisitions, either by increasing our costs of the acquisition, reducing our opportunities to realize revenues from the acquisition or imposing litigation costs or adverse judgments on us. Acquisitions may also expose us to litigation from our stockholders arising out of the acquisition, which, even if unsuccessful, could be costly to defend and serve as a distraction to management.

Consolidations or failures among our clients or within their respective industries could adversely affect us by causing a decline in demand for our products and services.

If banks and financial services firms fail or consolidate, there could be a decline in demand for our products and services. Failures, mergers and consolidations of banks and financial institutions reduce the number of our clients and potential clients, which could adversely affect our revenues even if these events do not reduce the aggregate activities of the consolidated entities. Further, if our clients fail and/or merge with or are acquired by other entities that are not our clients, or that use fewer of our products and services, they may discontinue or reduce their use of our products and services. It is also possible that the larger financial institutions resulting from mergers or consolidations would have greater leverage in negotiating terms with us. In addition, these larger financial institutions could decide to perform in-house some or all of the services that we currently provide or could provide or to consolidate their processing on a non-SS&C system. The resulting decline in demand for our products and services over time could have a material adverse effect on our business, results of operations and financial condition.

Our revenues may decrease due to declines in the levels of participation and activity in the securities markets .

We generate significant revenues from the transaction processing fees we earn for our products and services. These revenue sources are substantially dependent on the levels of participation and activity in the securities markets. The number of unique securities positions held by investors through our clients and our clients' customer trading volumes reflect the levels of participation and activity in the markets, which are impacted by market prices and the liquidity of the securities markets, among other factors. We could be negatively impacted by the volatile markets as certain of our fees are tied to the asset bases of our clients. The occurrence of significant market volatility or decreased levels of participation would likely result in reduced revenues and decreased profitability from our business operations. Additionally, we may be exposed to operational or other risks in connection with any systematic failures in the markets, or the default due to market-related failures of one or more counterparties with whom we transact.

Our business has become increasingly focused on the hedge fund industry, and we are subject to the variations and fluctuations of that industry.

Certain of our acquisitions have resulted in a higher percentage of our clients being hedge funds or funds of hedge funds. We derive significant revenues from asset management, administration and distribution contracts with such clients. Under these contracts, the fees paid to us are based on a variety of factors, including the market value of assets under management, assets under administration and number of transactions processed. Assets under management, assets under administration or the number of transactions processed may decline for various reasons, causing results to vary. Factors that could decrease assets under management and assets under administration (and therefore revenues) include declines in the market value of the assets in the funds (and accounts as applicable) managed, administered and distributed, redemptions and other withdrawals from, or shifts among, the funds (and accounts as applicable) managed, administered and distributed, as well as market conditions generally.

These clients and our business relating to them are affected by trends, developments and risks associated with the global hedge fund industry. In addition, the market environment for hedge funds involves risk and has suffered significant turmoil, including as a result of substantial changes in global economies, political uncertainty, stock market declines, a trend toward passive and algorithmic investment strategies and various regulatory initiatives. Even in the absence of such factors, the global hedge fund industry is subject to fluctuations in assets under management that are impossible to predict or anticipate. These risks and trends could significantly and adversely affect some or all of our hedge fund clients, which could adversely affect our business, results of operations and financial condition. In addition, market forces have negatively impacted liquidity for many of the financial instruments in which hedge fund clients' trade, which, in turn, could negatively impact our ability to access independent pricing sources for valuing those instruments.

If we are unable to retain and attract clients, our revenues and net income would remain stagnant or decline.

If we are unable to keep existing clients satisfied, sell additional products and services to existing clients or attract new clients, then our revenues and net income would remain stagnant or decline. A variety of factors could affect our ability to successfully retain and attract clients, including:

- the level of demand for our products and services;
- the difficulty of potential customers to change software service providers;
- the level of client spending for IT;
- the level of competition from internal client solutions and from other vendors;
- the quality of our client service and the performance of our products;
- our ability to update our products and services and develop new products and services needed by clients;
- our ability to understand the organization and processes of our clients; and
- our ability to integrate and manage acquired businesses.

An increase in subaccounting services performed by brokerage firms has and will continue to adversely impact our revenues.

We service open-end and closed-end funds registered under the Investment Company Act of 1940, including mutual funds, exchange-traded funds, interval funds and exchange-listed closed-end funds, as well as private funds, collective investment trusts and other accounts under shareowner recordkeeping arrangements which we refer to as registered accounts. These arrangements are distinguished from broker subaccounts, which are serviced under contract with a broker/dealer. Our clients may adopt the broker subaccount structure. We offer subaccounting services to brokerage firms that perform shareowner subaccounting. As the recordkeeping functions in connection with subaccounting are more limited than traditional shareowner accounting, the fees charged are generally lower on a per unit basis. Brokerage firms that obtain agreements from our clients to use a broker subaccount structure cause accounts currently on our traditional recordkeeping system to convert to our subaccounting system, or to the subaccounting systems of other service providers, which generally results in lower revenues. While subaccounting conversions have generally been

limited to our non tax-advantaged mutual fund accounts, such conversions have begun to extend to the tax-advantaged accounts (such as retirement and Section 529 accounts) we service, which could adversely affect our business and operating results.

We face significant competition with respect to our products and services, which may result in price reductions, reduced gross margins or loss of market share.

In the financial and healthcare markets we serve, we compete based on a variety of factors, including investment performance, the range of products or services offered, brand recognition, business reputation, financial strength, stability and continuity of client and other intermediary relationships, quality of service, and level of fees charged for products and services. The market for financial and healthcare services software and services is competitive, rapidly evolving and highly sensitive to new product and service introductions, technology innovations and marketing efforts by industry participants. The markets we serve are also highly fragmented and served by numerous firms that target only local markets or specific client types. We also face competition from information systems developed and serviced internally by the IT departments of financial services firms. Some of our current and potential competitors may have significantly greater financial, technical, distribution and marketing resources, generate higher revenues and have greater name recognition. Our current or potential competitors may develop products comparable or superior to those developed by us, or adapt more quickly to new technologies, evolving industry trends or changing client or regulatory requirements. It is also possible that our competitors may enter into alliances with each other or other third-parties, and through such alliances, acquire increased market share. Increased competition may result in price reductions, reduced gross margins and loss of market share. Accordingly, our failure to successfully compete in any of our material businesses could have a material adverse effect on results of operations. Competition could also affect the revenue mix of products or services we provide, resulting in decreased revenues in lines of business with higher profit margins, and our business may not grow as expected and may decline.

Our role as a fund administrator has in the past, and may in the future, expose us to claims and litigation from clients, their investors, regulators or other third-parties.

As a service provider, we have been, and may in the future be, subject to claims and lawsuits from investors, regulators, liquidators, other third-parties and our clients, some of which pursue high-risk investment strategies and all of which are subject to substantial market risk, in the event that the underlying fund suffers investment losses, incurs instances of fraud, becomes insolvent, files for bankruptcy or otherwise becomes defunct. Even if we are not ultimately found to be liable, defending such claims or lawsuits could be time-consuming, divert management resources, harm our reputation and cause us to incur significant expenses. These claims or lawsuits could have an adverse effect on our business, results of operations and financial condition.

Our software-enabled services may be subject to disruptions, attacks or failures that could adversely affect our reputation and our business.

Our software-enabled services maintain and process confidential data and process trades and perform other back-office functions, including wiring funds, on behalf of our clients, some of which is critical to their business operations. For example, our trading systems maintain account and trading information for our clients and their customers. In addition, following our acquisition of Intralinks, our platforms now house sensitive, confidential client information. Our internal technology infrastructure on which our software-enabled services depend may be subject to disruptions or may otherwise fail to operate properly or become disabled or damaged as a result of a number of factors, including events that are wholly or partially beyond our control and that could adversely affect our ability to process transactions, provide services or otherwise appropriately conduct our business activities. Such events include IT attacks or failures, threats to physical security, sudden increases in transaction volumes, electrical or telecommunications outages, damaging weather or other acts of nature, or employee or contractor error or malfeasance. In particular, cybersecurity threats have become prevalent in our industry as well as for many firms that process information. Cybersecurity threats are evolving and our security measures, and those of our service providers, may not detect or prevent all attempts to hack our systems, denial-of-service attacks, viruses, malicious software, attempts to gain unauthorized access to data, phishing attacks, social engineering, security breaches or employee or contractor malfeasance and other electronic security breaches that may jeopardize the security of information stored in or transmitted by our sites, networks and systems or that we or our third-party service providers otherwise maintain. Such cyber security incidents could lead to disruptions in our systems, the unauthorized release or destruction of our or our clients' or other parties' confidential or otherwise protected information and corruption of data. We and our service providers may not have the resources or technical sophistication to anticipate or prevent all types of attacks, and techniques used to obtain unauthorized access to or sabotage systems change frequently and may not be known until launched against us or our third-party service providers. In the last few years there have been many successful advanced cyber-attacks that have damaged several prominent companies in spite of strong information security measures, and we expect that the risks associated with cyber-attacks and the costs of preventing such attacks will continue to increase in the future. We and our clients are regularly the target of attempted cyber-attacks and we must continuously monitor and develop our systems to protect our technology infrastructure and data from misappropriation or corruption. Although we expend significant resources and oversight efforts in an attempt to ensure that we maintain appropriate safeguards with respect to

cyber-attacks, there is no guarantee that our systems and procedures are adequate to protect against all security breaches. If our software-enabled services are disrupted or fail for any reason, or if our systems or facilities are infiltrated or damaged by unauthorized persons, we and our clients could experience data loss, including confidential and personal information, financial loss, harm to their reputation and significant business interruption. If that happens, we may be exposed to significant liability, our reputation may be harmed, our clients may be dissatisfied and we may lose business. Although we maintain privacy, data breach and network security liability insurance, we cannot be certain that our coverage will be adequate or cover liabilities actually incurred, or that insurance will continue to be available to us on economically reasonable terms, or at all. Given the unpredictability of the timing, nature and scope of such failures or disruptions, we could potentially experience significant costs and exposures, including production downtimes, operational delays, other detrimental impacts on our operations or ability to provide services to our customers, the compromising of confidential or otherwise protected information, misappropriation, destruction or corruption of data, security breaches, other manipulation or improper use of our systems or networks, financial losses from remedial actions, loss of business, potential liability, regulatory inquiries, enforcements, actions and fines and/or damage to our reputation, any of which could have a material adverse effect on our business, results of operations and financial condition.

Because our platform could be used to collect and store personal information of our customers' employees or customers, privacy concerns could result in additional cost and liability to us or inhibit use of our platform.

Personal privacy has become a significant issue in the U.S. and in many other countries where we offer our solutions or may offer them in the future. The regulatory framework for privacy issues worldwide is currently evolving, is not uniform and is likely to remain uncertain for the foreseeable future. Many federal, state and foreign government bodies and agencies have adopted or are considering adopting laws and regulations regarding the collection, use, disclosure, control, security and deletion of personal information. In the U.S., these include, without limitation, laws and regulations promulgated by states, as well as rules and regulations promulgated under the authority of the Federal Trade Commission (" FTC ") and federal financial regulatory bodies. Additionally, California recently enacted legislation, the California Consumer Privacy Act of 2018, that will afford consumers expanded privacy protections when it goes into effect on January 1, 2020. Legislators have stated that they intend to propose amendments to this legislation, and it remains unclear what, if any, modification will be made to this legislation or how it will be interpreted. The effects of this legislation potentially are far-reaching, however, and may require us to modify our data processing practices and policies and to incur costs to comply. Internationally, most of the jurisdictions in which we operate have established their own data security and privacy legal frameworks, many of which are broader in scope, more restrictive and impose greater obligations on us and our customers. For instance, the European Union ' s (" E.U. ") General Data Protection Regulation (" GDPR ") became effective in May 2018 and imposes strict requirements related to processing the personal data of E.U. individuals and provides for robust regulatory enforcement and sanctions for non-compliance. EU data protection authorities will have the power to impose administrative fines for violations of the GDPR of up to a maximum of €20 million or 4% of the noncompliant company's annual global turnover for the preceding financial year, whichever is higher, and violations of the GDPR may also lead to damages claims by data controllers and data subjects. Such penalties are in addition to any civil litigation claims by data controllers, data processors, customers and data subjects. The GDPR is likely to increase our obligations, including by mandating documentation requirements and granting certain rights to individuals to inquire into how we collect, use, disclose, retain and process information about them. Although we are continuing to take steps to comply with applicable portions of the GDPR, the scope of many of the GDPR's requirements remains unclear and regulatory guidance on several topics is still forthcoming. Therefore, we cannot assure you that such steps will be sufficient. On June 23, 2016, the U.K. held a referendum in which voters approved an exit from the E.U, commonly referred to as " Brexit, " and it is unclear how Brexit will affect the applicability of the GDPR with respect to U.K. individuals .

In addition to government regulation, privacy advocacy and industry groups may propose new and different self-regulatory standards that either legally or contractually apply to us. As a result of uncertainty regarding the interpretation and application of privacy and data protection-related laws, regulations, and self-regulatory requirements, it is possible that these laws, regulations, and requirements may be interpreted and applied in a manner that is inconsistent with our existing data handling practices or the technological features of our solutions. If so, in addition to the possibility of fines, lawsuits and other claims, each of which may be material, we could be required to fundamentally change our business activities and practices or modify our solutions, which could have an adverse effect on our business. Any inability to adequately address privacy or data protection-related concerns, even if unfounded, or comply with applicable privacy or data protection-related laws, regulations and policies, could result in additional cost and liability to us, damage our reputation, inhibit sales and harm our business. Furthermore, the costs of compliance with, and other burdens imposed by, the laws, regulations, standards and policies that are applicable to the businesses of our customers may limit the use and adoption of, and reduce the overall demand for, our solutions. Also, privacy concerns, whether valid or not valid, may inhibit market adoption of our solutions, particularly in foreign countries.

We expect that our operating results, including our profit margins and profitability, may fluctuate over time.

Historically, our revenues, profit margins and other operating results have fluctuated from period to period and over time primarily due to the timing, size and nature of our license and service transactions. See “ Management ’ s Discussion and Analysis of Financial Condition and Results of Operations ” for further discussion on fluctuations in revenues, profit margins and other operating results. Additional factors that may lead to such fluctuation include:

- the costs, timing of the introduction and the market acceptance of new products, product enhancements or services by us or our competitors;
- the lengthy and often unpredictable sales cycles of large client engagements;
- the amount and timing of our operating costs and other expenses;
- the financial health of our clients;
- changes in the volume of assets under our clients’ management;
- cancellations of maintenance and/or software-enabled services arrangements by our clients;
- changes in local, national and international regulatory requirements;
- acquisitions during the relevant period;
- implementation of our licensing contracts and software-enabled services arrangements;
- changes in economic and financial market conditions; and
- changes in the types of products and services we provide.

Additional tax expense or additional tax exposures could affect our future profitability.

We are subject to income taxes in the U.S. and various international jurisdictions. Changes in tax laws and regulations, as well as changes in related interpretations and other tax guidance could materially impact our tax receivables and liabilities and our deferred tax assets and deferred tax liabilities. On December 22, 2017, U.S. federal tax legislation, commonly referred to as the Tax Cuts and Jobs Act (“ Tax Act ”), was signed into law, significantly reforming the U.S. Internal Revenue Code. The Tax Act, among other things, reduces the U.S. federal statutory corporate tax rate, imposed a one-time transition tax on previously undistributed foreign earnings, limits the deductibility on executive compensation, imposes a tax on Global Intangible Low-Taxed Income (“ GILTI ”) and modifies or repeals many business deductions and credits. During 2018, the U.S. Department of Treasury and Internal Revenue Service issued several complex proposed and final regulations, and related guidance, regarding provisions of the Tax Act. However, several aspects of the legislation remain unclear and subject to interpretation. Further guidance, technical corrections and regulations are expected to be issued, which could lessen or increase certain impacts of the legislation. Furthermore, states continue to issue guidance and enact legislation in response to the Tax Act, all of which could have a material impact on our income tax expense, assets and liabilities. See “ Management ’ s Discussion and Analysis of Financial Condition and Results of Operations ” for additional information.

Additionally, in the ordinary course of business we are subject to examinations by various authorities, including tax authorities. In addition to ongoing investigations, there could be additional investigations launched in the future by governmental authorities in various jurisdictions, and existing investigations could be expanded. The global and diverse nature of our operations means that these risks will continue to exist and additional investigations, proceedings and contingencies will arise from time to time. Our business, results of operations and financial condition may be affected by the outcome of investigations, proceedings and other contingencies that cannot be predicted with certainty.

If third-party service providers on which we rely, or other third-parties with which we do business or which facilitate our business activities, suffer disruptions to their IT systems, our business could be harmed.

In providing our software-enabled services to our customers, we depend upon IT infrastructure that is primarily managed by our firm, but we also depend on third-party service providers to provide some of the IT infrastructure on which we rely. Although we seek to ensure that appropriate security and other standards are maintained by these third-parties, these third-parties are also subject to the risks discussed in the preceding risk factor, and there is no guarantee that they will maintain systems and procedures sufficient to protect against system failures and security breaches, including as a result of cyber-attacks.

In addition, the third-parties with which we do business or which facilitate our business activities, including financial intermediaries, are susceptible to the risks described in the preceding risk factor (including regarding the third-parties with which they are similarly interconnected), and our or their business operations and activities may therefore be adversely affected, perhaps materially, by failures, terminations, errors or malfeasance by, or attacks or constraints on, one or more financial, technology or infrastructure institutions or intermediaries with whom they are interconnected or conduct business.

Catastrophic events may adversely affect our business.

A war, terrorist attack, natural disaster, pandemic or other catastrophe may adversely affect our business. A catastrophic event could have a direct negative impact on us or an indirect impact on us by, for example, affecting our clients, the financial markets or the overall economy and reducing our ability to provide, our clients' ability to use, and the demand for, our products and services. The potential for a direct effect on our business operations is due primarily to our significant investment in infrastructure. Although we maintain redundant facilities and have contingency plans in place to protect against both man-made and natural threats, it is impossible to fully anticipate and protect against all potential catastrophes. A computer virus, physical or cyber security breach, criminal act, military action, power or communication failure, flood, severe storm or the like could lead to service interruptions and data losses for clients, disruptions to our operations, or damage to important facilities. In addition, such an event may cause clients to cancel their agreements with us for our products or services. Any of these events could adversely affect our business, results of operation and financial condition.

We have substantial operations and a significant number of employees in India and we are therefore subject to regulatory, economic and political uncertainties in India.

As of December 31, 2018, we had approximately 4,400 employees located in India. The economy of India may differ favorably or unfavorably from the U.S. economy and our business may be adversely affected by the general economic conditions and economic and fiscal policy in India, including changes in exchange rates and controls, interest rates and taxation policies. In particular, in recent years, India's government has adopted policies that are designed to promote foreign investment, including significant tax incentives, relaxation of regulatory restrictions, liberalized import and export duties and preferential rules on foreign investment and repatriations. These policies may not continue. In addition, we are subject to risks relating to social stability, political, economic or diplomatic developments affecting India in the future.

India faces major challenges in the years ahead sustaining the economic growth that it has experienced over the past several years. These challenges include the need for substantial infrastructure development and improving access to healthcare and education. Our ability to recruit, train and retain qualified employees and develop and operate our facilities in India could be adversely affected if India does not successfully meet these challenges, in which case we may need to relocate those facilities and that could have a material adverse effect on our business, financial condition and results of operations.

We are dependent on our senior management and their continued performance and productivity.

We are dependent on the continued efforts of the members of our senior management. The loss of any of the members of our senior management may cause a significant disruption in our business, jeopardize existing customer relationships, impair our compliance efforts as a public company, and have a material adverse effect on our business objectives. We do not maintain key man life insurance policies for any senior officer or manager.

If we cannot attract, train and retain qualified employees, we may not be able to provide adequate technical expertise and customer service to our clients.

We believe that our success is due in part to our ability to attract, train and retain highly skilled employees. Competition for qualified personnel in the software and hedge fund industries is intense, and we have, at times, found it difficult to attract and retain skilled personnel for our operations. Our failure to attract and retain a sufficient number of highly skilled employees could prevent us from developing and servicing our products at the same levels as our competitors; therefore, we may lose potential clients and suffer a decline in revenues.

If we are unable to protect our proprietary technology and other confidential information, our success and our ability to compete will be subject to various risks, such as third-party infringement claims, unauthorized use of our technology, disclosure of our proprietary information or inability to license technology from third-parties.

Our success and ability to compete depends in part upon our ability to protect our proprietary technology and other confidential information. We rely on a combination of patent, trade secret, copyright and trademark law, and nondisclosure agreements, license agreements and technical measures to protect our proprietary technology and other confidential information. We have registered trademarks for some of our products and will continue to evaluate the registration of additional trademarks as appropriate. We generally enter into confidentiality agreements with our employees, distributors, clients and potential clients. However, these efforts may be insufficient to prevent those parties or others from infringing, misappropriating, violating or asserting rights in our intellectual property, confidential information or other technology and our proprietary technology and confidential information may be subject to embezzlement, theft, or other similar illegal behavior by our employees or third-parties. In addition, our employees, distributors, clients and potential clients may breach our confidentiality agreements and we may not have adequate remedies for any such breach. Furthermore, unauthorized third-parties may seek to copy portions of our products or to reverse engineer or otherwise obtain and use

our proprietary information. If a third-party were to gain unauthorized access to or independently develop the confidential or proprietary information we possess, we could suffer a loss of revenues, we could experience an adverse impact on our competitive position, and our relationships with our clients and our reputation could be materially adversely affected. Existing patent and copyright laws afford only limited protection. Third-parties may develop substantially equivalent or superseding proprietary technology or may offer equivalent products in competition with our products in a manner that does not infringe, misappropriate or otherwise violate our intellectual property or other proprietary rights, thereby substantially reducing the value of our proprietary rights. A number of third-parties hold patents and other intellectual property rights with application in the financial services field. Consequently, we are subject to the risk that such third-parties will claim that our products infringe, misappropriate or otherwise violate their intellectual property rights, including their patent rights. Such claims, regardless of merit, could result in expensive and time-consuming litigation, divert the attention of our personnel, and impair our intellectual property rights. Moreover, as a result of such claims, we may be required to redesign our products or services in a manner that is not infringing, misappropriating or otherwise violating such third-party's intellectual property rights, which may not be technically or commercially feasible. We may also be required to obtain a license to such intellectual property rights, which may not be available on commercially reasonable terms or at all. Any of the foregoing could have a material adverse effect on our business, results of operation, and financial condition.

We incorporate open source software into a limited number of our software products. We monitor our use of open source software in an effort to avoid subjecting our products to unfavorable conditions or conditions we do not intend. Some open source licenses require that source code subject to the license be disclosed to third-parties, grant such third-parties the right to modify and redistribute that source code and a requirement that the source code for any software derived from it be disclosed. If we combine our proprietary software with open source software in a certain manner, we could, under certain open source licenses, be required to release the source code of our proprietary software to the public. Although we believe that we have complied with our obligations under the applicable licenses for open source software that we use, there is little or no legal precedent governing the interpretation of many of the terms of certain of these licenses. As a result, the potential impact of these terms is uncertain and may result in unanticipated obligations or restrictions regarding those of our products, technologies or solutions affected.

We have acquired and may acquire important technology rights through our acquisitions and have often incorporated and may incorporate features of these technologies across many of our products and services. As a result, we are subject to the above risks and the additional risk that the seller of the technology rights may not have appropriately protected the intellectual property rights we acquired. Indemnification and other rights under applicable acquisition documents are limited in term and scope and therefore provide us with only limited protection.

In addition, we rely on third-party software in providing some of our products and services. If we lose our licenses to use such software or if such licenses are found to infringe, misappropriate or otherwise violate upon the rights of others, we will need to seek alternative means of obtaining the licensed software to continue to provide our products or services, which may not be feasible on a technical or commercial basis. Our inability to replace such software, or to replace such software in a timely manner, could significantly disrupt our business and our ability to deliver products and services to our clients, and adversely affect our business, results of operation and financial condition.

We could become subject to litigation regarding our or a third-party's intellectual property rights or other confidential or proprietary information, which could seriously harm our business and require us to incur significant costs.

In recent years, there has been a high incidence of litigation in the U.S. involving patents and other intellectual property rights. We are from time to time a party to litigation to enforce our intellectual property rights or to protect our confidential or proprietary information, or as a result of an allegation that we infringe, misappropriate or otherwise violate a third-party's intellectual property rights, including patents, trademarks, trade secrets and copyrights. From time to time, we have received notices claiming our technology may infringe, misappropriate or otherwise violate third-party intellectual property rights or otherwise threatening to assert intellectual property rights. These claims and any resulting lawsuit, if successful, could subject us to significant liability for damages and our intellectual property rights being reduced, narrowed or held unenforceable or invalid. These lawsuits, regardless of their success, could be time-consuming and expensive to resolve, adversely affect our revenues, profitability and prospects, and divert management time and attention. If we are found to infringe, misappropriate or otherwise violate a third-party's intellectual property rights, we may be required to pay the third-party substantial monetary damages and to cease the activities covered by such intellectual property rights, unless we obtain a license to such intellectual property rights, which may not be available on commercially reasonable terms or at all. In addition, these claims and threats could also cause us to undertake to re-engineer our products or services which may not be technically or commercially feasible. Any of the foregoing could have a material adverse effect on our business, results of operation and financial condition.

We may be unable to adapt to rapidly changing technology and evolving industry standards and regulatory requirements.

Rapidly changing technology, evolving industry standards and regulatory requirements and new product and service introductions characterize the market for our products and services. Our future success will depend in part upon our ability to enhance our existing products and services and to develop and introduce new products and services to keep pace with such changes and developments and to meet changing client needs. The process of developing our software products is complex and is expected to become increasingly complex and expensive in the future due to the introduction of new platforms, operating systems and technologies. Current areas of significant technological change include mobility, cloud-based computing and the processing and analyzing of large amounts of data. Our ability to keep up with technology and business and regulatory changes is subject to a number of risks, including that:

- we may find it difficult or costly to update our services and software and to develop new products and services quickly enough to meet our clients' needs;
- we may find it difficult or costly to make some features of our software work effectively and securely over the Internet or with new or changed operating systems;
- we may find it difficult or costly to update our software and services to keep pace with business, evolving industry standards, regulatory requirements and other developments in the industries in which our clients operate; and
- we may be exposed to liability for security breaches that allow unauthorized persons to gain access to confidential information stored on our computers or transmitted over our network.

Our failure to enhance our existing products and services and to develop and introduce new products and services to promptly address the needs of our clients and a changing marketplace could adversely affect our business, results of operations and financial condition.

Undetected software design defects, errors or failures, or employee errors, may result in defects, delays, loss of our clients' data, litigation against us and harm to our reputation and business.

Our software products are highly complex and sophisticated and could contain design defects or software errors that are difficult to detect and correct. Errors or bugs in our software may affect the ability of our products to work with other hardware or software products, delay the development or release of new products or new versions of products, result in the loss of client data, damage our reputation, affect market acceptance of our products or result in the rejection of our products by the market, cause loss of revenues, divert development resources, increase product liability and warranty claims, and increase service and support costs. We cannot be certain that, despite testing by us and our clients, errors will not be found in new products or new versions of products. Moreover, our clients engage in complex trading activities and this complexity increases the likelihood that our employees may make errors. Employee errors, poor employee performance or misconduct may be difficult to detect and deter. These product defects or errors in the product operations, or employee errors, poor performance or misconduct, could cause damages to our clients for which they may assert claims or lawsuits against us. The cost of defending such a lawsuit, regardless of its merit, could be substantial and could divert management's attention and result in reputational harm. In addition, if our business liability insurance coverage proves inadequate with respect to a claim or future coverage is unavailable on acceptable terms or at all, we may be liable for payment of substantial damages. Any or all of these potential consequences could have an adverse impact on our business, results of operations and financial condition.

Our businesses expose us to risks of claims and losses that could be significant and damage our reputation and business prospects.

Our proprietary applications and related consulting and other services include the processing or clearing of financial and healthcare transactions for our clients and their customers and the design of benefit plans and compliance programs. The dollar amount of transactions processed or cleared is vastly in excess than the revenues we derive from providing these services. In the event we make transaction processing or operational errors, or mismanage any process, we could be exposed to claims for any resulting processing delays, disclosure of protected information, miscalculations, mishandling of pass-through disbursements or other processes, and failure to follow a client's instructions or meet specifications. Additionally, we may be subject to claims or liability resulting from a failure of third parties (including regulatory authorities) to recognize the limitations of our role as our clients' agent or consultant, and we may be subject to claims or liability resulting from fraud committed by third parties. We may be exposed to the risk of counterparty breaches or failure to perform. We may be subject to claims, including class actions, for reimbursements, losses or damages arising from any transaction processing or operational error, or from process mismanagement. Because of the sensitive nature of the financial and healthcare transactions we process, our liability and any alleged damages may significantly exceed the fees we receive for performing the service at issue. Litigation could include class action claims based upon, among other theories, various regulatory requirements and consumer protection and privacy laws that class action plaintiffs may attempt to use to assert private rights of action. Any of these claims and related settlements or judgments could affect our operating results, damage our reputation, decrease demand for our products and services, or cause us to make costly operating changes.

Investment decisions with respect to cash balances, market returns or losses on investments, and limits on insurance applicable to cash balances held in bank and brokerage accounts, including those held by us and as agent on behalf of our clients, could expose us to losses of such cash balances and adversely affect revenues attributable to cash balance deposit investments.

As part of our transaction processing and other services, we maintain and manage large bank and investment accounts containing client funds, which we hold as agent, as well as operational funds. Our revenues include investment earnings related to client fund cash balances. Our choices in selecting investments, or market conditions that affect the rate of return on or the availability of investments, could have an adverse effect on the level of such revenues. The amounts held in our operational and client deposit accounts could exceed the limits of government insurance programs of organizations such as the Federal Deposit Insurance Corporation and the Securities Investors Protection Corporation, exposing us to the risk of loss. Any substantial loss would have a material adverse impact on our business, results of operations and our financial condition.

Our business is subject to evolving regulations and increased scrutiny from regulators.

Our business is subject to evolving and increasing U.S. and foreign regulation, including privacy, licensing, processing, recordkeeping, investment adviser, broker/dealer, retirement, data protection, reporting and related regulations. New products and services we plan to offer may also be subject to regulation, either directly or as a downstream provider to customers or clients. Such regulations cover all aspects of our business including, but not limited to, sales and trading methods, trade practices among broker/dealers, use and safekeeping of clients' funds and securities, use of client and employee data, capital structure of securities firms, net capital, anti-money laundering efforts, healthcare, recordkeeping and the conduct of directors, officers and employees. Any violation of applicable regulations could expose us or those businesses to civil or criminal liability, significant fines or sanctions, damage our reputation, the revocation of licenses, censures, or a temporary suspension or permanent bar from conducting business, which could adversely affect our business, results of operations and our financial condition.

Our clients are subject to extensive regulation, including investment adviser, broker/dealer and privacy regulations applicable to products and services we provide to the financial services industry and insurance, privacy and other regulations applicable to services we provide to the healthcare industry. As a result, our relationships with our clients may subject us to increased scrutiny from a number of regulators, including the Federal Financial Institutions Examination Council (and its constituent members, the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the National Credit Union Administration, the Office of the Comptroller of the Currency and the Consumer Financial Protection Bureau), the Bermuda Monetary Authority, British Virgin Islands Financial Services Commission, Centrale Bank van Curacao en Sint Maarten, Commodity Futures Trading Commission, FTC, Cayman Islands Monetary Authority, Commission de Surveillance du Secteur Financier, Financial Industry Regulatory Authority, Financial Conduct Authority, Central Bank of Ireland, National Futures Association, Ontario Securities Commission, SEC, Securities Commission of the Bahamas, U.S. Treasury Department and other government entities that regulate the financial services, hedge fund and hedge fund services industry in the U.S., the United Kingdom (" U.K. ") and the other jurisdictions in which we operate. As a result of the changes in the global economy and the turmoil in global financial markets in recent years, the risk of additional government regulation has increased. In addition, the final outcome of negotiations between the U.K. and the E.U. relating to Brexit remains uncertain. As a result, the impact of the U.K. ' s exit on the U.K. regulatory regime is unknown, but it is possible that we will become subject to more onerous regulations in the U.K. as a result. Moreover, our healthcare business is subject to evolving and increasing federal and state regulation. Such federal regulation is developed, interpreted or enforced by regulators including, the Centers for Medicare and Medicaid Services, the U.S. Dept. of Health and Human Services, the Office for Civil Rights and the Office of the Inspector General. Typically a state's department of insurance regulates much of our healthcare business; however, each state's statutes dictate such authority. Any of these regulations may limit or curtail our activities, including activities that might be profitable, and changes to existing regulations, or the interpretations thereof, may affect our ability to continue to offer our existing products and services, or to offer products and services we may wish to offer in the future.

The European Union ' s AIFMD and the U.S. Dodd-Frank Act, among other initiatives, pose significant changes to the regulatory environment in which we and our clients operate. The impact of these regulatory changes remains uncertain. If we fail to comply with any applicable laws, rules or regulations, we may be subject to censure, fines or other sanctions, including revocation of our licenses and/or registrations with various regulatory agencies, criminal penalties and civil lawsuits.

The U.S. Foreign Corrupt Practices Act (" FCPA ") and anti-bribery laws in other jurisdictions, including the U.K. Bribery Act (" Bribery Act "), generally prohibit companies and their intermediaries from making improper payments for the purpose of obtaining or retaining business or other commercial advantage. The FCPA also imposes accounting standards and requirements on publicly traded U.S. corporations and their foreign affiliates which are intended to prevent the diversion of corporate funds to the payment of bribes and other improper payments, and to prevent the establishment of " off books " slush funds from which such improper payments can be made. We and our clients operate in a number of jurisdictions that may pose a risk of potential FCPA or Bribery Act violations.

Changes in, and any violation by our clients of, applicable laws and regulations (whether related to the products and services we provide or otherwise) could diminish their business or financial condition and thus their demand for our products and services or could increase our cost of continuing to provide our products and services to such industries. Demand could also decrease if we do not continue to offer products and services that help our clients comply with regulations. For example, our accounts in the healthcare industry are impacted by the Patient Protection and Affordable Care Act of 2010 (the “Affordable Care Act”), including the Health Insurance Marketplace. Changes to the Affordable Care Act have been enacted by Congress in response to the current administration’s stated agenda.

In addition, we cannot predict the nature, scope or effect of future regulatory requirements to which our internal operations might be subject or the manner in which existing laws might be administered or interpreted. While our policies mandate compliance with these laws, there can be no assurance that we will be completely effective in ensuring our compliance with all applicable anti-corruption laws. A failure to comply with these laws, rules or regulations, or allegations of such noncompliance, could adversely affect our business, reputation, results of operations and financial condition.

A substantial portion of our revenues are derived, and a substantial portion of our operations are conducted, outside the U.S.

For the years ended December 31, 2018, 2017 and 2016 international revenues accounted for 28%, 27% and 27%, respectively, of our total revenues. We sell certain of our products primarily outside the U.S. In addition, Brexit and international trade tensions have created political and economic uncertainty and instability in global financial and foreign currency markets. The current uncertainty over the final outcome of the negotiations between the U.K. and the E.U., with respect to the terms of Brexit, may adversely affect our operations and financial results, as we generated approximately \$503.9 million and \$115.8 million in revenues from the U.K. in the years ended December 31, 2018 and 2017, respectively. Our international business is also subject to a variety of other risks, including:

- potential changes in a specific country’s or region’s political or economic climate;
- the need to comply with a variety of local regulations and laws, U.S. export controls, the FCPA and the Bribery Act;
- potential expropriation of assets by foreign governments;
- difficulty repatriating any international profits;
- fluctuations in foreign currency exchange rates;
- application of discriminatory fiscal policies;
- potential changes in tax laws and the interpretation of such laws; and
- potential difficulty enforcing third-party contractual obligations and intellectual property rights.

Such factors could adversely affect our business, results of operations and financial condition.

We are exposed to fluctuations in currency exchange rates that could negatively impact our operating results and financial condition.

Because a significant portion of our business is conducted outside the U.S. and significant revenues are generated outside the U.S., we face exposure to adverse movements in foreign currency exchange rates. Fluctuations in currencies relative to currencies in which our earnings are generated also make it more difficult to perform period-to-period comparisons of our reported results of operations. Because our Consolidated Financial Statements are reported in U.S. dollars, translation of sales or earnings generated in other currencies into U.S. dollars can result in a significant increase or decrease in the reported amount of those sales or earnings. In addition, we incur currency transaction risk whenever we enter into either a purchase or a sales transaction using a currency other than the local currency of the transacting entity. Given the volatility of exchange rates, we cannot be assured we will be able to effectively manage our currency translation or transaction risk, and significant changes in the value of foreign currencies relative to the U.S. dollar could adversely affect our financial statements. See “Management’s Discussion and Analysis of Financial Condition and Results of Operations” for further discussion on the foreign currency translation impact on operating results and financial condition.

We do not currently engage in material hedging activities. Changes in economic or political conditions globally and in any of the countries in which we operate could result in exchange rate movements, new currency or exchange controls or other restrictions being imposed on our operations.

Our investments in funds and our joint ventures could decline in value.

From time to time we add new investment strategies to our investment product offerings by providing the initial cash investments as “seed capital.” The seed capital investments may decline in value. A significant decline in their value could have a material adverse effect on our financial condition or operating results. We are a limited partner in various private equity funds and have future capital commitments related to certain private equity fund investments. These investments are illiquid. Generally, private equity fund securities are non-transferable or are subject to long holding periods, and withdrawals from the private equity firm partnerships are typically not permitted. Even when transfer restrictions do not apply, there is generally no public market for the securities. Therefore, we may not be able to sell the securities at a time when we desire to do so. We may not always be able to sell those investments at the same or higher prices than we paid for them. We also participate in joint ventures with other companies. These joint venture investments could require further capital contributions.

Changes or modifications in financial accounting standards may have a material adverse impact on our reported results of operations or financial condition.

A change or modification in accounting policies can have a significant effect on our reported results and may even affect our reporting of transactions completed before the change is effective, including the impact of the adoption and implementation of the accounting standard update on revenue recognition issued in May 2014 by the Financial Accounting Standards Board. Under the new standard, we recognize term license revenues upfront at time of delivery rather than ratably over the related contract period. Additionally, under the new standard, we capitalize and amortize certain direct costs, such as commissions, over the expected customer life rather than expensing them as incurred. While the adoption of the new standard does not change the cash flows received from our contracts with customers, its adoption could have a material adverse effect on our financial position or results of operations. See Note 2 to our Consolidated Financial Statements for additional information. New pronouncements and varying interpretations of existing pronouncements have occurred with frequency and may occur in the future. Changes to existing rules, or changes to the interpretations of existing rules, could lead to changes in our accounting practices, and such changes could materially adversely affect our reported financial results or the way we conduct our business.

We do not control certain businesses in which we have significant ownership.

We invest in joint ventures and other unconsolidated affiliates as part of our business strategy, and part of our net income is derived from our pro rata share of the earnings of those businesses. Despite owning significant equity interests in those companies and having directors on their boards, we do not control their operations, strategies or financial decisions. The other owners may have economic, business or legal interests or goals that are inconsistent with our goals or the goals of the businesses we co-own. Our pro rata share of any losses due to unfavorable performance of those companies could negatively impact our financial results.

Some of our joint venture investments are subject to buy-sell agreements, which could, among other things, restrict us from selling our interests even if we were to determine it would be prudent to do so.

We own interests in unconsolidated entities and various real estate joint ventures. Our interests in such unconsolidated entities are subject to buy/sell arrangements, which could restrict our ability to sell our interests even if we were to determine it would be prudent to do so. These arrangements could also allow us to purchase the other owners’ interests to prevent someone else from acquiring them and we cannot control the timing of occasions to do so. The businesses or other owners may encourage us to increase our investment in or make contributions to the businesses at an inopportune time.

In addition, some of the agreements governing our joint venture arrangements include buy/sell provisions that provide a party to the arrangement with the option to purchase the other party’s interests upon such other party’s change of control at a purchase price that may be less than fair market value. For instance, under the partnership agreement of IFDS L.P., in the event of a change of control of the Company, the other partner would have the option to purchase our interests in IFDS L.P. at a price equal to book value, unless another purchase provision in the partnership agreement was triggered prior to the change of control. Book value may be substantially less than fair market value at the time of any sale of our interests upon a change of control.

A material weakness in our internal controls could have a material adverse effect on us.

Effective internal controls are necessary for us to provide reasonable assurance with respect to our financial reports and to effectively prevent fraud. If we cannot do so, our reputation and operating results could be harmed. A material weakness in our internal control over financial reporting could adversely impact our ability to provide timely and accurate financial information. Even effective internal controls can provide only reasonable assurance with respect to the preparation and fair presentation of financial statements. In addition, controls can be circumvented by individual acts of some persons, by collusion of two or more people, or by management override of the controls. Over time, controls may become inadequate because changes in conditions or deterioration in the degree of compliance with policies or procedures may occur. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected. If we are unable to report financial information timely and

accurately or to maintain effective disclosure controls and procedures, our stock price could be negatively impacted and we could be subject to, among other things, regulatory or enforcement actions by the SEC, which could have a material adverse effect on our business, results of operations and financial condition.

Risks Relating to Our Indebtedness

Our substantial indebtedness could adversely affect our financial health and operations.

We currently have a substantial amount of indebtedness. As of December 31, 2018, we had total indebtedness of \$8,347.3 million and an additional \$242.4 million available for revolving borrowings under our Credit Agreement. This indebtedness could have adverse consequences. For example, it may:

- require us to dedicate a substantial portion of our cash flow from operations to payments on our indebtedness, thereby reducing the availability of our cash flow to fund acquisitions, working capital, capital expenditures, research and development efforts and other general corporate purposes;
- increase our vulnerability to and limit our flexibility in planning for, or reacting to, change in our business and the industry in which we operate;
- restrict our ability to make certain distributions with respect to our capital stock due to restricted payment and other financial covenants in our credit facilities and other financing agreements;
- expose us to the risk of increased interest rates as borrowings under our senior credit facility are subject to variable rates of interest;
- place us at a competitive disadvantage compared to our competitors that have less debt; and
- limit our ability to borrow additional funds.

In addition, the agreement governing our senior credit facility contains financial and other restrictive covenants that limit our ability to engage in activities that may be in our long-term best interests, and any additional indebtedness may incur may also contain restrictive covenants. Our failure to comply with those covenants could result in an event of default which, if not cured or waived, could result in the acceleration of all of our debts.

To service our indebtedness, we require a significant amount of cash. Our ability to generate cash depends on many factors beyond our control.

We estimate that our current levels of indebtedness as of December 31, 2018 will result in annual interest payments of approximately \$401.0 million. Our ability to make payments on and to refinance our indebtedness and to fund planned capital expenditures will depend on our ability to generate cash in the future. This, to a certain extent, is subject to general economic, financial, competitive, legislative, regulatory and other factors that are beyond our control.

If our business fails to generate sufficient cash flow from operations and future borrowings are not available to us, we may not be able to pay our indebtedness or fund our other liquidity needs. We may need to refinance all or a portion of our indebtedness on or before maturity. We may not be able to refinance any of our indebtedness on commercially reasonable terms or at all. If we cannot service our indebtedness, we may have to take actions such as selling assets, seeking additional equity or reducing or delaying capital expenditures, strategic acquisitions, investments and joint ventures. We may not be able to effect such actions, if necessary, on commercially reasonable terms or at all.

Restrictive covenants in the agreements governing our indebtedness may restrict our ability to pursue our business strategies.

The Credit Agreement limits our ability, among other things, to:

- incur additional indebtedness;
- make certain investments;
- sell assets, including capital stock of certain subsidiaries;
- declare or pay dividends, repurchase or redeem stock or make other distributions to stockholders;
- consolidate, merge, liquidate or dissolve;
- enter into transactions with our affiliates; and

- incur liens.

In addition, the Credit Agreement also requires us, in certain instances, to maintain compliance with specified leverage ratios. Our ability to comply with these provisions may be affected by events beyond our control, and these provisions could limit our ability to plan for or react to market conditions, meet capital needs or otherwise conduct our business activities and plans.

Our inability to comply with any of these provisions could result in a default under one or more of the agreements governing our indebtedness. If such a default occurs under one such agreement, the creditors under another debt agreement may elect to declare all borrowings outstanding, together with accrued interest and other fees, to be immediately due and payable. In addition, the lenders under our Credit Agreement would have the right to terminate any commitments they have to provide further borrowings.

If we are unable to repay outstanding borrowings when due, the lenders under our Credit Agreement also have the right to proceed against the collateral, including substantially all of our domestic assets and the assets of our domestic subsidiaries, granted to them to secure the indebtedness under that facility. If the indebtedness under our Credit Agreement were to be accelerated, we cannot assure you that our assets would be sufficient to repay in full that indebtedness and our other indebtedness.

Changes in the method of determining London Interbank Offered Rate (“LIBOR”), or the replacement of LIBOR with an alternative reference rate, may adversely affect interest expense related to our outstanding debt.

Changes in the method of determining London Interbank Offered Rate (“LIBOR”), or the replacement of LIBOR with an alternative reference rate, may adversely affect interest expense related to outstanding debt. At December 31, 2018, we had total debt of \$8,347.3 million, including \$8,319.1 million of variable interest rate debt and which may bear interest rates in relation to LIBOR, depending on our selection of repayment options. On July 27, 2017, the Financial Conduct Authority in the United Kingdom announced that it would phase out LIBOR as a benchmark by the end of 2021. It is unclear whether new methods of calculating LIBOR will be established such that it continues to exist after 2021. If LIBOR ceases to exist, we may need to renegotiate our Credit Agreement and may not be able to do so with terms that are favorable to us. See “Management’s Discussion and Analysis of Financial Condition and Results of Operations – Contractual Obligations – Senior Secured Credit Facilities” for additional information. The overall financial market may be disrupted as a result of the phase-out or replacement of LIBOR. Disruption in the financial market or the inability to renegotiate our Credit Agreement with favorable terms could have a material adverse effect on our business, results of operations and financial condition.

Risks Relating to Ownership of Our Common Stock

If equity research analysts do not publish or cease publishing research or reports about our business or if they issue unfavorable commentary or downgrade our common stock, the price and trading volume of our common stock could decline.

The trading market for our common stock is influenced by the research and reports that equity research analysts publish about us and our business. We do not control these analysts. The price of our stock or trading volume in our stock could decline if one or more equity analysts downgrade our stock or if those analysts issue other unfavorable commentary or cease publishing regular reports about us or our business.

The market price of our common stock may be volatile, which could result in substantial losses for investors in our common stock.

Shares of our common stock were sold in our initial public offering at a price of \$7.50 per share on March 31, 2010, and through December 31, 2018, our common stock has traded as high as \$60.97 and as low as \$6.64. An active, liquid and orderly market for our common stock may not be sustained, which could depress the trading price of our common stock. In addition, the market price of our common stock may fluctuate significantly. Some of the factors that may cause the market price of our common stock to fluctuate include:

- fluctuations in our quarterly financial results or the quarterly financial results of companies perceived to be similar to us;
- changes in estimates of our financial results or recommendations by securities analysts;
- failure of any of our products to achieve or maintain market acceptance;
- changes in market valuations of similar companies;
- success of competitive products;
- changes in our capital structure, such as future issuances of securities or the incurrence of additional debt;
- announcements by us or our competitors of significant products, contracts, acquisitions or strategic alliances;
- regulatory developments in any of our markets;

- litigation involving our Company, our general industry or both;
- additions or departures of key personnel;
- investors' general perception of us; and
- changes in general economic, industry and market conditions.

In addition, if the market for technology stocks, financial services stocks or the stock market in general experiences a loss of investor confidence, the trading price of our common stock could decline for reasons unrelated to our business, financial condition or results of operations. If any of the foregoing occurs, it could cause our stock price to fall and may expose us to class action lawsuits that, even if unsuccessful, could be costly to defend and a distraction to management.

William C. Stone, our Chairman of the Board and Chief Executive Officer, exerts significant control over our Company.

As of February 22, 2019, William C. Stone, our Chairman of the Board and Chief Executive Officer, beneficially owned approximately 13.4% of the outstanding shares of our common stock. We are party to a stockholders' agreement with Mr. Stone, pursuant to which Mr. Stone has the right to nominate two members of our board of directors, one of which will be Mr. Stone for so long as he is our Chief Executive Officer. As a result, Mr. Stone has significant influence over our policy and affairs and matters requiring stockholder approval.

SS&C Holdings is a holding company with no operations or assets of its own and its ability to pay dividends is limited or otherwise restricted.

As of December 31, 2018, SS&C Holdings has no direct operations and no significant assets other than the stock of SS&C and Advent Software, Inc. The ability of SS&C Holdings to pay dividends is limited by its status as a holding company and by the terms of the agreement governing our indebtedness. See "Risk factors - Risks relating to our indebtedness - Restrictive covenants in the agreements governing our indebtedness may restrict our ability to pursue our business strategies." Moreover, none of the subsidiaries of SS&C Holdings is obligated to make funds available to SS&C Holdings for the payment of dividends or otherwise. In addition, Delaware law imposes requirements that may restrict the ability of our subsidiaries, including SS&C, to pay dividends to SS&C Holdings. These limitations could reduce our attractiveness to investors.

Our management has broad discretion in the use of our existing cash resources and may not use such funds effectively.

Our management has broad discretion in the application of our cash resources. Accordingly, our stockholders will have to rely upon the judgment of our management with respect to our existing cash resources, with only limited information concerning management's specific intentions. Our management may spend our cash resources in ways that our stockholders may not desire or that may not yield a favorable return. The failure by our management to apply these funds effectively could harm our business.

Provisions in our certificate of incorporation and bylaws might discourage, delay or prevent a change of control of our Company or changes in our management and, therefore, depress the trading price of our common stock.

Provisions of our certificate of incorporation and bylaws and Delaware law may discourage, delay or prevent a merger, acquisition or other change in control that stockholders may consider favorable, including transactions in which stockholders might otherwise receive a premium for their shares of our common stock. These provisions may also prevent or frustrate attempts by our stockholders to replace or remove our management. These provisions include:

- limitations on the removal of directors;
- a classified board of directors so that not all members of our board are elected at one time;
- advance notice requirements for stockholder proposals and nominations;
- the inability of stockholders to call special meetings;
- the ability of our board of directors to make, alter or repeal our bylaws;
- the ability of our board of directors to designate the terms of and issue new series of preferred stock without stockholder approval, which could be used to institute a rights plan, or a poison pill, that would work to dilute the stock ownership of a potential hostile acquirer, likely preventing acquisitions that have not been approved by our board of directors; and
- a prohibition on stockholders from acting by written consent.

The existence of the foregoing provisions and anti-takeover measures could limit the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our Company, thereby reducing the likelihood that our stockholders could receive a premium for their shares of common stock in an acquisition.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We lease our corporate offices, which consist of approximately 93,500 square feet of office space located at 80 Lamberton Road, Windsor, CT 06095. In 2013, we extended the lease term through October 2022. We utilize facilities and offices in approximately 100 other locations in the United States and have offices in North America, South America, Europe, Asia, Australia and Africa. We lease approximately 60% of our office space as compared to owning 40% of our office space. We believe that our facilities are in good condition and generally suitable to meet our needs for the foreseeable future; however, we will continue to seek additional space as needed to satisfy our growth.

ITEM 3. LEGAL PROCEEDINGS

From time to time, we are subject to legal proceedings and claims. Certain legal proceedings in which we are involved are discussed in Note 16 to the Consolidated Financial Statements, which is included elsewhere in this annual report on Form 10-K and incorporated by reference herein. In the opinion of our management, we are not involved in any litigation or proceedings that would have a material adverse effect on us or our business.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock trades on The Nasdaq Global Select Market under the symbol "SSNC". On February 22, 2019, the closing price reported on The Nasdaq Global Select Market of our common stock was \$59.88 per share. As of February 22, 2019, we had approximately 76,000 holders of record of our common stock.

There is no established public trading market for shares of our Class A non-voting common stock, and as of and since December 31, 2016 there were no shares of our Class A non-voting common stock outstanding. On March 30, 2016, William C. Stone converted 2.7 million shares of Class A non-voting stock into 2.7 million shares of our common stock, or 5.4 million shares of common stock on a post-split basis. Each share of Class A non-voting common stock converted automatically into one share of our common stock upon the expiration of the applicable waiting period under the HSR Act.

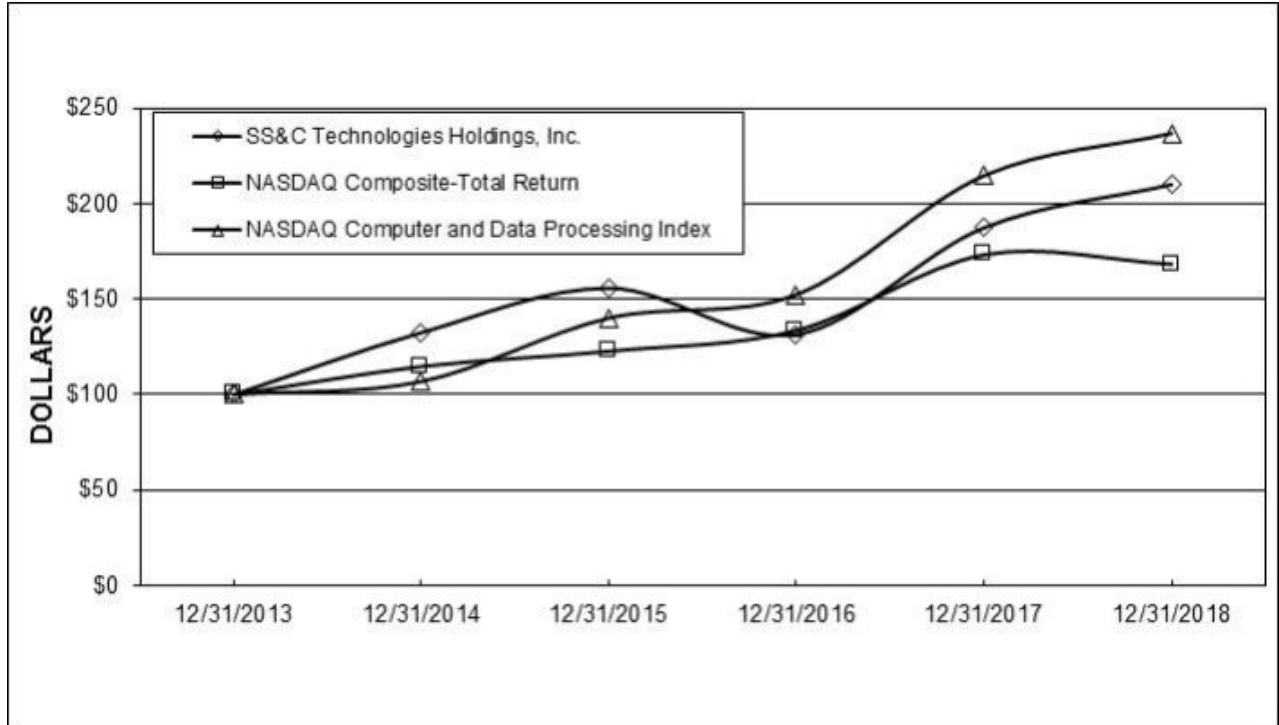
Our equity plan information required by this item is incorporated by reference to the information in Part III, Item 12 of this annual report on Form 10-K.

Performance graph

This performance graph shall not be deemed “soliciting material” or to be “filed” with the SEC for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or the Exchange Act, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any filing of SS&C Technologies Holdings, Inc. under the Exchange Act.

The following graph shows a comparison from December 31, 2013 through December 31, 2018 of cumulative total return for our common stock, the Nasdaq Composite Index and the Nasdaq Computer and Data Processing Index. Such returns are based on historical results and are not intended to suggest future performance. Data for the Nasdaq Composite Index and the Nasdaq Computer and Data Processing Index assume reinvestment of dividends.

COMPARISON OF CUMULATIVE TOTAL RETURN*
Among SS&C Technologies Holdings, Inc., the Nasdaq Composite Index
And the Nasdaq Computer and Data Processing Index



* \$100 invested in stock on 12/31/2013. Return calculations of indices assume the reinvestment of dividends.

	<u>12/31/2013</u>	<u>12/31/2014</u>	<u>12/31/2015</u>	<u>12/31/2016</u>	<u>12/31/2017</u>	<u>12/31/2018</u>
SS&C Technologies Holdings, Inc.	100	132	156	132	187	210
Nasdaq Composite - Total Returns	100	115	123	134	173	168
Nasdaq Computer & Data Processing Index	100	107	140	152	215	237

ITEM 6. SELECTED FINANCIAL DATA

The five-year selected financial data set forth below should be read in conjunction with our Consolidated Financial Statements and related notes and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” appearing elsewhere in this annual report on Form 10-K.

	For the Year Ended December 31,				
	2018 (5)	2017 (4)	2016 (3)	2015 (2)	2014 (1)
CONSOLIDATED STATEMENTS OF COMPREHENSIVE (LOSS)					
INCOME DATA					
	(\$ in millions, except per share data)				
Revenues	\$ 3,421.1	\$ 1,675.3	\$ 1,481.4	\$ 1,000.3	\$ 767.9
Operating income	429.1	396.9	288.6	164.7	200.4
Other income (expense), net	8.2	(4.5)	3.4	3.9	2.8
Net income	103.2	328.9	131.0	42.9	131.1
Earnings per share - Basic	\$ 0.44	\$ 1.60	\$ 0.65	\$ 0.24	\$ 0.79
Earnings per share - Diluted	\$ 0.42	\$ 1.55	\$ 0.64	\$ 0.22	\$ 0.75
Weighted average shares outstanding - Basic	232.5	204.9	200.3	182.2	166.6
Weighted average shares outstanding - Diluted	243.7	211.6	205.8	190.9	174.7
Cash dividends declared and paid per common share (6)	\$ 0.30	\$ 0.265	\$ 0.25	\$ 0.25	\$ 0.0625

	As of December 31,				
	2018 (5)	2017 (4)	2016 (3)	2015 (2)	2014 (1)
CONSOLIDATED BALANCE SHEET DATA					
	(\$ in millions)				
Total assets	\$ 16,107.5	\$ 5,539.5	\$ 5,707.0	\$ 5,802.2	\$ 2,266.2
Total long-term debt, including current portion	8,256.0	2,045.2	2,501.1	2,751.4	619.7
Stockholders’ equity	4,580.0	2,686.4	2,258.6	2,105.4	1,346.7

- (1) On November 30, 2014, we acquired all of the outstanding stock of DST Global Solutions Ltd. and the assets and business of DST Global Solutions LLC, together DSTGS, subsidiaries of DST Systems, Inc.
- (2) On July 8, 2015, we acquired all of the outstanding stock of Advent. On September 1, 2015, we acquired the assets and business of Varden Technologies. On November 16, 2015, we acquired all of the outstanding stock of Primatics Financial.
- (3) On March 11, 2016, we acquired the assets and business associated with Citigroup AIS. On October 20, 2016, we acquired all of the outstanding stock of Salentica. On December 1, 2016, we acquired the assets and business associated with GFS. On December 15, 2016, we acquired all of the outstanding stock of Conifer.
- (4) On October 13, 2017, we acquired all of the outstanding stock of CommonWealth. On October 31, 2017, we acquired all of the outstanding stock of Modestspark. See Note 7 to our Consolidated Financial Statements.
- (5) On April 16, 2018, we acquired all of the outstanding stock of DST. On June 1, 2018, we acquired the assets and business associated with CACEIS. On October 1, 2018, we acquired all of the outstanding stock of Eze. On November 16, 2018, we acquired all of the outstanding stock of Intralinks. See Note 7 to our Consolidated Financial Statements.
- (6) On June 24, 2016, SS&C Technologies Holdings, Inc. completed a two-for-one stock split, effected in the form of a stock dividend. All share and per share amounts have been retroactively restated for all periods presented to reflect the stock split.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Overview

Business. We are a leading provider of mission-critical, sophisticated software-enabled services that allow financial services providers to automate complex business processes. Our portfolio of software products and rapidly deployable software-enabled services allows our clients to automate and integrate front-office functions such as trading and modeling, middle-office functions such as portfolio management and reporting, and back-office functions such as accounting, transfer agency, compliance, regulatory services, performance measurement, reconciliation, reporting, processing and clearing. We provide our solutions globally to thousands of clients, principally within the institutional asset and wealth management, alternative investment management, brokerage, retirement, financial advisory and financial institutions vertical markets. In addition, we provide solutions to the healthcare industry including pharmacy, healthcare administration and health outcomes optimization solutions to satisfy their information processing, quality of care, cost management and payment integrity needs. Our healthcare solutions include claims adjudication, benefit management, care management, and business intelligence services.

Acquisitions. To supplement our growth, we evaluate and execute acquisitions that provide complementary products or services, add proven technology and an established client base and expand our intellectual property portfolio or address a highly specialized problem or a market niche. Since the beginning of 2016, we have spent approximately \$8.7 billion to acquire eight businesses in the financial services and healthcare industries, using a combination of cash on hand, equity and debt financing (as discussed in Notes 7, 9 and 10 to our Consolidated Financial Statements).

The following table lists the significant businesses we have acquired since January 1, 2016:

<u>Acquired Business</u>	<u>Acquisition Date</u>	<u>Acquired Capabilities, Products and Services</u>
Intralinks Holdings, Inc.	November 2018	Increased key account footprint and adds cloud-based virtual data rooms and secure collaboration solutions for SS&C's banking and alternative clients
Eze Software	October 2018	Strengthened SS&C's front to back office technology
CACEIS North America	June 2018	Expanded fund administration services in hedge fund and private equity sectors
DST Systems, Inc.	April 2018	Provided additional scale and breadth across institutional and retail asset management, alternatives, wealth management, and healthcare sectors
CommonWealth Fund Services Ltd.	October 2017	Expanded fund administration services in hedge fund and private equity sectors
Conifer Financial Services, LLC.	December 2016	Expanded fund administration services in hedge fund and other asset management sectors
Wells Fargo's Global Funds Service	December 2016	Expanded fund administration services in hedge fund and private equity sectors
Citigroup's Alternative Investor Service	March 2016	Expanded fund administration services in hedge fund and private equity sectors

The discussion in this Part II, Item 7 of this Annual Report on Form 10-K includes the operations of the business listed in the table above for the respective time periods each was owned by SS&C.

Revenues. As we have expanded our business, we have focused on increasing our software-enabled services. Since 2016, we have seen increased demand in the financial services industry for these services from existing and new customers. We have taken a number of steps to support that demand, such as automating our software-enabled services delivery methods, expanded our service offerings and providing our employees with sales incentives. We have also acquired businesses that offer software-enabled services or have a large base of term license or maintenance clients. Our software-enabled services revenues increased from \$956.8 million and 65% of total revenues in 2016 to \$2,798.9 million and 82% of revenues in 2018. We believe that our high level of these contractually recurring revenues provides us with the ability to better manage our costs and capital investments. To support the growth in our software-enabled services revenues and maintain our level of customer service, we have added personnel, expanded our facilities and invested in information technology. These investments and automation improvements in our software-enabled services have served to improve gross margins.

Liquidity. In connection with the acquisition of DST in the second quarter of 2018, we entered into a new credit agreement ("Credit Agreement"), which is described in *Contractual Obligations*, to fund a large portion of the purchase price, refinance amounts

outstanding including our previously issued Senior Notes and our prior credit facility (“Prior Facility”) and refinance all of DST’s existing indebtedness. We also raised cash through the sale and issuance of approximately 30.3 million shares of our common stock for total net proceeds of \$1.4 billion. In the third quarter of 2018, we funded our acquisition of Eze with a combination of cash on-hand and \$875.0 million in incremental term loan debt. In the fourth quarter of 2018, we funded our acquisition of Intralinks with a combination of \$1.0 billion in incremental term loan debt and the issuance of 9.9 million shares of our common stock.

We generated \$640.1 million in cash from operating activities in 2018, compared to \$471.8 million and \$418.4 million in 2017 and 2016, respectively. In 2018, we used our operating cash flow, \$8.7 billion in proceeds received from debt financing, \$1.4 billion in proceeds from the sale of our common stock, \$84.9 million in proceeds from the exercise of stock options and existing cash to acquire DST, CACEIS, Eze and Intralinks, repay \$3.1 billion of debt, pay \$70.9 million in dividends and invest in capital expenditures in our business.

Results of Operations

Revenues

We derive our revenues from two sources: software-enabled services revenues and license, maintenance and related revenues. As a general matter, fluctuations in our software-enabled services revenues are attributable to the number of new software-enabled services clients as well as total assets under management in our clients’ portfolios and the number of outsourced transactions provided to our existing clients. Software-enabled services revenues also fluctuate as a result of reimbursements received for “out-of-pocket” expenses, such as postage and telecommunications charges, which are recorded as revenues on an accrual basis. Because these additional revenues are offset by the reimbursable expenses incurred, there is no impact on gross profit, operating income and net income, however the reimbursements billed and expenses incurred can lead to fluctuations in revenues, cost of revenues and gross margin percentage each period. License, maintenance and related revenues consist primarily of term and perpetual license fees, maintenance fees and professional services. Maintenance revenues vary based on customer retention and on the annual increases in fees, which are generally tied to the consumer price index. License and professional services revenues tend to fluctuate based on the number of new licensing clients, the timing and terms of contract renewals and demand for consulting services.

The following table sets forth the percentage of our total revenues represented by each of the following sources of revenues for the periods indicated:

	Year Ended December 31,		
	2018	2017	2016
Software-enabled services	81.8%	66.5%	64.6%
License, maintenance and related	18.2%	33.5%	35.4%
Total revenues	100.0%	100.0%	100.0%

The following table sets forth revenues (dollars in millions) and percent change in revenues for the periods indicated:

	Year Ended December 31,			Percent Change from Prior Period	
	2018	2017	2016	2018	2017
Software-enabled services	\$ 2,798.9	\$ 1,114.0	\$ 956.8	151.2%	16.4%
License, maintenance and related	622.2	561.3	524.6	10.8%	7.0%
Total revenues	\$ 3,421.1	\$ 1,675.3	\$ 1,481.4	104.2%	13.1%

Fiscal 2018 versus Fiscal 2017. Our revenues increased \$1,745.8 million, primarily due to revenues related to our acquisitions of Intralinks and Eze in the fourth quarter of 2018, CACEIS and DST in the second quarter of 2018 and Commonwealth Fund Services in the fourth quarter of 2017, which contributed \$1,709.9 million in revenues. Additionally, revenues increased due to increased demand for our software-enabled services and the favorable impact from foreign currency translation, which added \$1.2 million. Software-enabled services revenues increased \$1,684.9 million or 151.2%, primarily due to the acquisitions, which added revenues of \$1,629.6 million, as well as from a continued increase in demand for our fund administration services and services for advisory and wealth managers. The favorable impact from foreign currency translation was \$1.6 million. License, maintenance and related revenues increased \$60.9 million, or 10.8%, primarily due to the acquisitions, which added revenues of \$80.3 million. The unfavorable impact from foreign currency translation was \$0.4 million and the remaining decrease in license, maintenance and related

revenues was primarily due to a decline in professional services revenues and the impact on term licenses as a result of the adoption of a new revenue recognition standard, ASC 606, on January 1, 2018.

Fiscal 2017 versus Fiscal 2016. Our revenues increased \$193.9 million, primarily due to revenues related to our acquisitions of Commonwealth Fund Services in the fourth quarter of 2017, GFS and Conifer in the fourth quarter of 2016 and Citigroup AIS in the first quarter of 2016, which contributed \$117.7 million in revenues, net of a reduction of \$2.7 million in revenues related to the loss of sales to these businesses. The increase in revenues also reflects a reduction of \$19.0 million related to fund administration service clients that were acquired through the Citigroup AIS acquisition who had indicated they were terminating their contracts prior to the acquisition closing. The final purchase price of the Citigroup AIS business acquisition included an adjustment for these terminated clients. The remaining increases in revenues were primarily due to an increase in term license revenues and a continued increase in demand for our fund administration services. These increases were also impacted favorably from foreign currency translation by \$1.1 million. Software-enabled services revenues increased \$157.2 million, primarily due to the acquisitions, which added revenues of \$114.4 million, as well as from an increase in software-enabled services revenues within our fund administration business. These increases were also impacted favorably from foreign currency translation by \$0.5 million. License, maintenance and related revenues increased \$36.7 million, primarily due to an increase in revenues for advisory and wealth managers, as well as an increase resulting from the large prior period impact of the fair value adjustment of acquired deferred revenue and by our acquisitions, which contributed \$3.3 million. These increases were also impacted favorably from foreign currency translation by \$0.6 million. License, maintenance and related revenues were partially offset by declines in revenues for institutional and investment management customers.

Cost of Revenues

Cost of software-enabled services revenues consists primarily of costs related to personnel utilized in servicing our software-enabled services and amortization of intangible assets. Cost of license, maintenance and other related revenues consists primarily of the costs related to personnel utilized in servicing our maintenance contracts and to provide implementation, conversion and training services to our software licensees, as well as system integration and custom programming consulting services and amortization of intangible assets.

The following tables set forth each of the following cost of revenues as a percentage of their respective revenue source for the periods indicated:

	Year Ended December 31,		
	2018	2017	2016
Cost of software-enabled services	62.6%	56.4%	56.9%
Cost of license, maintenance and related	47.9%	46.0%	48.8%
Total cost of revenues	60.0%	52.9%	54.0%
Gross margin percentage	40.0%	47.1%	46.0%

The following table sets forth cost of revenues (dollars in millions) and percent change in cost of revenues for the periods indicated:

	Year Ended December 31,			Percent Change from Prior Period	
	2018	2017	2016	2018	2017
Cost of software-enabled services	\$ 1,753.0	\$ 628.1	\$ 544.4	179.1%	15.4%
Cost of license, maintenance and related	298.1	258.3	256.1	15.4%	0.9%
Total cost of revenues	\$ 2,051.1	\$ 886.4	\$ 800.5	131.4%	10.7%

Fiscal 2018 versus Fiscal 2017. Our total cost of revenues increased \$1,164.7 million, or 131.4%, primarily due to our acquisitions, which contributed \$1,136.7 million to the increase. Included in these costs are severance charges of \$38.8 million in 2018 related to the elimination of redundant positions within the acquired businesses. The unfavorable impact from foreign currency translation added \$0.7 million in costs. Cost of software-enabled services revenues increased \$1,124.9 million, or 179.1%, primarily due to our acquisitions, which added \$1,088.6 million in costs, as well as increased costs to support the growth in software-enabled services revenues. The unfavorable impact from foreign currency translation added \$0.2 million in costs. Costs of license, maintenance and related revenues increased \$39.8 million or 15.4%, primarily due to our acquisitions, which added \$48.0 million in costs, partially offset by decreases in personnel-related costs and independent contractors. The unfavorable impact from foreign currency translation added \$0.5 million in costs.

Fiscal 2017 versus Fiscal 2016. Our total cost of revenues increased \$85.9 million, primarily due to our acquisitions, which included Commonwealth, GFS, Conifer and Citigroup AIS, which added costs of \$87.4 million for the twelve months ended December 31, 2017. This increase was partially offset by a decrease of \$1.2 million in costs of revenues, primarily related to cost synergies from acquisitions as well as by the favorable impact from foreign currency translation of \$0.3 million. Cost of software-enabled services revenues increased \$83.7 million, primarily due to the acquisitions, which added costs of \$85.3 million. Cost of license, maintenance and related revenues increased \$2.2 million, primarily due to the acquisitions.

Operating Expenses

Selling and marketing expenses consist primarily of the personnel costs associated with the selling and marketing of our products, including salaries, commissions and travel and entertainment. Such expenses also include amortization of intangible assets, the cost of branch sales offices, trade shows and marketing and promotional materials. Research and development expenses consist primarily of personnel costs attributable to the enhancement of existing products and the development of new software products. General and administrative expenses consist primarily of personnel costs related to management, accounting and finance, information management, human resources and administration and associated overhead costs, as well as fees for professional services. Transaction expenses consist of certain costs associated with our acquisition of DST, including costs to enter into our Credit Agreement, investment banker advisory fees, legal and other professional fees.

The following table sets forth operating expenses as a percentage of our total revenues for the periods indicated:

	Year Ended December 31,		
	2018	2017	2016
Selling and marketing	6.1%	7.1%	7.9%
Research and development	9.3%	9.2%	10.3%
General and administrative	9.2%	7.1%	8.3%
Transaction expenses	2.9%	0.0%	-
Total operating expenses	<u>27.5%</u>	<u>23.4%</u>	<u>26.5%</u>

The following table sets forth operating expenses (dollars in millions) and percent change in operating expenses for the periods indicated:

	Year Ended December 31,			Percent Change from Prior Period	
	2018	2017	2016	2018	2017
Selling and marketing	\$ 211.0	\$ 118.5	\$ 117.1	78.1%	1.2%
Research and development	318.2	153.3	152.7	107.6%	0.4%
General and administrative	313.9	119.6	122.5	162.5%	(2.4)%
Transaction expenses	97.8	0.6	—	16200.0%	—
Total operating expenses	<u>\$ 940.9</u>	<u>\$ 392.0</u>	<u>\$ 392.3</u>	140.0%	(0.1)%

Fiscal 2018 versus 2017. The increase in total operating expenses in 2018 was primarily due to our acquisitions, which added expenses of \$522.6 million. Included in these costs are severance charges of \$23.8 million in 2018, related to the elimination of redundant positions within the acquired businesses. The impact from foreign currency translation increased costs by \$0.5 million in 2018. Total operating expenses in 2018 also increased due to higher personnel-related costs, higher non-income based taxes, higher professional fees and increased stock-based compensation expense partially offset by lower software maintenance costs, legal settlements paid and lower rent and occupancy costs.

Fiscal 2017 versus 2016. The decrease in total operating expenses in 2017 of \$0.3 million was primarily due to a decrease in organic total operating expenses of \$15.7 million as well as the favorable impact from foreign currency translation of \$0.8 million, which resulted from the strength of the U.S. dollar relative to the British pound. These decreases were partially offset by increased operating expenses related to our acquisitions of Commonwealth, GFS, Conifer and Citigroup AIS, which added expenses of \$16.2 million. The decrease in organic operating expenses was primarily due to lower stock-based compensation, independent contractor costs and market data costs, partially offset by higher professional fees and legal settlement fees.

Transaction Expenses

Fiscal 2018 versus 2017 . Transaction expenses of \$97.8 million consist of certain costs associated with the acquisition of DST, including those related to our Credit Agreement, investment banker advisory fees, legal and other professional fees. The DST acquisition is further discussed in the Notes to our Consolidated Financial Statements and in “Liquidity and Capital Resources”.

Comparison of Fiscal 2018, 2017 and 2016 for Interest, Taxes and Other

Interest income . We had interest income of \$9.1 million in 2018 compared to \$1.2 million in 2017 and \$1.5 million in 2016. The increase in interest income in 2018 primarily resulted from higher average cash balances relative to the prior year. The decreases in interest income in 2017 primarily resulted from lower average cash balances relative to the prior year.

Interest expense . We had interest expense of \$280.1 million in 2018 compared to \$108.6 million in 2017 and \$129.9 million in 2016. The increase in interest expense in 2018 was primarily due to increased borrowings in connection with our acquisitions of DST, Eze and Intralinks and, to a lesser extent, higher average interest rates. These increases were partially offset by the impact of repayments of the Prior Credit Agreement. The decrease in interest expense in 2017 was primarily due to a lower average debt balance and a lower average interest rate, as a result of the amendment of our senior secured credit facility in March 2017. These facilities are discussed further in “Liquidity and Capital Resources”.

Other income (expense), net . Other income (expense), net for 2018 consisted primarily of dividend income and foreign currency transaction gains partially offset by unrealized losses on our investments. Other income (expense), net for 2017 and 2016 consisted primarily of foreign currency transaction losses and gains, respectively.

Equity in earnings of unconsolidated affiliates, net . We had equity in earnings of unconsolidated affiliates, net of \$2.1 million for 2018. This is primarily related to our proportionate share of IFDS L.P.’s net income, offset by amortization of basis differences.

Loss on extinguishment of debt, net . We recorded a \$43.3 million loss on extinguishment of debt in 2018 related to the amendment and restatement of our credit agreement. The loss on extinguishment of debt includes the write-off of a portion of the unamortized capitalized financing fees and unamortized original issue discount related to the Prior Credit Agreement and Senior Notes for amounts accounted for as a debt extinguishment and a make-whole premium paid in connection with the redemption of the Senior Notes. We recorded a \$2.3 million loss on extinguishment of debt in 2017 in connection with the amendment of our senior secured credit facility. The loss on extinguishment of debt includes the write-off of a portion of the unamortized capitalized financing fees related to the senior secured credit facility for amounts accounted for as a debt extinguishment, as well as the new financing fees related to the senior secured credit facility for amounts accounted for as a debt modification.

Provision (benefit) for income taxes. The following table sets forth the provision (benefit) for income taxes (dollars in millions) and effective tax rates for the periods indicated:

	Year Ended December 31,			Percent Change from Prior Period	
	2018	2017	2016	2018	2017
Provision (benefit) for income taxes	\$ 21.9	\$ (46.2)	\$ 32.6	(147.4)%	(241.7)%
Effective tax rate	17.5%	(16.3)%	19.9%		

Our 2018, 2017 and 2016 effective tax rates differ from the statutory rate primarily due to the effect of our foreign operations and permanent book to tax differences, and in 2017 and 2018, the effect of the Tax Act. The increase in the effective tax rate from 2017 to 2018 is due primarily to the unfavorable impact of certain provisions in the Tax Act as well as the absence of the net favorable impact of the Tax Act in 2017. These increases were partially offset by the relative favorable impact of excess tax benefits from stock-based awards compared to the prior year and the favorable impact of a revaluation on existing state deferred tax liabilities due to acquisitions. The decrease in the effective tax rate from 2016 to 2017 was primarily due to the overall favorable net impact of the Tax Act and the favorable impact of excess tax benefits from stock-based awards. In 2017, we recorded a provisional tax benefit for the impact of the Tax Act of \$88.0 million. We made reasonable estimates to determine the impact of the Tax Act in 2017 and completed our accounting of the Tax Act in the fourth quarter of 2018. We did not make any material adjustments as a result of completing our accounting related to the Tax Act. See Notes 2 and 15 to the Consolidated Financial Statements for additional information. The favorable impact of excess tax benefits from stock-based awards in 2017 and 2018 is due to the prospective adoption of ASU 2016-09, *Compensation – Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting* . We had \$1,347.8 million and \$347.8 million of deferred tax liabilities and \$150.9 million and \$66.6 million of deferred tax assets at December 31, 2018 and 2017, respectively.

Our effective tax rate includes the effect of operations outside the U.S. , which historically have been taxed at rates lower than the U.S. statutory rate. While we have income from multiple foreign sources, the majority of our non-U.S. operations are in India and the U . K . , where the statutory rates were 30.5 % and 19.0 %, respectively, in 2018 , 34.6% and 19.3 %, respectively, in 2017 , and 34.6 % and 20.0 %, respectively, in 2016 . A future proportionate change in the composition of income before income taxes from foreign and domestic tax jurisdictions could impact our periodic effective tax rate.

Liquidity and Capital Resources

Our principal cash requirements are to finance the costs of our operations pending the billing and collection of client receivables, to fund payments with respect to our indebtedness, to invest in research and development, to acquire complementary businesses or assets and to pay dividends on our common stock. We expect our cash on hand, cash flows from operations, and cash available under our Credit Agreement to provide sufficient liquidity to fund our current obligations, projected working capital requirements and capital spending for at least the next twelve months.

In April 2018, we purchased all of the outstanding stock of DST for approximately \$5.1 billion, plus the costs of effecting the transaction. We funded the acquisition and refinanced our existing debt with \$7.4 billion of debt financing (of which approximately \$524.5 million was rolled over from our Prior Credit Agreement) and a portion of the net proceeds from the issuance and sale of approximately \$1.4 billion of our common stock. We funded our acquisition of Eze in October 2018 with a combination of cash on-hand and \$875.0 million in incremental term loan debt. We funded our acquisition of Intralinks in November 2018 with a combination of \$1.0 billion in incremental term loan debt and 9.9 million shares of our common stock .

In 2018, we paid quarterly cash dividends totaling \$70.9 million.

Our cash, cash equivalents and restricted cash and cash equivalents, including amounts held on behalf of clients, at December 31, 2018 were \$1,113.3 million, an increase of \$1,048.6 million from \$64.7 million at December 31, 2017. The increase in cash was primarily due to the inclusion of cash and cash equivalents associated with funds held on behalf of clients of \$940.2 million. See Notes 7, 9 and 10 to our Consolidated Financial Statements for further discussion of acquisitions, debt and equity, respectively.

Client funds obligations represent our contractual obligations within the DST business to remit funds to satisfy client pharmacy claim obligations and are recorded on the Consolidated Balance Sheet when incurred, generally after a claim has been processed by us. In addition, client funds obligations include transfer agency client balances invested overnight. Our contractual obligations to remit funds to satisfy client obligations are primarily sourced by funds held on behalf of clients. We had \$1,014.7 million of client funds obligations at December 31, 2018.

Cash flows from operating, investing and financing activities, as reflected in our Consolidated Statements of Cash Flows, are summarized in the following table (in millions):

	<u>Year Ended December 31,</u>			<u>Change from Prior Year</u>
	<u>2018</u>	<u>2017</u>	<u>2016</u>	
Net cash, cash equivalents and restricted cash provided by (used in):				
Operating activities	\$ 640.1	\$ 471.8	\$ 418.4	\$ 168.3
Investing activities	(7,102.6)	(63.3)	(496.0)	(7,039.3)
Financing activities	7,517.0	(468.0)	(236.1)	7,985.0
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(5.9)	4.5	(3.6)	(10.4)
Net increase (decrease) in cash, cash equivalents and restricted cash	<u>\$ 1,048.6</u>	<u>\$ (55.0)</u>	<u>\$ (317.3)</u>	<u>\$ 1,103.6</u>

Operating activities: Cash provided by operating activities primarily resulted from net income of \$103.2 million adjusted for non-cash items of \$572.0 million, slightly offset by changes in our working capital accounts (excluding the effect of acquisitions) totaling \$35.1 million. The changes in our working capital accounts were driven by decreases in accounts payable and accrued expenses, increases in contract assets and changes in income taxes prepaid and payable, partially offset by decreases in accounts receivable and prepaid expenses and other assets and increase in deferred revenue. Cash provided by operating activities was negatively affected by approximately \$244.0 million of costs related to the DST acquisition, including transaction, severance and other such items. The decrease in accounts payable was primarily due to the timing of payments. The decrease in accounts receivable was primarily due to an overall decrease in days' sales outstanding, excluding the effect of acquisitions, as well as an improvement in the

average days' sales outstanding associated with businesses acquired in 2018 since the date of those acquisitions. The decrease in prepaid expenses and other assets was primarily due to the timing of payments, particularly as a result of the mid-month acquisition of DST. The increase in contract asset and deferred revenue was primarily due to the adoption of ASC 606.

Investing activities : We used net cash of \$7,102.6 million primarily related to cash paid for business acquisitions (net of cash acquired) of \$7,066.7 million, \$55.5 million in capitalized software development costs, \$33.6 million in capital expenditures and \$16.4 million in investments in securities, partially offset by proceeds from sales and maturities of investments of \$52.9 million, proceeds from the sale of property and equipment of \$9.7 million and receipts from the collection of loans made of \$7.0 million.

Financing activities: Cash provided by financing activities of \$7,517.0 million primarily resulted from \$8,744.0 million received from debt borrowings, net of original issue discount, net proceeds of \$1,399.1 million from common stock issuance, net increase in client funds obligations of \$604.8 million and \$84.9 million in cash received from stock option exercises. These proceeds were partially offset by repayments of debt totaling \$3,141.0 million, the payment of \$86.4 million in fees related to debt extinguishment and refinancing activities, \$70.9 million in quarterly dividends paid and \$17.5 million in withholding taxes paid related to equity award net share settlements.

Fiscal 2017 versus 2016

Our cash and cash equivalents and restricted cash and cash equivalents at December 31, 2017 were \$64.7 million, a decrease of \$55.0 million from \$119.7 million at December 31, 2016. The decrease in cash was primarily due to repayments of debt, payment of dividends, capital expenditures and cash paid for acquisitions. These decreases were partially offset by cash provided by operations, proceeds from stock option exercises and proceeds received from our borrowings.

Operating activities: Cash provided by operating activities primarily resulted from net income of \$328.9 million adjusted for non-cash items of \$142.8 million and changes in our working capital accounts (excluding the effect of acquisitions). The changes in our working capital accounts were driven by increases in accounts receivable and prepaid expenses and other assets as well as decreases in accrued expenses and deferred revenue. These changes were partially offset by an increase in accounts payable and a change in income taxes prepaid and payable. The decrease in deferred revenue was primarily due to an increase in the number of new license contracts and contract renewals that qualified for up-front revenue recognition as well as the decline in deferred revenue associated with the completion of professional services installations of our software. The decrease in accrued expenses was primarily due to lower accrued interest on our outstanding debt as well as lower compensation accruals. The increase in accounts payable was primarily due to the timing of payments.

Investing activities : We used net cash primarily related to \$35.5 million in capital expenditures, \$17.4 million cash paid for acquisitions and \$10.4 million in capitalized software.

Financing activities: We used net cash primarily related to \$512.5 million of repayments of debt, \$54.4 million in quarterly dividends and \$4.8 million in withholding taxes paid related to equity award net share settlements. These payments were partially offset by \$60.2 million cash received from stock option exercises and \$45.0 million received from debt borrowings.

We have made a permanent reinvestment determination in certain non-U.S. operations that have historically generated positive operating cash flows. At December 31, 2018, we held approximately \$93.0 million in cash and cash equivalents at non-U.S. subsidiaries where we had made such a determination and in turn no provision for income taxes had been made. At December 31, 2018, we held approximately \$78.7 million in cash that was available to our foreign borrowers under our senior secured credit facility and will be used to facilitate debt servicing of those entities.

Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements that have or are reasonably likely to have a current or future effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources that is material to investors.

Contractual Obligations

The following table summarizes our contractual obligations as of December 31, 2018 that require us to make future cash payments (in millions):

Contractual Obligations and Other Commitments	Payments Due by Period				
	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 Years
Short-term and long-term debt	\$ 8,347.3	\$ 87.4	\$ 191.3	\$ 658.0	\$ 7,410.6
Interest payments (1)	2,392.9	401.8	791.7	738.3	461.1
Operating lease obligations (2)	550.9	83.8	147.7	115.1	204.3
Tax payable (3)	24.3	—	—	2.1	22.2
Purchase obligations (4)	198.0	101.8	83.5	12.7	—
Total contractual obligations	<u>\$ 11,513.4</u>	<u>\$ 674.8</u>	<u>\$ 1,214.2</u>	<u>\$ 1,526.2</u>	<u>\$ 8,098.2</u>

- (1) Reflects interest payments on our Credit Agreement at an assumed interest rate of one-month LIBOR of 2.52% plus 2.25% for U.S. dollar loans on our Term B-1, B-3, B-4 and B-5 facilities.
- (2) We are obligated under noncancelable operating leases for office space and office equipment. The lease for the corporate facility in Windsor, Connecticut expires in 2022. We sublease office space under noncancelable leases. For the years ended December 31, 2018, 2017 and 2016, we received rental income under these leases of \$5.4 million, \$5.4 million and \$1.3 million, respectively. The effect of the rental income to be received in the future has not been included in the table above.
- (3) Represents our obligation under the Tax Act to pay the deemed repatriation tax on certain non-US earnings over eight years. Refer to Note 15 to the Consolidated Financial Statements for additional information.
- (4) Purchase obligations include the minimum amounts committed under contracts for goods and services.

As of December 31, 2018, our liability for uncertain tax positions and related interest and penalties payable was \$118.5 million and \$25.2 million, respectively. We are unable to reasonably estimate the timing of such liability and interest payments in individual years beyond 12 months due to uncertainties in the timing of the effective settlement of tax positions. As a result, these amounts are not included in the above contractual obligations table.

Senior Secured Credit Facilities

On April 16, 2018, in connection with our acquisition of DST, we entered into an amended and restated credit agreement with SS&C Technologies, Inc. (“SS&C”), SS&C European Holdings SARL, an indirect wholly-owned subsidiary of SS&C (“SS&C SARL”) and SS&C Technologies Holdings Europe SARL, an indirect wholly-owned subsidiary of SS&C (“SS&C Tech SARL”) as the borrowers (“Credit Agreement”).

The Credit Agreement includes four tranches of term loans (together the “Initial Term Loans”): (i) a \$518.6 million term B-1 facility which matures on July 8, 2022 for SS&C (“Term B-1 Loan”); (ii) a \$5.9 million term B-2 facility which matures on July 8, 2022 for SS&C SARL (“Term B-2 Loan”); (iii) a new \$5.046 billion term B-3 facility, which matures on April 16, 2025 for SS&C (the “Term B-3 Loan”); and (iv) a new \$1.8 billion term B-4 facility, which matures on April 16, 2025 for SS&C SARL (the “Term B-4 Loan”). In addition, the Credit Agreement has a revolving credit facility with a five-year term available for borrowings by SS&C with \$250 million in available commitments (“Revolving Credit Facility”), of which \$242.4 million was available as of December 31, 2018. The Revolving Credit Facility also contains a \$25 million letter of credit sub-facility, of which \$7.6 million was utilized as of December 31, 2018.

The majority of the initial proceeds from the Initial Term Loans was used to fund the acquisition of DST, repay certain amounts outstanding under our then-existing credit agreement (“Prior Credit Agreement”), repay all of the outstanding principal amount of our 5.875% Senior Notes due 2023 (“Senior Notes”) and repay acquired debt associated with DST.

The refinancing of the Prior Credit Agreement was evaluated in accordance with FASB Accounting Standards Codification 470-50, *Debt-Modifications and Extinguishments*, for modification and extinguishment accounting. We accounted for the refinancing as a debt modification with respect to amounts that remained obligations of the same lender in the syndicate with minor changes in cash flows and as a debt extinguishment with respect to amounts that were obligations of lenders that exited the syndicate or remained in the syndicate but experienced a change in cash flows of greater than 10%. See Note 9 to our Consolidated Financial Statements for further discussion of debt.

On October 1, 2018, in connection with our acquisition of Eze, we entered into an amendment (the “Commitment Increase Amendment”) to the Credit Agreement. Pursuant to the Commitment Increase Amendment, a new \$875.0 million senior secured term B-5 facility (“Term B-5 Loan”, and together with the Initial Term Loans, the “Term Loans”) was made available to us, the proceeds of which were used to finance, in part, the Eze acquisition.

On November 16, 2018, in connection with our acquisition of Intralinks, we entered into an amendment (the “Incremental Term Loan Amendment”) to the Credit Agreement. Pursuant to the Incremental Term Loan Amendment, an additional \$1.0 billion senior secured term B-5 facility (“Term B-5 Loan”, and together with the Initial Term Loans, the “Term Loans”) was made available to us, the proceeds of which were used to finance, in part, the Intralinks acquisition.

The Term Loans and Revolving Credit Facility bear interest, at the election of the borrowers, at the base rate (as defined in the Credit Agreement) or LIBOR, plus the applicable interest rate margin for the credit facility. Amounts drawn on the Revolving Credit Facility initially bear interest at either LIBOR plus 2.25% or at the base rate plus 1.25%, and is subject to a step-down at any time our consolidated net secured leverage ratio is less than 4.75 times, to 2.0% in the case of the LIBOR margin and 1.0% in the case of the base rate margin. The Term B-1 Loan and Term B-2 Loan bear interest at either LIBOR plus 2.25% or at the base rate plus 1.25%. The Term B-3 Loan, Term B-4 Loan and Term B-5 Loan initially bear interest at either LIBOR plus 2.50% or at the base rate plus 1.50%, and are subject to a step-down at any time our consolidated net secured leverage ratio is less than 4.75 times, to 2.25% in the case of the LIBOR margin and 1.25% in the case of the base rate margin.

As of December 31, 2018, there was \$514.5 million in principal amount outstanding under the Term B-1 Loan, \$4,309.6 million in principal amount outstanding under the Term B-3 Loan, \$1,634.7 million in principal amount outstanding under the Term B-4 Loan and \$1,860.3 million in principal amount outstanding under the Term B-5 Loan. There was no principal amount outstanding under the Term B-2 Loan.

SS&C and SS&C SARL are required to make scheduled quarterly payments of approximately 0.25% of the remaining principal amount of the Term B-1 Loan with the balance due and payable on July 8, 2022. SS&C and SS&C SARL are required to make scheduled quarterly payments of 0.25% of the original principal amount of the Term B-3 Loan, Term B-4 Loan and Term B-5 Loan, with the balance due and payable on April 16, 2025. No amortization is required under the Revolving Credit Facility.

SS&C’s and SS&C SARL’s obligations under the Term Loans are guaranteed by (i) our existing and future U.S. wholly-owned restricted subsidiaries, in the case of the Term B-1 Loan, Term B-3 Loan, Term B-5 Loan and the Revolving Credit Facility and (ii) our existing and future wholly-owned restricted subsidiaries, in the case of the Term B-4 Loan.

The obligations of the U.S. loan parties under the Credit Agreement are secured by substantially all of the assets of such persons (subject to customary exceptions and limitations), including a pledge of all of the capital stock of substantially all of the U.S. wholly-owned restricted subsidiaries of such persons (with customary exceptions and limitations) and 65% of the capital stock of certain foreign restricted subsidiaries of such persons (with customary exceptions and limitations). All obligations of the non-U.S. loan parties under the Credit Agreement are secured by substantially all of our and the other guarantors’ assets (subject to customary exceptions and limitations), including a pledge of all of the capital stock of substantially all of our wholly-owned restricted subsidiaries (with customary exceptions and limitations).

The Credit Agreement includes negative covenants that, among other things and subject to certain thresholds and exceptions, limit our ability and the ability of our restricted subsidiaries to incur debt or liens, make investments (including in the form of loans and acquisitions), merge, liquidate or dissolve, sell property and assets, including capital stock of our subsidiaries, pay dividends on our capital stock or redeem, repurchase or retire our capital stock, alter the business we conduct, amend, prepay, redeem or purchase subordinated debt, or engage in transactions with our affiliates. The Credit Agreement also contains customary representations and warranties, affirmative covenants and events of default, subject to customary thresholds and exceptions. In addition, the Credit Agreement contains a financial covenant for the benefit of the Revolving Credit Facility requiring us to maintain a minimum consolidated net secured leverage ratio. In addition, under the Credit Agreement, certain defaults under agreements governing other material indebtedness could result in an event of default under the Credit Agreement, in which case the lenders could elect to accelerate payments under the Credit Agreement and terminate any commitments they have to provide future borrowings.

Senior Notes

On April 16, 2018, we redeemed all of the outstanding principal amount of our Senior Notes utilizing a portion of the proceeds from the Initial Term Loans described above. The redemption of the Senior Notes required the payment of a “make whole” premium calculated pursuant to the indenture governing the Senior Notes. See Loss on extinguishment of debt within Note 9 to our

Consolidated Financial Statements for further discussion. In addition, on May 1, 2018, we redeemed senior notes of DST that were acquired as a part of the acquisition of DST utilizing a portion of the proceeds of the Initial Term Loans described above. The redemption of DST's senior notes totaled \$600.4 million, which included a "make whole" premium.

Other Indebtedness

In connection with the acquisition of DST, we assumed a mortgage with a principal amount of £21.0 million, which matures in October 2020 ("U.K. Mortgage") and a \$4.1 million mortgage on property in the U.S. The outstanding amount under the U.K. Mortgage was \$24.2 million at December 31, 2018 with a fixed interest rate of 3.1%. Principal payments of £1.0 million are payable semi-annually in April and October of each year and accrued interest payable quarterly, with the outstanding balance due at maturity.

Covenant Compliance

Under the Revolving Credit Facility portion of the Credit Agreement, we are required to satisfy and maintain a specified financial ratio at the end of each fiscal quarter if the sum of (i) outstanding amount of all loans under the Revolving Credit Facility and (ii) all non-cash collateralized letters of credit issued under the Revolving Credit Facility in excess of \$20 million is equal to or greater than 30% of the total commitments under the Revolving Credit Facility. Our financial ratio became effective with the period ended September 30, 2018. Our ability to meet this financial ratio can be affected by events beyond our control, and we cannot assure you that we will meet this ratio. Any breach of this covenant could result in an event of default under the Credit Agreement. Upon the occurrence of any event of default under the Credit Agreement, the lenders could elect to declare all amounts outstanding under the Credit Agreement to be immediately due and payable and terminate all commitments to extend further credit. Any default and subsequent acceleration of payments under the Credit Agreement would have a material adverse effect on our results of operations, financial position and cash flows. Additionally, under the Credit Agreement, our ability to engage in activities such as incurring additional indebtedness, making investments and paying dividends is also tied to baskets and ratios based on Consolidated EBITDA.

Consolidated EBITDA is a non-GAAP financial measure used in key financial covenants contained in the Credit Agreement, which is the material facility supporting our capital structure and providing liquidity to our business. Consolidated EBITDA is defined as earnings before interest, taxes, depreciation and amortization ("EBITDA"), further adjusted to exclude unusual items and other adjustments permitted in calculating covenant compliance under the Credit Agreement. We believe that the inclusion of supplementary adjustments to EBITDA applied in presenting Consolidated EBITDA is appropriate to provide additional information to investors to demonstrate compliance with the specified financial ratio and other financial condition tests contained in the Credit Agreement.

Management uses Consolidated EBITDA to gauge the costs of our capital structure on a day-to-day basis when full financial statements are unavailable. Management further believes that providing this information allows our investors greater transparency and a better understanding of our ability to meet our debt service obligations and make capital expenditures.

Consolidated EBITDA does not represent net income or cash flow from operations as those terms are defined by generally accepted accounting principles, or GAAP, and does not necessarily indicate whether cash flows will be sufficient to fund cash needs. Further, the Credit Agreement requires that Consolidated EBITDA be calculated for the most recent four fiscal quarters. As a result, the measure can be disproportionately affected by a particularly strong or weak quarter. Further, it may not be comparable to the measure for any subsequent four-quarter period or any complete fiscal year.

Consolidated EBITDA is not a recognized measurement under GAAP and investors should not consider Consolidated EBITDA as a substitute for measures of our financial performance and liquidity as determined in accordance with GAAP, such as net (loss) income, operating (loss) income or net cash provided by operating activities. Because other companies may calculate Consolidated EBITDA differently than we do, Consolidated EBITDA may not be comparable to similarly titled measures reported by other companies. Consolidated EBITDA has other limitations as an analytical tool, when compared to the use of net income, which is the most directly comparable GAAP financial measure, including:

- Consolidated EBITDA does not reflect the significant interest expense we incur as a result of our debt leverage;
- Consolidated EBITDA does not reflect the provision (benefit) of income tax expense in our various jurisdictions;
- Consolidated EBITDA does not reflect any attribution of costs to our operations related to our investments and capital expenditures through depreciation and amortization charges;
- Consolidated EBITDA does not reflect the cost of compensation we provide to our employees in the form of stock-based awards;

- Consolidated EBITDA does not reflect the equity in earnings of unconsolidated affiliates; and
- Consolidated EBITDA excludes expenses and income that are permitted to be excluded per the terms of our Credit Agreement, but which others may believe are normal expenses for the operation of a business.

The following is a reconciliation of net income to Consolidated EBITDA as defined in our Credit Agreement.

(in millions)	Year Ended December 31,		
	2018	2017	2016
Net income	\$ 103.2	\$ 328.9	\$ 131.0
Interest expense, net	271.0	107.4	128.4
Provision (benefit) for income taxes	21.9	(46.2)	32.6
Depreciation and amortization	518.5	237.2	228.7
EBITDA	914.6	627.3	520.7
Stock-based compensation	96.9	41.5	50.6
Capital-based taxes	—	0.3	1.5
Acquired EBITDA and cost savings (1)	523.5	4.5	9.1
Non-cash portion of straight-line rent expense	—	4.4	2.2
Loss on extinguishment of debt, net	43.3	2.3	—
Equity in earnings of unconsolidated affiliates, net	(2.1)	—	—
Purchase accounting adjustments (2)	17.8	4.4	31.6
ASC 606 adoption impact	40.2	—	—
Other (3)	170.5	15.3	5.9
Consolidated EBITDA, as defined	\$ 1,804.7	\$ 700.0	\$ 621.6

- (1) Acquired EBITDA reflects the EBITDA impact of significant businesses that were acquired during the period as if the acquisition occurred at the beginning of the period, as well as cost savings enacted in connection with acquisitions.
- (2) Purchase accounting adjustments include (a) an adjustment to increase revenues by the amount that would have been recognized if deferred revenue were not adjusted to fair value at the date of acquisitions and (b) an adjustment to increase personnel and commissions expense by the amount that would have been recognized if prepaid commissions and deferred personnel costs were not adjusted to fair value at the date of the acquisitions.
- (3) Other includes expenses and income that are permitted to be excluded per the terms of our Credit Agreement from Consolidated EBITDA, a financial measure used in calculating our covenant compliance. These include expenses and income related to currency transactions, investment gains and losses, facilities and workforce restructuring, legal settlements and business combinations.

Our covenant requirement for net senior secured leverage ratio and the actual ratio for the year ended December 31, 2018 are as follows:

	Covenant Requirement	Actual Ratio
Maximum consolidated net secured leverage to Consolidated EBITDA ratio (1)	7.25x	4.54x

-
- (1) Calculated as the ratio of consolidated net secured funded indebtedness, net of cash and cash equivalents, to Consolidated EBITDA, as defined by the Credit Agreement, for the period of four consecutive fiscal quarters ended on the measurement date. Consolidated net secured funded indebtedness is comprised of indebtedness for borrowed money, letters of credit, deferred purchase price obligations and capital lease obligations, all of which is secured by liens on our property.

Critical Accounting Policies

A number of our accounting policies require the application of significant judgment by our management, and such judgments are reflected in the amounts reported in our Consolidated Financial Statements. In applying these policies, our management uses its judgment to determine the appropriate assumptions to be used in the determination of estimates. Those estimates are based on our historical experience, terms of existing contracts, management's observation of trends in the industry, information provided by our clients and information available from other outside sources, as appropriate. On an ongoing basis, we evaluate our estimates and judgments, including those related to revenue recognition, goodwill and other intangible assets and other contingent liabilities. Actual results may differ significantly from the estimates contained in our Consolidated Financial Statements. Information about recently adopted accounting pronouncements and accounting pronouncements not yet effective is included in Note 2 to our Consolidated Financial Statements. We believe that the following are our critical accounting policies.

Accounting for investments

We have five significant types of investments: 1) investments in unconsolidated affiliates; 2) partnership interests in private equity funds; 3) investments in marketable equity securities related to our deferred compensation agreements; 4) non-marketable equity securities; and 5) seed capital investments.

The equity method of accounting is used for investments in entities, partnerships and similar interests (including investments in private equity funds for which we are a limited partner and hold a greater than 5% partnership interest in the fund) in which we have significant influence but do not control. Under the equity method, we recognize income or losses from our pro-rata share of these unconsolidated affiliates' net income or loss, which changes the carrying value of the investment of the unconsolidated affiliate.

Our investments in unconsolidated affiliates, which were recorded at fair value through the allocation of the purchase price for the acquisition of DST, are accounted for under the equity method of accounting. The carrying value of our investments in unconsolidated affiliates exceeds the proportionate share of net assets of the unconsolidated affiliates, resulting in basis differences. We recognize our proportionate share of the results of the unconsolidated affiliates and amortization expense related to basis differences in non-operating income.

Our partnership interests in private equity funds, marketable equity securities, and seed capital investments, other than those accounted for under the equity method of accounting or those that result in consolidation of the investee, are recorded at fair value, with changes in the fair value recognized in earnings. Our marketable equity securities and seed capital investments have readily determinable fair values in the market. We use net asset value as a practical expedient for the fair value of partnership interests in private equity funds that are not accounted for under the equity method of accounting.

Investments in non-marketable equity securities that do not have readily determinable fair values and do not qualify for the practical expedient to measure the investment using a net asset value per share are recorded using the measurement alternative in ASU 2016-01. These investments are recorded at cost, less impairment, adjusted for observable price changes in orderly transactions for an identical or similar investment of the same issuer. At each reporting period, we assesses if these investments continue to qualify for this measurement alternative. Impairment is recorded when there is evidence that the expected fair value of the investment has declined to below the recorded cost. Future adverse changes in market conditions or poor operating results of underlying investments could result in losses or an inability to recover the carrying value of the investments that may not be reflected in an investment's current carrying value, thereby possibly requiring an impairment charge in the future, which could have a material effect on our financial position.

Long-lived Assets, Intangible Assets and Goodwill

We must test goodwill annually for impairment (and in interim periods if certain events occur indicating that the carrying value of goodwill or indefinite-lived intangible assets may be impaired) by comparing fair value of a reporting unit to its carrying value. Judgement is required in the determination of goodwill reporting units. During the year ended December 31, 2018, our reporting unit structure changed as a result of acquisitions which we completed during the year. As of December 31, 2018, we had two reporting units, one which includes the DST business, and one which includes the rest of our operations. To the extent that we do not achieve our revenue or operating cash flow plans or other measures of fair value decline, including external valuation assumptions, our current goodwill carrying value could be impaired. In 2017, we adopted Accounting Standards Update ("ASU") 2017-04, *Goodwill and*

Other (Topic 350) – Simplifying the Test for Goodwill Impairment, for our annual goodwill impairment test. The new guidance removed the second step of the goodwill impairment test requiring a hypothetical purchase price allocation. The first step of the impairment analysis indicated that the fair values significantly exceeded the carrying values at December 31, 2018.

We assess the impairment of identifiable intangibles, long-lived assets and goodwill whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Factors we consider important which could trigger an impairment review include the following:

- significant underperformance relative to historical or projected future operating results;
- significant changes in the manner of our use of the acquired assets or the strategy for our overall business; and
- significant negative industry or economic trends.

When we determine that the carrying value of intangibles and long-lived assets may not be recoverable based upon the existence of one or more of the above indicators of potential impairment, we assess whether an impairment has occurred based on whether net book value of the assets exceeds related projected undiscounted cash flows from these assets. We consider a number of factors, including past operating results, budgets, economic projections, market trends and product development cycles in estimating future cash flows. Differing estimates and assumptions as to any of the factors described above could result in a materially different impairment charge, if any, and thus materially different results of operations.

Software Capitalization

Significant management judgement is required in determining what projects and costs associated with software development will be capitalized and in assigning estimated economic lives to the completed projects. Management specifically evaluates software development projects and analyzes the percentage of completion as compared to the initial plan and subsequent forecasts, milestones achieved and the commitments to continue funding the projects. Significant changes in any of these items may result in discontinuing capitalization of development costs, as well as immediately expensing previously capitalized costs. We review, on a quarterly basis, our capitalized software for possible impairment.

Acquisition Accounting

In connection with our acquisitions, we allocate the purchase price to the assets and liabilities we acquire, such as net tangible assets, completed technology, customer relationships, other identifiable intangible assets, deferred revenue and goodwill. We applied significant judgments and estimates in determining the fair market value of the assets acquired and their useful lives. For example, we have determined the fair value of existing client contracts based on the discounted estimated net future cash flows from such client contracts existing at the date of acquisition and the fair value of the completed technology based on the cost savings method or the relief-from-royalties method on estimated future revenues of such completed technology and assumed obsolescence factors. While actual results during the years ended December 31, 2018, 2017 and 2016 were consistent with our estimated cash flows and we did not incur any impairment charges during those years, different estimates and assumptions in valuing acquired assets could yield materially different results.

Revenue Recognition

Our revenues consist of software-enabled services and license, maintenance and related revenues.

Software-enabled services revenues, which are based on a monthly fee or are transaction-based, are recognized as the services are performed. Software-enabled services are generally provided under contracts with initial terms of one to five years that require monthly or quarterly payments, and are subject to automatic annual renewal at the end of the initial term unless terminated by either party.

We recognize software-enabled services revenues on a monthly basis as the arrangement is a single performance obligation or a stand-ready performance obligation, which in either case is comprised of a series of distinct services that are substantially the same and have the same pattern of transfer to the customer (i.e. distinct days or months of service). We apply a measure of progress (typically time-based) to any fixed consideration and allocate variable consideration to the distinct periods of service based on usage or summarization of account information. These variable payments relate specifically to our efforts to perform the services in the period in which the fee applies. This variability is solely attributed to and resolved as a result of the transfer of these services; these fees are independent of the transfer of past or future goods or services. These fees meet the allocation objective of ASC 606 because they represent the amount of consideration we are entitled to for these services. Revenue is generally recognized over the period the

services are provided, which results in revenue recognition that corresponds with the value to the client of the services transferred to date relative to the remaining services promised.

We generate revenues in the form of software license fees and related maintenance and services fees. License fees include perpetual license fees and term license fees that differ mainly in the duration over which the customer benefits from the software. Maintenance and services primarily consist of fees for maintenance services (including support and unspecified upgrades and enhancements when and if they are available) and, in some cases, professional services which focus on both deployment and training our customers to fully leverage the use of our products.

Software license revenues are recognized at the point of time when the software license has been delivered. Term license fees are typically due in annual installments at the beginning of each annual period and we record a contract asset for amounts recognized as revenue in excess of amounts billed. We recognize revenues from maintenance ratably over the term of the underlying maintenance contract term because we transfer control evenly by providing a stand-ready service. The term of the maintenance contract is usually one year. Revenues from professional services consist mostly of services provided on a time and materials basis.

In contracts with multiple performance obligations, we account for individual performance obligations separately if they are distinct. We allocate the transaction price to each performance obligation based on our relative standalone selling price out of total consideration of the contract. Standalone selling price is determined utilizing observable prices to the extent available. If the standalone selling price for a performance obligation is not directly observable, we estimate it maximizing the use of observable inputs. For maintenance and support, we determine the standalone selling price based on the price at which we separately sell a renewal contract and the economic relationship between licenses and maintenance. We primarily determine the standalone selling price for sales of licenses using the residual approach. For professional services, we determine the standalone selling prices based on the price at which we separately sell those services.

We occasionally enter into license agreements requiring significant customization of our software that are not material to our results of operations. We account for the license and professional service fees under these agreements as a single performance obligation, recognized over time using an input method during the development of the license. This method requires estimates to be made for costs to complete the agreement utilizing an estimate of development man-hours remaining. Revenue is recognized each period based on the hours incurred to date compared to the total hours expected to complete the project. Due to uncertainties inherent in the estimation process, it is at least reasonably possible that completion costs will be revised. Such revisions are recognized in the period in which the revisions are determined. Provisions for estimated losses on uncompleted contracts are determined on a contract-by-contract basis, and are made in the period in which such losses are first estimated or determined.

Depreciation of Fixed Assets

For personal property, we generally prefer to own rather than lease the property when practicable. We believe this approach provides us with better flexibility for disposing or redeploying the asset as it nears the completion of its economic life. Management judgement is required in assigning economic lives to fixed assets. Management specifically analyzes fixed asset additions, remaining net book values and gain/loss upon disposition of fixed assets to determine the appropriateness of assigned economic lives. Significant changes in any of these items may result in changes in the economic life assigned and the resulting depreciation expense.

Stock-based Compensation

Using the fair value recognition provisions of relevant accounting literature, stock-based compensation cost is measured at the grant date based on the value of the award and is recognized as expense over the appropriate service period. Determining the fair value of stock-based awards requires considerable judgment, including estimating the expected term of stock options and the expected volatility of our stock price. A deferred income tax asset is recorded over the vesting period as stock compensation expense is recorded for non-qualified stock options. The realizability of the deferred tax asset is ultimately based on the actual value of the stock-based award upon exercise. If the actual value is lower than the fair value determined on the date of grant, then there would be an income tax expense for the portion of the deferred tax asset that is not realizable.

Income Taxes

The carrying value of our deferred tax assets assumes that we will be able to generate sufficient future taxable income in certain tax jurisdictions, based on estimates and assumptions. If these estimates and related assumptions change in the future, we may be required to record additional valuation allowances against our deferred tax assets resulting in additional income tax expense in our Consolidated Statements of Comprehensive Income (Loss). On a quarterly basis, we evaluate whether deferred tax assets are realizable and assess whether there is a need for additional valuation allowances. The carrying value of our deferred tax assets and

liabilities is recorded based on the statutory rates that we expect our deferred tax assets and liabilities to reverse into income. We estimate the state rate at which our deferred tax assets and liabilities will reverse based on estimates of state income apportionment for future years. Each of these estimates requires significant judgment on the part of our management. In addition, we evaluate the need to provide additional tax provisions for adjustments proposed by taxing authorities.

As of December 31, 2018, we had \$118.5 million in liabilities associated with unrecognized tax benefits. All of the unrecognized tax benefits, if recognized, would decrease our effective tax rate and increase our net income. Additionally, we recognize accrued interest and penalties relating to unrecognized tax benefits as a component of the income tax provision.

Recently Adopted Accounting Pronouncements

In August 2016, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2016-15, *Classification of Certain Cash Receipts and Cash Payments*. ASU 2016-15 addresses how certain cash receipts and cash payments are presented and classified in the statement of cash flows under ASC Topic 230, Statement of Cash Flow, and other Topics. ASU 2016-15 is effective for our first quarter of fiscal 2018 and the guidance requires application using a retrospective method. The impact of our adoption of ASU 2016-15 to our Consolidated Financial Statements was to reflect the presentation of debt prepayment or debt extinguishment costs as cash outflows from financing activities within our Consolidated Statement of Cash Flows. We adopted ASU 2016-15 as of January 1, 2018, which resulted in presenting fees paid for debt extinguishment as a financing activity within the Consolidated Statement of Cash Flows for all periods shown.

In January 2016, the FASB issued ASU 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities*. ASU 2016-01 requires equity investments, except those accounted for under the equity method of accounting, that have readily determinable fair values to be measured at fair value with any changes in fair value recognized in net income. Equity securities that do not have readily determinable fair values may be measured at estimated fair value or cost less impairment, if any, adjusted for subsequent observable price changes, with changes in the carrying value recognized in net income. A qualitative assessment for impairment is required for equity investments without readily determinable fair values. The updated guidance also eliminates the requirement to disclose the method and significant assumptions used to estimate the fair value of financial instruments measured at amortized cost on the balance sheet. We adopted ASU 2016-01 as of January 1, 2018, which did not have a material impact on our financial position, results of operations or cash flows.

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers (ASC 606)*. ASC 606 supersedes the revenue recognition requirements in ASC 605 and 985 and requires entities to recognize revenue when control of the promised goods or services is transferred to customers at an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. We adopted ASC 606 as of January 1, 2018 using the modified retrospective transition method. See Note 11 for further details.

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We do not use derivative financial instruments for trading or speculative purposes. We have invested our available cash in short-term, highly liquid financial instruments, having initial maturities of three months or less. When necessary, we have borrowed to fund acquisitions.

Interest rate risk

We derive service revenues from investment earnings related to cash balances maintained in bank accounts on which we are the agent for clients. The balances maintained in the bank accounts will fluctuate. For 2018, there were average daily cash balances of approximately \$2.2 billion maintained in such accounts. We estimate that a 1% change in interest rates would equal approximately \$9.2 million of net income on an annual basis. The effect of changes in interest rates attributable to earnings derived from cash balances we hold for clients is partially offset by changes in interest rates on our variable debt.

At December 31, 2018, we had total debt of \$8,347.3 million, including \$8,319.1 million of variable interest rate debt. As of December 31, 2018, a 1% change in LIBOR would result in a change in interest expense of approximately \$83.2 million per year.

Equity price risk

We have exposure to equity price risk as a result of our investments in equity securities. Equity price risk results from changes in the level or volatility of equity prices which affect the value of equity securities or instruments that derive their value from such

securities or indexes. The fair value of our investments that are subject to equity price risk as of December 31, 2018 was approximately \$1 21.7 million. The impact of a 10% change in fair value of these investments would have been approximately \$9.1 million to net income. Changes in equity values of our investments could have a material effect on our results of operations and our financial position.

Foreign currency exchange rate risk

During 2018, approximately 28% of our revenues were from clients located outside the United States. A portion of the revenues from clients located outside the U.S. is denominated in foreign currencies, primarily the British pound. While revenues and expenses of our foreign operations are primarily denominated in their respective local currencies, some subsidiaries do enter into certain transactions in currencies that are different from their local currency. These transactions consist primarily of cross-currency intercompany balances and trade receivables and payables. As a result of these transactions, we have exposure to changes in foreign currency exchange rates that result in foreign currency transaction gains and losses, which we report in other income (expense). These outstanding amounts were not material for the year ended December 31, 2018. The amount of these balances can fluctuate in the future as we bill customers and buy products or services in currencies other than our functional currency, which could increase our exposure to foreign currency exchange rates. We continue to monitor our exposure to foreign exchange rates as a result of our acquisitions and changes in our operations. We do not enter into any market risk sensitive instruments for trading purposes.

The foregoing risk management discussion and the effect thereof are forward-looking statements. Actual results in the future may differ materially from these projected results due to actual developments in global financial markets. The analytical methods used by us to assess and minimize risk discussed above should not be considered projections of future events or losses.

Item 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Financial statement schedules are not submitted because they are not applicable, not required or the information is included in our Consolidated Financial Statements.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of SS&C Technologies Holdings, Inc.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of SS&C Technologies Holdings, Inc. and its subsidiaries (the "Company") as of December 31, 2018 and 2017, and the related consolidated statements of comprehensive (loss) income, changes in stockholders' equity and cash flows for each of the three years in the period ended December 31, 2018, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for revenues from contracts with customers in 2018.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the Report of Management on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

As described in the Report of Management on Internal Control over Financial Reporting, management has excluded DST Systems Inc., Eze Software, and Intralinks Holdings, Inc. from its assessment of internal control over financial reporting as of December 31, 2018 because they were acquired by the Company in purchase business combinations during 2018. We have also excluded DST Systems Inc., Eze Software, and Intralinks Holdings, Inc. from our audit of internal control over financial reporting. DST Systems Inc., Eze Software, and Intralinks Holdings, Inc. are wholly-owned subsidiaries whose total assets and total revenues excluded from management's assessment and our audit of internal control over financial reporting collectively represent approximately 17% and 50%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2018. DST Systems Inc. represents 16% and 47% of the related consolidated financial statement amounts, respectively.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers LLP

Hartford, Connecticut

March 1, 2019

We have served as the Company's auditor since 1995.

SS&C TECHNOLOGIES HOLDINGS, INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(in millions, except per share data)

ASSETS	December 31, 2018	December 31, 2017
Current assets:		
Cash and cash equivalents	\$ 166.7	\$ 64.1
Funds receivable and funds held on behalf of clients	1,014.7	—
Accounts receivable, net of allowance for doubtful accounts of \$9.4 and \$6.7, respectively (Note 3)	681.7	243.9
Contract asset	18.5	—
Prepaid expenses and other current assets	154.5	38.7
Prepaid income taxes	5.6	12.1
Restricted cash and cash equivalents	6.4	0.6
Total current assets	2,048.1	359.4
Property, plant and equipment, net (Note 4)	553.2	101.0
Investments (Note 5)	190.5	—
Unconsolidated affiliates (Note 6)	239.3	—
Deferred income taxes	4.8	2.3
Contract asset	31.5	—
Goodwill (Note 8)	7,858.0	3,707.8
Intangible and other assets, net of accumulated amortization of \$1,360.2 and \$954.0, respectively (Note 8)	5,182.1	1,369.0
Total assets	<u>\$ 16,107.5</u>	<u>\$ 5,539.5</u>
	LIABILITIES AND STOCKHOLDERS' EQUITY	
Current liabilities:		
Current portion of long-term debt (Note 9)	\$ 87.5	\$ 37.9
Client funds obligations	1,014.7	—
Accounts payable	41.4	27.1
Income taxes payable	11.1	6.0
Accrued employee compensation and benefits	322.0	96.0
Interest payable	0.2	16.4
Other accrued expenses	199.2	55.6
Deferred revenue	245.7	204.6
Total current liabilities	1,921.8	443.6
Long-term debt, net of current portion (Note 9)	8,168.5	2,007.3
Other long-term liabilities	235.5	118.7
Deferred income taxes	1,201.7	283.5
Total liabilities	11,527.5	2,853.1
Commitments and contingencies (Note 16)		
Stockholders' equity (Note 10):		
Preferred stock, \$0.01 par value per share, 5.0 million shares authorized; no shares issued	—	—
Class A non-voting common stock, \$0.01 par value per share, 5.0 million shares authorized; no shares issued	—	—
Common stock, \$0.01 par value per share, 400.0 million shares authorized; 252.4 million shares and 208.1 million shares issued, respectively, and 250.8 million shares and 206.5 million shares outstanding, respectively	2.5	2.1
Additional paid-in capital	4,091.4	2,018.1
Accumulated other comprehensive loss	(343.0)	(82.7)
Retained earnings	847.1	766.9
	4,598.0	2,704.4
Less: cost of common stock in treasury, 1.6 million shares	(18.0)	(18.0)
Total stockholders' equity	4,580.0	2,686.4
Total liabilities and stockholders' equity	<u>\$ 16,107.5</u>	<u>\$ 5,539.5</u>

The accompanying notes are an integral part of these Consolidated Financial Statements.

SS&C TECHNOLOGIES HOLDINGS, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE (LOSS) INCOME
(in millions, except per share data)

	Year Ended December 31,		
	2018	2017	2016
Revenues:			
Software-enabled services	\$ 2,798.9	\$ 1,114.0	\$ 956.8
License, maintenance and related	622.2	561.3	524.6
Total revenues	3,421.1	1,675.3	1,481.4
Cost of revenues:			
Software-enabled services	1,753.0	628.1	544.4
License, maintenance and related	298.1	258.3	256.1
Total cost of revenues	2,051.1	886.4	800.5
Gross profit	1,370.0	788.9	680.9
Operating expenses:			
Selling and marketing	211.0	118.5	117.1
Research and development	318.2	153.3	152.7
General and administrative	313.9	119.6	122.5
Transaction expenses	97.8	0.6	—
Total operating expenses	940.9	392.0	392.3
Operating income	429.1	396.9	288.6
Interest income	9.1	1.2	1.5
Interest expense	(280.1)	(108.6)	(129.9)
Other income (expense), net	8.2	(4.5)	3.4
Equity in earnings of unconsolidated affiliates, net	2.1	—	—
Loss on extinguishment of debt, net	(43.3)	(2.3)	—
Income before income taxes	125.1	282.7	163.6
Provision (benefit) for income taxes (Note 15)	21.9	(46.2)	32.6
Net income	\$ 103.2	\$ 328.9	\$ 131.0
Basic earnings per share	\$ 0.44	\$ 1.60	\$ 0.65
Diluted earnings per share	\$ 0.42	\$ 1.55	\$ 0.64
Basic weighted average number of common shares outstanding	232.5	204.9	200.3
Diluted weighted average number of common and common equivalent shares outstanding	243.7	211.6	205.8
Cash dividends declared and paid per common share	\$ 0.30	\$ 0.265	\$ 0.25
Net income	\$ 103.2	\$ 328.9	\$ 131.0
Other comprehensive (loss) income, net of tax:			
Foreign currency exchange translation adjustment	(260.3)	56.4	(55.9)
Total comprehensive (loss) income, net of tax	(260.3)	56.4	(55.9)
Comprehensive (loss) income	\$ (157.1)	\$ 385.3	\$ 75.1

The accompanying notes are an integral part of these Consolidated Financial Statements.

SS&C TECHNOLOGIES HOLDINGS, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in millions)

	Year Ended December 31,		
	2018	2017	2016
Cash flow from operating activities:			
Net income	\$ 103.2	\$ 328.9	\$ 131.0
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	518.5	237.2	228.7
Equity in earnings of unconsolidated affiliates, net	(2.1)	—	—
Cash distributions received from unconsolidated affiliates	4.2	—	—
Stock-based compensation expense	96.9	41.5	50.5
Income tax benefit related to exercise of stock options	—	—	(46.2)
Net unrealized gains on investments	(0.9)	—	—
Amortization and write-offs of loan origination costs and original issue discounts	13.6	10.5	10.7
Loss on extinguishment of debt, net	43.3	2.3	—
Loss on sale or disposition of property and equipment	0.3	0.9	0.1
Deferred income taxes	(105.8)	(152.0)	(47.8)
Provision for doubtful accounts	4.0	2.4	3.5
Changes in operating assets and liabilities, excluding effects from acquisitions:			
Accounts receivable	50.4	(1.8)	(10.9)
Prepaid expenses and other assets	31.9	(7.3)	(2.8)
Contract assets	(22.3)	—	—
Accounts payable	(91.0)	13.8	(1.3)
Accrued expenses	(2.9)	(14.8)	20.7
Income taxes prepaid and payable	(17.4)	45.6	65.1
Deferred revenue	16.2	(35.4)	17.1
Net cash provided by operating activities	<u>640.1</u>	<u>471.8</u>	<u>418.4</u>
Cash flow from investing activities:			
Additions to property and equipment	(33.6)	(35.5)	(27.9)
Proceeds from sale of property and equipment	9.7	—	—
Cash paid for business acquisitions, net of cash acquired	(7,066.7)	(17.4)	(457.5)
Additions to capitalized software	(55.5)	(10.4)	(9.6)
Investments in securities	(16.4)	—	(1.0)
Receipts from collections of loans made	7.0	—	—
Proceeds from sales / maturities of investments	52.9	—	—
Net cash used in investing activities	<u>(7,102.6)</u>	<u>(63.3)</u>	<u>(496.0)</u>
Cash flow from financing activities:			
Cash received from debt borrowings, net of original issue discount	8,744.0	45.0	120.0
Repayments of debt and acquired debt	(3,141.0)	(512.5)	(383.5)
Net increase in client funds obligations	604.8	—	—
Proceeds from exercise of stock options	84.9	60.2	39.2
Withholding taxes paid related to equity award net share settlement	(17.5)	(4.8)	(7.4)
Income tax benefit related to exercise of stock options	—	—	46.2
Fees paid for debt extinguishment and refinancing activities	(86.4)	(1.5)	(0.5)
Proceeds from common stock issuance, net	1,399.1	—	—
Dividends paid on common stock	(70.9)	(54.4)	(50.1)
Net cash provided by (used in) financing activities	<u>7,517.0</u>	<u>(468.0)</u>	<u>(236.1)</u>
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(5.9)	4.5	(3.6)
Net increase (decrease) in cash, cash equivalents and restricted cash	1,048.6	(55.0)	(317.3)
Cash, cash equivalents and restricted cash, beginning of period	64.7	119.7	437.0
Cash, cash equivalents and restricted cash and cash equivalents, end of period	<u>\$ 1,113.3</u>	<u>\$ 64.7</u>	<u>\$ 119.7</u>
Reconciliation of cash, cash equivalents and restricted cash and cash equivalents:			
Cash and cash equivalents	\$ 166.7	\$ 64.1	\$ 117.6
Restricted cash and cash equivalents	6.4	0.6	2.1

Funds receivable and funds held on behalf of clients	940.2	—	—
	<u>\$ 1,113.3</u>	<u>\$ 64.7</u>	<u>\$ 119.7</u>
Supplemental disclosure of cash paid for:			
Interest	\$ 249.8	\$ 102.7	\$ 126.7
Income taxes, net of refunds	\$ 143.4	\$ 67.6	\$ 8.8
Supplemental disclosure of non-cash investing activities:			
Property and equipment acquired through tenant improvement allowances	\$ 0.7	\$ 10.3	\$ 2.8

The accompanying notes are an integral part of these Consolidated Financial Statements.

SS&C TECHNOLOGIES HOLDINGS, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
FOR THE YEARS ENDED DECEMBER 31, 2018, 2017 AND 2016
(in millions, except per share data)

	Class A		Common Stock		Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive (Loss) Income	Treasury Stock	Total Stockholders' Equity
	Number of Issued Shares	Amount	Number of Issued Shares	Amount					
Balance, at December 31, 2015	2.7	\$ —	193.1	\$ 1.9	\$ 1,793.2	\$ 411.5	\$ (83.2)	\$ (18.0)	\$ 2,105.4
Net income	—	—	—	—	—	131.0	—	—	131.0
Foreign exchange translation adjustment	—	—	—	—	—	—	(55.9)	—	(55.9)
Stock-based compensation expense	—	—	—	—	50.2	—	—	—	50.2
Exercise of options, net of withholding taxes	—	—	6.1	0.1	31.7	—	—	—	31.8
Conversion of Class A common stock	(2.7)	—	5.4	0.1	—	—	—	—	0.1
Income tax benefit related to exercise of stock options	—	—	—	—	46.2	—	—	—	46.2
Cash dividends declared - \$0.25 per share (Note 10)	—	—	—	—	—	(50.1)	—	—	(50.1)
Balance, at December 31, 2016	—	\$ —	204.6	\$ 2.1	\$ 1,921.3	\$ 492.4	\$ (139.1)	\$ (18.0)	\$ 2,258.7
Net income	—	—	—	—	—	328.9	—	—	328.9
Foreign exchange translation adjustment	—	—	—	—	—	—	56.4	—	56.4
Stock-based compensation expense	—	—	—	—	41.4	—	—	—	41.4
Exercise of options, net of withholding taxes	—	—	3.5	—	55.4	—	—	—	55.4
Cash dividends declared - \$0.265 per share (Note 10)	—	—	—	—	—	(54.4)	—	—	(54.4)
Balance, at December 31, 2017	—	\$ —	208.1	\$ 2.1	\$ 2,018.1	\$ 766.9	\$ (82.7)	\$ (18.0)	\$ 2,686.4
Net income	—	—	—	—	—	103.2	—	—	103.2
Foreign exchange translation adjustment	—	—	—	—	—	—	(260.3)	—	(260.3)
Stock-based compensation expense	—	—	—	—	91.1	—	—	—	91.1
Exercise of options, net of withholding taxes	—	—	4.1	—	67.4	—	—	—	67.4
Non-cash purchase price consideration (Note 7)	—	—	—	—	48.1	—	—	—	48.1
Cumulative effect of accounting change (Note 11)	—	—	—	—	—	47.9	—	—	47.9
Issuance of common stock	—	—	40.2	0.4	1,866.7	—	—	—	1,867.1
Cash dividends declared - \$0.30 per share (Note 10)	—	—	—	—	—	(70.9)	—	—	(70.9)
Balance, at December 31, 2018	—	\$ —	252.4	\$ 2.5	\$ 4,091.4	\$ 847.1	\$ (343.0)	\$ (18.0)	\$ 4,580.0

The accompanying notes are an integral part of these Consolidated Financial Statements.

SS&C Technologies Holdings, Inc., or “Holdings”, is our top-level holding company. SS&C Technologies, Inc., or “SS&C,” is our primary operating company and a wholly-owned subsidiary of SS&C Technologies Holdings, Inc. “We,” “us,” “our,” and the “Company” means SS&C Technologies Holdings, Inc. and its consolidated subsidiaries, including SS&C.

Note 1—Organization

We provide software products and software-enabled services to the financial services and healthcare industries, primarily in North America. We also have operations in Europe, Asia, Australia, South America and Africa. Our portfolio of products and software-enabled services allows our financial services clients to automate and integrate front-office functions such as trading and modeling, middle-office functions such as portfolio management and reporting, and back-office functions such as accounting, performance measurement, reconciliation, reporting, processing and clearing. Our products and software-enabled services in the healthcare industry support claims adjudication benefit management, care management, and business intelligence services. We provide our products and related services in the following vertical markets within the financial services and healthcare industries:

1. Institutional asset and wealth management;
2. Alternative investment management;
3. Healthcare ;
4. Brokerage ;
5. Retirement ;
6. Financial advisory ; and
7. Financial institutions .

Note 2—Summary of Significant Accounting Policies

Use of Estimates

The preparation of the Consolidated Financial Statements in conformity with generally accepted accounting principles (“GAAP”) requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Estimates are used for, but not limited to, collectability of accounts receivable, valuation of non-marketable securities, costs to complete certain contracts, valuation of acquired assets and liabilities, valuation of stock options, income tax accruals and the value of deferred tax assets and liabilities. Estimates are also used to determine the remaining economic lives and carrying value of fixed assets, goodwill and intangible assets. Actual results could differ from those estimates.

Principles of Consolidation

The Consolidated Financial Statements include the accounts of us and our subsidiaries. All significant accounts, transactions and profits between the consolidated companies have been eliminated in consolidation. We consolidate any entity in which we have a controlling financial interest. Under the voting interest model, generally the investor that has voting control (usually more than 50% of an entity’s voting interests) consolidates the entity. Under the variable interest entity (“VIE”) model, the party that has the power to direct the entity’s most significant economic activities and the ability to participate in the entity’s economics consolidates the entity. An entity is considered a VIE if it possesses one of the following characteristics: 1) the entity is thinly capitalized; 2) residual equity holders do not control the entity; 3) equity holders are shielded from economic losses; 4) equity holders do not participate fully in an entity’s residual economics; and 5) the entity was established with non-substantive voting interests. Our investments in private equity funds meet the definition of a VIE; however, the private equity fund investments are not consolidated as we do not have the power to direct the entities’ most significant economic activities.

We are the lessee in a series of operating leases covering a large portion of our Kansas City, Missouri-based leased office facilities. The lessors are generally joint ventures (in which we have 50% ownership) that have been established specifically to purchase, finance and engage in leasing activities with the joint venture partners and unrelated third parties. Our analysis of our real estate joint ventures for all periods presented indicate that none qualified as a VIE and, accordingly, they have not been consolidated.

Unconsolidated investments in entities over which we do not have control but have the ability to exercise influence over operating and financial policies, if any, are accounted for under the equity method of accounting. Earnings and losses from such investments are recorded on a pre-tax basis, if any.

Revenue Recognition

We account for the recognition of our revenue in accordance with the relevant accounting literature, primarily Accounting Standards Update 2014-09, *Revenue from Contracts with Customers (ASC 606)*. Our sources of revenue are described below.

Software-enabled Services Revenue

We primarily offer software-enabled outsourcing services in which we utilize our own software to offer comprehensive fund administration services for alternative investment managers, including fund manager services, transfer agency services, funds-of-funds services, tax processing and accounting. We also use our own software applications to provide healthcare organizations a variety of medical and pharmacy benefit solutions to satisfy their information processing, quality of care, cost management concerns and payment integrity programs. Our healthcare solutions include claims adjudication, benefit management, care management, business intelligence and other ancillary services. We also offer subscription-based on-demand software applications that are managed and hosted at our facilities. The software-enabled services arrangements provide an alternative for clients who do not wish to install, run and maintain complicated financial software. Under these arrangements, the client does not have the right to take possession of the software, rather, we agree to provide access to our applications, remote use of our equipment to process transactions, access to client's data stored on our equipment, and connectivity between our environment and the client's computing systems.

Software-enabled services are generally provided under contracts with initial terms of one to five years that require monthly or quarterly payments, and are subject to automatic annual renewal at the end of the initial term unless terminated by either party.

In software-enabled services arrangements, the arrangement is a single performance obligation or a stand-ready performance obligation, which in either case is comprised of a series of distinct services that are substantially the same and have the same pattern of transfer to the customer (i.e. distinct days or months of service). We apply a measure of progress (typically time-based) to any fixed consideration and allocate variable consideration to the distinct periods of service based on usage or summarization of account information. These variable payments relate specifically to our efforts to perform the services in the period in which the fee applies. This variability is solely attributed to and resolved as a result of the transfer of these services; these fees are independent of the transfer of past or future goods or services. These fees meet the allocation objective of ASC 606 because they represent the amount of consideration we are entitled to for these services. Revenue is generally recognized over the period the services are provided, which results in revenue recognition that corresponds with the value to the client of the services transferred to date relative to the remaining services promised.

For our software-enabled services contracts which are cancelable with 90 days' notice or meet the allocation objective for series performance obligations under ASC 606, we have not disclosed the transaction price for the remaining performance obligations as of the end of each reporting period or when we expect to recognize this revenue.

License, Maintenance and Related Revenue Agreements

We generate revenues in the form of software license fees and related maintenance and services fees. License fees include perpetual license fees and term license fees that differ mainly in the duration over which the customer benefits from the software. Maintenance and services primarily consist of fees for maintenance services (including support and unspecified upgrades and enhancements when and if they are available) and, in some cases, professional services which focus on both deployment and training our customers to fully leverage the use of our products.

Under ASC 606, we identify a contract with a customer, we identify the performance obligations in the contract, we determine the transaction price, we allocate the transaction price to each performance obligation in the contract and recognize revenues when (or as) we satisfy a performance obligation.

Software license performance obligations are functional intellectual property that are distinct as the user can benefit from the software on its own as defined under ASC 606. Software license revenues are recognized at the point of time when the software license has been delivered. Term license fees are typically due in annual installments at the beginning of each annual period and we record a contract asset for amounts recognized as revenue in excess of amounts billed.

We recognize revenues from maintenance ratably over the term of the underlying maintenance contract term because we transfer control evenly by providing a stand-ready service. The term of the maintenance contract is usually one year. Renewals of maintenance contracts create new performance obligations that are satisfied over the term with the revenues recognized ratably over the term.

Revenues from professional services consist mostly of services provided on a time and materials basis. The performance obligations are satisfied, and revenues are recognized, over time as the services are provided.

In contracts with multiple performance obligations, we account for individual performance obligations separately if they are distinct. We allocate the transaction price to each performance obligation based on our relative standalone selling price out of total consideration of the contract. Standalone selling price is determined utilizing observable prices to the extent available. If the standalone selling price for a performance obligation is not directly observable, we estimate it maximizing the use of observable inputs. For maintenance and support, we determine the standalone selling price based on the price at which we separately sell a renewal contract and the economic relationship between licenses and maintenance. We primarily determine the standalone selling price for sales of licenses using the residual approach. For professional services, we determine the standalone selling prices based on the price at which we separately sell those services.

We occasionally enter into license agreements requiring significant customization of our software that are not material to our results of operations. We account for the license and professional service fees under these agreements as a single performance obligation, recognized over time using an input method during the development of the license. This method requires estimates to be made for costs to complete the agreement utilizing an estimate of development man-hours remaining. Revenue is recognized each period based on the hours incurred to date compared to the total hours expected to complete the project. Due to uncertainties inherent in the estimation process, it is at least reasonably possible that completion costs will be revised. Such revisions are recognized in the period in which the revisions are determined. Provisions for estimated losses on uncompleted contracts are determined on a contract-by-contract basis, and are made in the period in which such losses are first estimated or determined.

We do not account for significant financing components if the period between when we transfer the promised product or service to the client and when the client pays for that product or service will be one year or less. We record revenue net of any taxes assessed by governmental authorities.

Accounts Receivable, net is primarily comprised of billed and unbilled receivables for which we have an unconditional right to consideration, net of an allowance for doubtful accounts.

Pre-adoption of ASC 606

We adopted ASC 606 using the modified retrospective method and as such, comparative results for the years ended December 31, 2017 and 2016 were not retrospectively adjusted. For the years ended December 31, 2017 and 2016, we recognized revenue under ASC 605 and ASC 985. Specifically, the software-enabled services revenues were recognized on a monthly basis as the services were provided, when persuasive evidence of an arrangement existed, the price was fixed or determinable and collectability was reasonably assured. Maintenance revenues were recognized ratably over the term of the maintenance agreement. Term license arrangements, many of which included bundled maintenance services, did not have vendor-specific objective evidence for the maintenance element and therefore the total term license fee was recognized ratably over the contractual term of the arrangement. We also recognized perpetual license revenues generally upon delivery of each of the related products and receipt of a signed contract, provided that collection was probable and all other revenue recognition criteria was met. Professional services revenues were generally recognized over the period during which the services were performed.

Costs of Revenues

Costs of revenues include all costs, including depreciation and amortization, incurred to produce revenues. Incremental costs of obtaining a contract (e.g., sales commissions) are capitalized and amortized on a basis consistent with the pattern of transfer of goods or services to the customer to which the asset relates over the expected customer relationship period if we expect to recover those costs. Prior to the adoption of ASC 606, we previously expensed these costs over the length of the initial contract excluding any renewals. The expected customer relationship period is determined based on average historical customer relationship periods, including expected renewals. Expected renewal periods are only included in the expected customer relationship period if commission amounts paid upon renewal are not commensurate with amounts paid on the initial contract. Incremental costs of obtaining a contract include only those costs we incur to obtain a contract that we would not have incurred if the contract had not been obtained. We have determined that certain commissions programs meet the requirements to be capitalized. Certain sales commissions associated with multi-year contracts are subject to an employee service requirement. As an action other than each party approving the contract is required to trigger payment of these sales commissions, they are not considered incremental costs to obtain a contract and are expensed as incurred. These costs are included in selling and marketing and general and administrative expenses. We expense sales commissions as incurred when the amortization period would have been one year or less.

Research and Development

Research and development costs associated with computer software are charged to expense as incurred. Capitalization of internally developed computer software costs in the case of software to be sold begins upon the establishment of technological feasibility based on a working model. Capitalization of internally developed computer software costs in the case of internal use software begins when management authorizes and commits funding to a project and the preliminary design stage has been completed.

Our policy is to amortize these costs upon a product's general release to the client. Amortization of capitalized software costs is calculated by the greater of (a) the ratio that current gross revenues for a product bear to the total of current and anticipated future gross revenues for that product or (b) the straight-line method over the remaining estimated economic life of the product, including the period being reported on, typically two to five years. It is reasonably possible that those estimates of anticipated future gross revenues, the remaining estimated economic life of the product, or both could be reduced significantly due to competitive pressures.

Stock-based Compensation

Using the fair value recognition provisions of relevant accounting literature, stock-based compensation cost is measured at the grant date based on the estimated fair value of the award and is recognized as expense over the appropriate service period. Determining the fair value of stock-based awards requires considerable judgment, including estimating the expected term of stock options and the expected volatility of our stock price. Differences between actual results and these estimates could have a material effect on our financial results. Forfeitures are accounted for as they occur. A deferred income tax asset is recorded over the vesting period as stock compensation expense is recorded for non-qualified option awards. The realizability of the deferred tax asset is ultimately based on the actual value of the stock-based award upon exercise. If the actual value is lower than the fair value determined on the date of grant, then there would be an income tax expense for the portion of the deferred tax asset that is not realizable.

Transaction Expenses

Transaction expenses are those costs that are directly related to our acquisition of DST Systems, Inc. ("DST"), as described in Note 7, "Acquisitions." Transaction expenses consist primarily of certain costs associated with the amendment and restatement of our Credit Agreement, as described in Note 9, "Debt", investment banker advisory fees, legal fees and other fees.

Income Taxes

We account for income taxes in accordance with the relevant accounting literature. An asset and liability approach is used to recognize deferred tax assets and liabilities for the future tax consequences of items that are recognized in our financial statements and tax returns in different years. A valuation allowance is established against net deferred tax assets if, based on the weight of available evidence, it is more likely than not that some or all of the net deferred tax assets will not be realized.

We account for uncertain tax positions using a two-step approach. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates it is more likely than not that the position will be sustained on audit, including resolution of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount which is more than 50% likely of being realized upon ultimate settlement. We consider many factors when evaluating and estimating its tax positions and tax benefits, which may require periodic adjustments and which may not accurately forecast actual outcomes.

The Tax Act added a new minimum tax on global intangible low-taxed income ("GILTI"), for which we have elected to factor such amounts into our measurement of deferred taxes under U.S. GAAP. We recorded a deferred tax liability related to GILTI of \$27.4 million and \$6.7 million at December 31, 2018 and December 31, 2017, respectively. On December 22, 2017, the SEC staff issued Staff Accounting Bulletin No. 118, *Income Tax Accounting Implications of the Tax Cuts and Jobs Act* ("SAB 118"), which allowed us to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. During the fourth quarter of 2018, we completed our accounting on the impact of the Tax Act. We did not record any material adjustments as part of the completion of our accounting of the Tax Act. We will continue to monitor future guidance, regulations and legislation regarding the Tax Act at both the federal and state level, and account for any changes accordingly. See Note 15, "Income Taxes" for additional information.

Cash and Cash Equivalents

We consider all highly liquid marketable securities with original maturities of three months or less at the date of acquisition to be cash equivalents.

Funds receivable and funds held on behalf of clients

We hold client funds on behalf of transfer agency clients and pharmacy processing clients in connection with providing our data processing services. End-of-day available client bank balances for full service mutual fund transfer agency clients are invested overnight in credit quality money market funds. Invested balances are returned to the full service mutual fund transfer agency client's accounts the following business day. Funds received from clients for the payment of pharmacy claims incurred by its members are invested in credit quality money market funds and certificates of deposit until the claims are paid. Client funding receivables represent amounts due to us for pharmacy claims paid in advance of receiving client funding and for pharmacy claims processed for which client funding requests have not been made.

Funds held on behalf of clients in the form of cash, cash equivalents and certificates of deposit with a maturity of less than twelve months are included in Funds receivable and funds held on behalf of clients in the Consolidated Balance Sheet. Funds held on behalf of clients in the form of certificates of deposit with a maturity of greater than twelve months are classified as Investments in the Consolidated Balance Sheet. All funds held on behalf of clients represent assets that are restricted for use.

We have included funds held on behalf of clients that meet the definition of restricted cash and restricted cash equivalents in the beginning and end of period balances in the Consolidated Statements of Cash Flows. Cash inflows and outflows related to investment of funds held on behalf of clients are reported on a gross basis as "Investments in securities" and "Proceeds from sales / maturities of investments" in the investing section of the Consolidated Statements of Cash Flows.

Client funds obligations

Client funds obligations represent funds owed to full service mutual fund transfer agency clients for cash balances invested overnight, and our contractual obligations to satisfy client pharmacy claim obligations that are recorded on the balance sheet when incurred, generally after we have processed a claim on behalf of its pharmacy clients.

Restricted Cash

Restricted cash primarily includes monies held by a bank as security for letters of credit issued due to lease requirements for office space. The letters of credit are expected to be renewed within the next twelve months, and as such, the restricted cash is classified as a current asset on the Consolidated Balance Sheets.

Investments and unconsolidated affiliates

We hold various investments, including investments in marketable securities, non-marketable securities, and partnership interests in private equity funds, joint ventures and other similar entities.

The equity method of accounting is used for investments in entities, partnerships and similar interests (including investments in private equity funds where we are a limited partner and hold a greater than 5% partnership interest in the fund) in which we have significant influence but do not control. Under the equity method, we recognize income or losses from our pro-rata share of these unconsolidated affiliates' net income or loss, which changes the carrying value of the investment of the unconsolidated affiliate.

We measure equity investments in marketable securities, seed capital investments and other investments, other than those accounted for under the equity method of accounting or those that result in consolidation of the investee, at fair value, with changes in the fair value recognized in earnings. We use net asset value as a practical expedient for the fair value of partnership interests in private equity funds that are not accounted for under the equity method of accounting.

Investments in non-marketable equity securities that do not have readily determinable fair values and do not qualify for the practical expedient to measure the investment using a net asset value per share are recorded using the measurement alternative in ASU 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities*. These investments are recorded at cost, less impairment, adjusted for observable price changes in orderly transactions for an identical or similar investment of the same issuer. At each reporting period, we assess if these investments continue to qualify for this measurement alternative. Impairment is recorded when there is evidence that the expected fair value of the investment has declined to below the recorded cost.

We have certain investments in unconsolidated affiliates accounted for under the equity method of accounting in which our carrying value exceeds the proportionate share of net assets of the unconsolidated affiliate. The total investment in unconsolidated affiliates, including basis differences, is included in Unconsolidated affiliates on the Consolidated Balance Sheet. We record our proportionate share of the results of the unconsolidated affiliates and amortization expense related to basis differences in Equity in earnings of unconsolidated affiliates, net on the Consolidated Statement of Comprehensive (Loss) Income.

Property, Plant and Equipment

Property, plant and equipment are stated at cost. Depreciation of property, plant and equipment is calculated using a combination of straight-line and accelerated methods over the estimated useful lives of the assets as follows:

Description	Useful Life
Land	—
Buildings and improvements	40 years
Equipment and software	3-5 years
Furniture and fixtures	7-10 years
Leasehold improvements	Shorter of lease term or estimated useful life

Maintenance and repairs are expensed as incurred. The costs of sold or retired assets are removed from the related asset and accumulated depreciation accounts and any gain or loss is included in the Consolidated Statements of Comprehensive (Loss) Income.

Goodwill and Intangible Assets

We test goodwill annually for impairment as of December 31st (and in interim periods if certain events occur or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying amount). We have completed the required impairment tests for goodwill and have determined that no impairment existed as of December 31, 2018 or 2017. During the year ended December 31, 2018, our reporting unit structure changed as a result of acquisitions which we completed during the year. As of December 31, 2018, we had two reporting units, one which includes the DST business, and one which includes the rest of our operations. Our impairment analysis indicated that the fair value significantly exceeded the carrying value of each of our reporting units at December 31, 2018. There were no other indefinite-lived intangible assets as of December 31, 2018 or 2017.

Customer relationships, completed technology, trade names and other identifiable intangible assets are amortized over lives ranging from two to 17 years based on the ratio that cash flows for the intangible asset bear to the total of expected future cash flows for the intangible asset.

Impairment of Long-Lived Assets

We evaluate the recoverability of our long-lived assets when there is evidence that events or changes in circumstances have made recovery of the carrying value of the asset or asset group unlikely. An impairment loss would be recognized when the sum of the expected future undiscounted net cash flows is less than the carrying amount of the asset or asset group. We have identified no such impairment losses in the years ended December 31, 2018 and 2017.

Concentration of Credit Risk

Financial instruments, which potentially subject us to concentrations of credit risk, consist principally of cash, cash equivalents, marketable securities, and trade receivables. We have cash investment policies that limit investments to investment grade securities. Concentrations of credit risk, with respect to trade receivables, are limited due to the fact that our client base is highly diversified. As of December 31, 2018 and 2017, we had no significant concentrations of credit.

International Operations and Foreign Currency

The functional currency of each foreign subsidiary is generally the local currency. Accordingly, assets and liabilities of foreign subsidiaries are translated to U.S. dollars at period-end exchange rates, and capital stock accounts are translated at historical rates. Revenues and expenses are translated using the average rates during the period. The resulting translation adjustments are excluded from net earnings and accumulated as a separate component of stockholders' equity. Foreign currency transaction gains and losses are included within other income (expense) in the Consolidated Statements of Comprehensive (Loss) Income in the periods in which they occur.

Comprehensive (Loss) Income

Our comprehensive (loss) income consists of net income and foreign currency translation adjustments, which are presented in the Consolidated Statement of Comprehensive (Loss) Income, net of tax and reclassifications to earnings. The accumulated balance of other comprehensive (loss) income is reported separately from retained earnings and additional paid-in capital in the equity section of the Consolidated Balance Sheets. Total comprehensive (loss) income consists of net income and other accumulated comprehensive (loss) income disclosed in the equity section of the Consolidated Balance Sheets.

Treasury Stock

Treasury stock purchases are accounted for under the cost method and are included as a deduction from equity in the Stockholders' Equity section of the Consolidated Balance Sheets. Under the cost method, the price paid for the stock is charged to the treasury stock account.

Contingencies

Loss contingencies from legal proceedings and claims may occur from government investigations, shareholder lawsuits, contractual claims, tax and other matters. Accruals are recognized when it is probable that a liability will be incurred and the amount of loss can be reasonably estimated. Gain contingencies (including contingent proceeds related to business divestitures) are not recognized until realized. Legal fees are expensed as incurred.

Recently Adopted Accounting Pronouncements

In August 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2016-15, *Classification of Certain Cash Receipts and Cash Payments*. ASU 2016-15 addresses how certain cash receipts and cash payments are presented and classified in the statement of cash flows under ASC Topic 230, Statement of Cash Flow, and other Topics. ASU 2016-15 was effective for us in the first quarter of fiscal 2018 and the guidance required application using a retrospective method. The impact of our adoption of ASU 2016-15 to our Consolidated Financial Statements was to reflect the presentation of debt prepayment or debt extinguishment costs as cash outflows from financing activities within our Consolidated Statement of Cash Flows. We adopted ASU 2016-15 as of January 1, 2018, which resulted in presenting fees paid for debt extinguishment as a financing activity within the Consolidated Statement of Cash Flows for all periods shown.

In January 2016, the FASB issued ASU 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities*. ASU 2016-01 requires equity investments, except those accounted for under the equity method of accounting, that have readily determinable fair values to be measured at fair value with any changes in fair value recognized in net income. Equity securities that do not have readily determinable fair values may be measured at estimated fair value or cost less impairment, if any, adjusted for subsequent observable price changes, with changes in the carrying value recognized in net income. A qualitative assessment for impairment is required for equity investments without readily determinable fair values. The updated guidance also eliminates the requirement to disclose the method and significant assumptions used to estimate the fair value of financial instruments measured at amortized cost on the balance sheet. We adopted ASU 2016-01 as of January 1, 2018, which did not have a material impact on our financial position, results of operations or cash flows.

In May 2014, the FASB issued ASU 2014-09, *Revenue from Contracts with Customers (ASC 606)*. ASC 606 supersedes the revenue recognition requirements in ASC 605 and 985 and requires entities to recognize revenue when control of the promised goods or services is transferred to customers at an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. We adopted ASC 606 as of January 1, 2018 using the modified retrospective transition method. See Note 11, "Revenue" for further details.

Recent Accounting Pronouncements Not Yet Effective

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)*. ASU 2016-02 requires lessees to recognize the following for all leases (with the exception of short-term leases) at the commencement date: (i) a lease liability, which is a lessee's obligation to make lease payments arising from a lease, measured on a discounted basis; and (ii) a right-of-use asset, which is an asset that represents the lessee's right to use, or control the use of, a specified asset for the lease term. Lessor accounting is largely unchanged under the amendments of ASU 2016-02. Additional disclosures will be required to allow the user to assess the amount, timing and uncertainty of cash flows arising from leasing activities. In July 2018, the FASB issued ASU 2018-11, *Leases (Topic 842): Targeted Improvements*, which provides another transition method no longer requiring application to previously reported periods. We plan to adopt ASU 2018-11 by applying the new standard on January 1, 2019 and recognizing a cumulative adjustment to the opening balance of retained earnings. A modified retrospective transition approach is required for leases existing at the time of adoption. ASU 2016-02 and ASU 2018-11 are effective for us for our first quarter of fiscal 2019. The impact of our adoption of ASU 2016-02 to our Consolidated Financial Statements will be to recognize the majority of our operating lease commitments as operating lease liabilities and right-of-use assets upon adoption, which will result in an increase in the assets and liabilities recorded on our Consolidated Balance Sheet, but will not have a material impact on our Consolidated Statement of Comprehensive (Loss) Income.

The new standard provides for a number of optional practical expedients in transition. We will elect the practical expedients, which permit us to not reassess prior conclusions about lease identification, lease classification and initial direct costs under the new standard. We do not expect to elect the "use-of hindsight" practical expedient to determine the lease term or in assessing the

likelihood that a lease purchase option will be exercised. The new standard also provides practical expedients for an entity's ongoing accounting. We currently expect to elect the short-term lease recognition exemption for all leases that qualify. This means, for those leases that qualify, we will not recognize right-of-use assets or lease liabilities, and this includes not recognizing right-of-use assets or lease liabilities for existing short-term leases in transition. We also currently expect to elect the practical expedient to not separate lease and non-lease components for all leases. We are continuing to assess the impact of the ASU on our Consolidated Financial Statements, required disclosures, and changes to internal controls. Upon adoption, we expect to recognize additional right-of-use assets of approximately \$400 million, with corresponding lease liabilities of the same amount based on the present value of the remaining minimum rental payments determined under current leasing standards for existing operating leases.

In June 2016, the FASB issued ASU 2016-13, *Measurement of Credit Losses on Financial Instruments*. ASU 2016-13 requires companies to measure credit losses utilizing a methodology that reflects expected credit losses and requires a consideration of a broader range of reasonable and supportable information to inform credit loss estimates. ASU 2016-13 is effective for us for our first quarter of fiscal 2020 and earlier adoption is permitted beginning in the first quarter of fiscal 2019. Application of the ASU is through a cumulative-effect adjustment to retained earnings as of the effective date. We are currently evaluating the impact of the pending adoption of ASU 2016-13 on our Consolidated Financial Statements. This ASU is not expected to have a material impact on our financial position, results of operations or cash flows.

Note 3—Accounts Receivable, net

Accounts receivable are as follows (in millions):

	December 31,	
	2018	2017
Accounts receivable	\$ 516.4	\$ 179.0
Unbilled accounts receivable	174.7	71.6
Allowance for doubtful accounts	(9.4)	(6.7)
Total accounts receivable, net	<u>\$ 681.7</u>	<u>\$ 243.9</u>

The following table represents the activity for the allowance for doubtful accounts (in millions):

	Year Ended December 31,		
	2018	2017	2016
Balance at beginning of period	\$ 6.7	\$ 5.9	\$ 3.0
Charge to costs and expenses	4.0	2.4	3.5
Write-offs, net of recoveries	(1.3)	(1.8)	(0.4)
Other adjustments	0.0	0.2	(0.2)
Balance at end of period	<u>\$ 9.4</u>	<u>\$ 6.7</u>	<u>\$ 5.9</u>

Management establishes the allowance for doubtful accounts based on historical bad debt experience. In addition, management analyzes client accounts, client concentrations, client creditworthiness, current economic trends and changes in the client's payment terms when evaluating the adequacy of the allowance for doubtful accounts.

Note 4—Property, plant and equipment, net

Property, plant and equipment and the related accumulated depreciation are as follows (in millions):

	December 31,	
	2018	2017
Land	\$ 54.8	\$ 2.7
Building and improvements	309.5	59.9
Equipment, furniture, and fixtures	384.7	138.8
	749.0	201.4
Less: accumulated depreciation and amortization	(195.8)	(100.4)
Total property, plant and equipment, net	<u>\$ 553.2</u>	<u>\$ 101.0</u>

Depreciation expense for the years ended December 31, 2018, 2017 and 2016 was \$ 100.1 million, \$25.9 million and \$ 23.7 million, respectively.

Note 5—Investments

Investments are as follows (in millions):

	<u>December 31, 2018</u>
Partnership interests in private equity funds	\$ 102.1
Marketable equity securities	32.6
Non-marketable equity securities	45.0
Seed capital investments	10.3
Other investments	0.5
Total investments	<u>\$ 190.5</u>

We had \$190.5 million of investments as of December 31, 2018 as compared to no investments as of December 31, 2017. The increase in investments was the result of acquiring the net assets of DST in the second quarter of 2018.

Realized and unrealized gains and losses for our equity securities are as follows (in millions):

	<u>Year Ended December 31,</u>
	<u>2018</u>
Unrealized losses on equity securities held as of the end of the period	\$ (4.5)
Realized gains for equity securities sold during the period	0.9
Total losses recognized in other income, net	<u>\$ (3.6)</u>

Fair Value Measurement

Authoritative accounting guidance on fair value measurements establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value. These tiers include: Level 1, defined as observable inputs such as quoted prices in active markets; Level 2, defined as inputs other than quoted prices in active markets that are either directly or indirectly observable; and Level 3, defined as unobservable inputs for which little or no market data exists, therefore requiring an entity to develop its own assumptions.

As of December 31, 2018, we held certain investment assets and certain liabilities that are required to be measured at fair value on a recurring basis. These investments include money market funds, marketable equity securities and seed capital investments each of which determines fair value using quoted prices in active markets. Accordingly, the fair value measurements of these investments have been classified as Level 1 in the tables below. Investments for which we elected net asset value as a practical expedient for fair value and investments measured using the fair value measurement alternative are excluded from the table below. Fair value for deferred compensation liabilities that are credited with deemed gains or losses of the underlying hypothetical investments, primarily equity securities, have been classified as Level 1 in the tables below. We have foreign currency derivative instruments that are required to be reported at fair value. Fair value for the derivative instruments was determined using inputs from quoted prices for similar assets and liabilities in active markets that are directly or indirectly observable. Accordingly, the derivative instruments have been classified as Level 2 in the tables below.

The following table present assets and liabilities measured at fair value on a recurring basis (in millions):

	December 31, 2018	Fair Value Measurements at Reporting Date Using		
		Quoted prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Money market funds (1)	\$ 558.0	\$ 558.0	\$ —	\$ —
Marketable equity securities (2)	32.6	32.6	—	—
Seed capital investments (2)	10.3	10.3	—	—
Deferred compensation liabilities (3)	(23.3)	(23.3)	—	—
Derivative instruments (4)	(0.3)	—	(0.3)	—
Total	\$ 577.3	\$ 577.6	\$ (0.3)	\$ —

(1) Included in Cash and cash equivalents and Funds receivable and funds held on behalf of clients on the Consolidated Balance Sheet.

(2) Included in Investments on the Consolidated Balance Sheet.

(3) Included in Other long-term liabilities on the Consolidated Balance Sheet.

(4) Included in Other accrued expenses on the Consolidated Balance Sheet.

We have not become aware of any information indicative of fair value impairments or adjustments to the carrying value of our non-marketable equity securities for the year ended December 31, 2018.

We have partnership interests in various private equity funds that are not included in the table above. Our investments in private equity funds were \$102.1 million at December 31, 2018, of which \$95.2 million were measured using net asset value as a practical expedient for fair value and \$6.9 million were accounted for under the equity method of accounting. The investments in private equity funds represent underlying investments in domestic and international markets across various industry sectors. At December 31, 2018, one of our investments in private equity funds, representing 77% of the total value of the private equity fund investments, was primarily invested in the energy sector and real estate. We have no management rights associated with our partnership interests in this fund and withdrawals from this fund are subject to general partner consent. This fund has a termination date in 2019 with an optional two-year extension at the discretion of the general partner. We expect to receive distributions from this fund upon liquidation of the underlying investments over the next several years, however the exact timing of the distributions is unknown. We have no unfunded commitments related to this fund. Future capital commitments related to our other private equity fund investments were approximately \$1.9 million as of December 31, 2018.

Generally, our investments in private equity funds are non-transferable or are subject to long holding periods, and withdrawals from the private equity firm partnerships are typically not permitted. Even when transfer restrictions do not apply, there is generally no public market for the securities. Therefore, we may not be able to sell the securities at a time when we desire to do so. We may not always be able to sell those investments at the same or higher prices than we paid for them. As of December 31, 2018, we did not have plans to sell any of these investments. The maximum risk of loss related to our private equity fund investments is limited to the carrying value of our investments in the entities plus any future capital commitments, which include future commitments that we believe are unlikely to be called by the general partner.

Note 6—Unconsolidated affiliates

Investments in unconsolidated affiliates are as follows (in millions):

	Ownership Percentage	Carrying Value December 31, 2018	Excess carrying value of investment over proportionate share of net assets December 31, 2018
International Financial Data Services L.P.	50%	\$ 93.1	\$ 48.3
Pershing Road Development Company, LLC	50%	79.1	77.7
Broadway Square Partners, LLP	50%	53.0	33.1
Other unconsolidated affiliates		14.1	—
Total		\$ 239.3	\$ 159.1

Investments in unconsolidated affiliates are accounted for under the equity method of accounting. The total investment in unconsolidated affiliates, including basis differences, is included in Unconsolidated affiliates on the Consolidated Balance Sheet. We record our proportionate share of the results of the unconsolidated affiliates and amortization expense related to basis differences in Equity in earnings of unconsolidated affiliates, net on the Consolidated Statement of Comprehensive (Loss) Income.

Equity in earnings of unconsolidated affiliates are as follows (in millions):

	Year Ended December 31,	
	2018	
International Financial Data Services L.P.	\$	2.9
Pershing Road Development Company, LLC		0.2
Broadway Square Partners, LLP		(1.5)
Other unconsolidated affiliates		0.5
Total	\$	<u>2.1</u>

International Financial Data Services L.P. (“IFDS L.P.”) is a 50% owned joint venture with State Street Corporation with operations in Canada, Ireland and Luxembourg. Pershing Road Development Company, LLC (“PRDC LLC”) is a 50% owned special-purpose entity formed to develop and lease office space to the U.S. government. Broadway Square Partners, LLP (“Broadway Square Partners”) is a 50% owned real estate joint venture. The difference between the amount at which each of IFDS L.P., PRDC LLC and Broadway Square Partners, is carried, and the amount of underlying equity in net assets, will be amortized as a component of equity in earnings of unconsolidated affiliates over approximately 15 years, 28 years and 40 years, respectively.

The following tables summarize related party transactions and balances outstanding with our related parties, which is entirely comprised of transactions with our unconsolidated affiliates (in millions):

	Year Ended December 31,	
	2018	
Operating revenues from related parties	\$	5.6
Amounts paid to related parties (1)		14.4
Distributions received from related parties		11.8

	December 31,	
	2018	
Outstanding advances/loans to related parties	\$	6.1
Trade accounts receivable from related parties		1.2
Total amounts receivable from related parties	\$	<u>7.3</u>

Amounts payable to related parties	\$	—
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(1) Excludes amounts paid to our unconsolidated joint ventures related to loans, advancements and other capital investments.

Operating revenues from related parties were primarily generated from services provided for the use of our proprietary software and software development services. Payments to our related parties primarily included payments for rent and other facility and maintenance costs pursuant to the properties we lease from our unconsolidated real estate joint ventures. Distributions received include \$4.2 million return on investment and \$7.8 million return of investment, primarily related to our investments in IFDS L.P., Broadway Square Partners and PRDC LLC.

Note 7—Acquisitions

2018 Acquisitions

Intralinks Holdings Inc.

On November 16, 2018, we purchased all of the outstanding stock of Intralinks Holdings, Inc. (“Intralinks”) for approximately \$1.0 billion in cash, which was funded with incremental term loan debt and 9.9 million shares of our common stock, plus the costs of effecting the transaction and the assumption of certain liabilities. Intralinks provides financial technology for the global banking, deal

making and capital markets communities. Intralinks enables and secures the flow of information through its virtual data room offerings, facilitating strategic initiatives such as mergers and acquisitions, capital raising and investor reporting.

The net assets and results of operations of Intralinks have been included in our Consolidated Financial Statements from November 16, 2018. The fair value of the intangible assets, consisting of customer relationships, completed technologies and trade names, was determined using the income approach. Specifically, the relief from-royalty method was utilized for the completed technology and trade name and the excess earnings method was utilized for the customer relationships. The completed technology and customer relationships are amortized each year based on the ratio that the projected cash flows for the intangible assets bear to the total of current and expected future cash flows for the intangible assets. The tradename is amortized on a straight-line basis. The completed technology is amortized over approximately seven years, customer relationships are amortized over approximately twelve years, the trade name is amortized over approximately thirteen years, in each case the estimated lives of the assets. The fair value of deferred revenue was determined using the market approach. The remainder of the purchase price was allocated to goodwill and is not tax deductible.

There are \$36.3 million in revenues from Intralinks' operations included in the Consolidated Statement of Comprehensive (Loss) Income for the year ended December 31, 2018.

Eze Software

On October 1, 2018, we purchased all of the outstanding stock of Eze Software ("Eze") for approximately \$1.45 billion in cash, plus the costs of effecting the transaction and the assumption of certain liabilities. We funded the acquisition with a combination of cash and \$875.0 million in incremental term loan debt. Eze provides investment management solutions designed to optimize operational and investment alpha running throughout the entire investment process.

The net assets and results of operations of Eze have been included in our Consolidated Financial Statements from October 1, 2018. The fair value of the intangible assets, consisting of customer relationships, completed technologies, and trade names, was determined using the income approach. Specifically, the relief from-royalty method was utilized for the completed technology and trade name and the excess earnings method was utilized for the customer relationships. The intangible assets are amortized each year based on the ratio that the projected cash flows for the intangible assets bear to the total of current and expected future cash flows for the intangible assets. The completed technology is amortized over approximately seven years, customer relationships are amortized over approximately sixteen years, the trade name is amortized over approximately ten years, in each case the estimated lives of the assets. The remainder of the purchase price was allocated to goodwill and a portion is tax deductible.

There are \$69.9 million in revenues from Eze's operations included in the Consolidated Statement of Comprehensive (Loss) Income for the year ended December 31, 2018.

CACEIS North America

On June 1, 2018, we purchased all of the outstanding stock of CACEIS North America ("CACEIS") for approximately \$20.0 million in cash, plus the costs of effecting the transaction and the assumption of certain liabilities. CACEIS provides fund administration services and support for complex investment strategies.

The net assets and results of operations of CACEIS have been included in our Consolidated Financial Statements from June 1, 2018. The fair value of the intangible assets, consisting of customer relationships, was determined using the income approach, specifically, the excess earnings method. The customer relationships are amortized each year based on the ratio that the projected cash flows for the intangible assets bear to the total of current and expected future cash flows for the intangible assets. The customer relationships are amortized over approximately sixteen years, which is the estimated life of the asset. The remainder of the purchase price was allocated to goodwill and is not tax deductible.

There are \$6.4 million in revenues from CACEIS's operations included in the Consolidated Statement of Comprehensive (Loss) Income for the year ended December 31, 2018.

DST Systems Inc.

On April 16, 2018, we purchased all of the outstanding stock of DST Systems, Inc. ("DST") for approximately \$5.1 billion in cash, plus the costs of effecting the transaction. In connection with this acquisition, we entered into the Credit Agreement pursuant to

which our subsidiaries SS&C and SS&C SARL borrowed an aggregate of approximately \$7.4 billion (approximately \$524.5 million of which was rolled over from our existing credit facility). DST is a global provider of specialized technology, strategic advisory and business operations outsourcing to the financial services and healthcare industries.

The net assets and results of operations of DST have been included in our Consolidated Financial Statements from April 16, 2018. The fair value of the intangible assets, consisting of customer relationships, completed technologies, trade names and a non-compete agreement, was determined using the income approach. Specifically, the relief-from-royalty method was utilized for the completed technology and trade name, the excess earnings method was utilized for the customer relationships and the lost profits method was utilized for the non-compete agreements. The intangible assets are amortized each year based on the ratio that the projected cash flows for the intangible assets bear to the total of current and expected future cash flows for the intangible assets. The completed technology is amortized over approximately twelve years, customer relationships are amortized over approximately fourteen years, the trade name is amortized over approximately twelve years and the non-compete agreement is amortized over approximately two years, in each case the estimated lives of the assets. The fair value of the fixed assets was determined using a combination of income, market and cost approaches, dependent on the type of fixed asset that was valued. The fair value of investments was determined based on the nature of the underlying investment. The fair value of investments in marketable equity securities and seed capital investments were determined using quoted prices in active markets for identical assets. The fair value of investment in partnership interests in private equity funds was primarily determined using the net asset value of the fund. The fair value of investments in non-marketable equity securities was determined based on recent observable transactions of similar equity securities of the investee. The fair value of the investments in unconsolidated affiliates was determined using a combination of income and market approaches. The remainder of the purchase price was allocated to goodwill and is not tax deductible.

There are \$1.6 billion in revenues and \$82.4 million of net income from DST's operations included in the Consolidated Statement of Comprehensive (Loss) Income for the year ended December 31, 2018.

2017 Acquisitions

CommonWealth Fund Services Ltd.

On October 13, 2017, we purchased all of the outstanding stock of CommonWealth Fund Services Ltd. ("CommonWealth") for approximately \$16.4 million, plus the costs of effecting the transaction and the assumption of certain liabilities. CommonWealth provides a full range of administration services to hedge funds, private equity funds, real estate funds, fund of funds, family offices and other institutions.

The net assets and results of operations of CommonWealth have been included in our Consolidated Financial Statements from October 13, 2017. The fair value of the intangible assets, consisting of customer relationships and trade names, was determined using the income approach. Specifically, the excess earnings method was utilized for the customer relationships and the relief-from-royalty method was utilized for the trade name. The intangible assets are amortized each year based on the ratio that the projected cash flows for the intangible assets bear to the total of current and expected future cash flows for the intangible assets. The customer relationships are being amortized over approximately fifteen years and the trade name is being amortized over approximately two years, in each case the estimated lives of the assets. The remainder of the purchase price was allocated to goodwill and is not tax deductible.

The following summarizes the preliminary allocation of the purchase price for the 2018 acquisitions of Intralinks, Eze, CACEIS and DST. The assets and liabilities pending finalization include the valuation of acquired tangible and intangible assets and the evaluation of taxes. The following also summarizes the final allocation of the purchase price for the 2017 acquisition of CommonWealth (in millions):

	<u>Intralinks</u>	<u>Eze</u>	<u>CACEIS</u>	<u>DST</u>	<u>CommonWealth</u>
Accounts receivable	\$ 58.3	\$ 45.0	\$ 1.5	\$ 406.8	\$ 0.8
Fixed assets	8.0	15.9	0.4	507.4	0.1
Other assets	31.9	8.2	0.4	386.4	0.2
Investments	—	—	—	474.0	—
Acquired client relationships and contracts	646.1	463.8	9.8	1,889.1	6.7
Completed technology	123.2	168.1	—	550.0	—
Trade names	43.1	13.0	—	139.0	0.1
Non-compete agreements	—	—	—	43.0	—
Goodwill	823.4	838.5	9.7	2,643.8	10.9
Current portion of long-term debt	—	—	—	(605.8)	—
Accounts payable	(5.9)	(3.3)	(0.1)	(98.3)	(0.1)
Accrued employee compensation and benefits	(45.6)	(17.0)	(0.3)	(174.9)	—
Deferred revenue	(35.3)	(0.9)	(0.1)	(34.2)	—
Deferred income taxes	(176.4)	(77.1)	(1.3)	(760.4)	(1.8)
Long-term debt	—	—	—	(29.4)	—
Client funds obligations	—	—	—	(376.2)	—
Other liabilities assumed	(18.8)	(5.0)	(0.3)	(298.5)	(0.3)
Consideration paid, net of cash acquired	<u>\$ 1,452.0</u>	<u>\$ 1,449.2</u>	<u>\$ 19.7</u>	<u>\$ 4,661.8</u>	<u>\$ 16.6</u>

Additionally, we acquired Modestspark in October 2017 for approximately \$2.8 million.

The consideration paid, net of cash acquired for DST above includes \$48.1 million of non-cash consideration related to the fair value of unvested acquired equity awards with a pre-acquisition service period. This amount is excluded from “Cash paid for business acquisitions, net of cash acquired” for 2018 on the Company’s Consolidated Statement of Cash Flows. Cash acquired for DST includes \$347.0 million of restricted cash and cash equivalents classified as funds held on behalf of clients.

The Company recorded severance expense related to reductions in headcount in connection with the integration efforts associated with the acquisitions of DST, Eze and Intralinks. The majority of the positions eliminated in the reduction in force were effective in June 2018 for DST. The reduction was completed in December 2018. The amount of severance expense recognized in the Company’s Consolidated Statement of Comprehensive (Loss) Income for 2018 was as follows (in millions):

<u>Consolidated Statements of Comprehensive (Loss) Income Classification</u>	<u>For the Year Ended December 31,</u>	
	<u>2018</u>	
Cost of software-enabled services	\$	38.3
Cost of license, maintenance and other related		0.5
Total cost of revenues		<u>38.8</u>
Selling and marketing		3.5
Research and development		12.7
General and administrative		7.6
Total operating expenses		<u>23.8</u>
Total severance expense	\$	<u>62.6</u>

The fair value of acquired accounts receivable balances approximates the contractual amounts due from acquired customers, except for approximately \$7.9 million, \$7.5 million and \$6.1 million of contractual amounts that are not expected to be collected as of the acquisition date and that were also reserved by the companies we acquired – Intralinks, Eze and DST, respectively.

The goodwill associated with each of the transactions above is a result of expected synergies from combining the operations of businesses acquired with us and intangible assets that do not qualify for separate recognition, such as an assembled workforce.

The following unaudited pro forma condensed consolidated results of operations are provided for illustrative purposes only and assume that the acquisitions of Intralinks, Eze, CACEIS and DST occurred on January 1, 2017 and CommonWealth and Modestspark occurred on January 1, 2016, after giving effect to certain adjustments, including amortization of intangibles, interest, transaction costs and tax effects. This unaudited pro forma information (in millions, except per share data) should not be relied upon as being indicative of the historical results that would have been obtained if the acquisitions had actually occurred on that date, nor of the results that may be obtained in the future.

	Year Ended December 31,	
	2018	2017
Revenues	\$ 4,624.7	\$ 4,501.6
Net income	\$ 103.1	\$ 120.8
Basic EPS	\$ 0.44	\$ 0.59
Diluted EPS	\$ 0.42	\$ 0.57
Basic weighted average number of common shares outstanding	232.5	204.9
Diluted weighted average number of common and common equivalent shares outstanding	243.7	211.6

Note 8—Goodwill and intangible assets

The following table summarizes changes in goodwill (in millions):

Balance at December 31, 2016	\$ 3,652.7
2017 acquisitions	13.3
Adjustments to prior acquisitions	(0.6)
Effect of foreign currency translation	42.4
Balance at December 31, 2017	\$ 3,707.8
2018 acquisitions	4,315.4
Adjustments to prior acquisitions	0.2
Effect of foreign currency translation	(165.4)
Balance at December 31, 2018	<u>\$ 7,858.0</u>

A summary of the components of intangible assets is as follows (in millions):

	December 31,	
	2018	2017
Customer relationships	\$ 4,618.4	\$ 1,665.8
Completed technology	1,379.6	550.9
Trade names	255.6	61.1
Other	45.7	2.8
Total intangible assets	6,299.3	2,280.6
Less: accumulated amortization	(1,338.0)	(938.8)
Total intangible assets, net	<u>\$ 4,961.3</u>	<u>\$ 1,341.8</u>

Total estimated amortization expense, related to intangible assets, for each of the next five years and thereafter, as of December 31, 2018, is expected to approximate (in millions):

Year Ending December 31,	
2019	\$ 632.8
2020	571.3
2021	510.2
2022	476.9
2023	442.9
Thereafter	2,327.2
Total	<u>\$ 4,961.3</u>

Amortization expense associated with customer relationships, completed technology and other amortizable intangible assets was \$410.7 million, \$205.9 million and \$201.5 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Net capitalized software costs of \$42.6 million and \$12.1 million are included in the December 31, 2018 and 2017 Consolidated Balance Sheets, respectively, under "Intangible and other assets".

Amortization expense related to capitalized software development costs was \$7.7 million, \$5.4 million, and \$3.5 million for each of the years ended December 31, 2018, 2017, and 2016, respectively.

Note 9—Debt

At December 31, 2018 and 2017, debt consisted of the following (in millions):

	December 31,	
	2018	2017
Senior secured credit facilities, weighted-average interest rate of 4.77% and 3.75%, respectively	\$ 8,319.1	\$ 1,492.2
5.875% senior notes due 2023	—	600.0
Other indebtedness	28.2	—
Unamortized original issue discount and debt issuance costs	(91.3)	(47.0)
	8,256.0	2,045.2
Less current portion of long-term debt	87.5	37.9
Long-term debt	<u>\$ 8,168.5</u>	<u>\$ 2,007.3</u>

Senior Secured Credit Facilities

On April 16, 2018, in connection with our acquisition of DST Systems, Inc. (“DST”), we entered into an amended and restated credit agreement with SS&C Technologies, Inc. (“SS&C”), SS&C European Holdings SARL, an indirect wholly-owned subsidiary of SS&C (“SS&C SARL”) and SS&C Technologies Holdings Europe SARL, an indirect wholly-owned subsidiary of SS&C (“SS&C Tech SARL”) as the borrowers (“Credit Agreement”).

The Credit Agreement includes four tranches of term loans (together the “Initial Term Loans”): (i) a \$518.6 million term B-1 facility which matures on July 8, 2022 for SS&C (“Term B-1 Loan”); (ii) a \$5.9 million term B-2 facility which matures on July 8, 2022 for SS&C SARL (“Term B-2 Loan”) (iii) a new \$5.046 billion term B-3 facility, which matures on April 16, 2025 for SS&C (“Term B-3 Loan”); and (iv) a new \$1.8 billion term B-4 facility, which matures on April 16, 2025 for SS&C SARL (“Term B-4 Loan”). In addition, the Credit Agreement has a revolving credit facility with a five-year term available for borrowings by SS&C with \$250.0 million in available commitments (“Revolving Credit Facility”), of which \$242.4 million was available as of December 31, 2018. The Revolving Credit Facility also contains a \$25 million letter of credit sub-facility, of which \$7.6 million was utilized as of December 31, 2018.

The majority of the initial proceeds from the Initial Term Loans was used to satisfy the consideration required to fund the acquisition of DST, repay certain amounts outstanding under our then-existing credit agreement (“Prior Credit Agreement”), repay all of the outstanding principal amount of our 5.875% Senior Notes due 2023 (“Senior Notes”) and to repay acquired debt associated with DST.

The refinancing of the Prior Credit Agreement was evaluated in accordance with FASB ASC 470-50, *Debt-Modifications and Extinguishments*, for modification and extinguishment accounting. We accounted for the refinancing as a debt modification with respect to amounts that remained obligations of the same lender in the syndicate with minor changes in cash flows and as a debt extinguishment with respect to amounts that were obligations of lenders that exited the syndicate or remained in the syndicate but experienced a change in cash flows of greater than 10%. See *Loss on extinguishment of debt* section below.

On October 1, 2018, in connection with our acquisition of Eze, Holdings, we entered into an amendment (the “Commitment Increase Amendment”) to the Credit Agreement. Pursuant to the Commitment Increase Amendment, a new \$875.0 million senior secured term B-5 facility (“Term B-5 Loan”, and together with the Initial Term Loans, the “Term Loans”) was made available to us, the proceeds of which was used to finance, in part, the Eze acquisition.

On November 16, 2018, in connection with our acquisition of Intralinks, Holdings, we entered into an amendment (the “Incremental Term Loan Amendment”) to the Credit Agreement. Pursuant to the Incremental Term Loan Amendment, an additional \$1.0 billion senior secured term B-5 facility (“Term B-5 Loan”, and together with the Initial Term Loans, the “Term Loans”) was made available to us, the proceeds of which was used to finance, in part, the Intralinks acquisition.

The Term Loans and Revolving Credit Facility bear interest, at the election of the borrowers, at the base rate (as defined in the Credit Agreement) or LIBOR, plus the applicable interest rate margin for the credit facility. Amounts drawn on the Revolving Credit Facility initially bear interest at either LIBOR plus 2.25% or at the base rate plus 1.25%, and is subject to a step-down at any time our consolidated net secured leverage ratio is less than 4.75 times, to 2.00% in the case of the LIBOR margin and 1.00% in the case of the base rate margin. The Term B-1 Loan and Term B-2 Loan bear interest at either LIBOR plus 2.25% or at the base rate plus 1.25%. The Term B-3 Loan, Term B-4 Loan and Term B-5 Loan initially bear interest at either LIBOR plus 2.50% or at the base rate plus 1.50%, and are subject to a step-down at any time our consolidated net secured leverage ratio is less than 4.75 times, to 2.25% in the case of the LIBOR margin and 1.25% in the case of the base rate margin.

As of December 31, 2018, there was \$514.5 million in principal amount outstanding under the Term B-1 Loan, \$4,309.6 million in principal amount outstanding under the Term B-3 Loan, \$1,634.7 million in principal amount outstanding under the Term B-4 Loan and \$1,860.3 million in principal amount outstanding under the Term B-5 Loan. There was no principal amount outstanding under the Term B-2 Loan.

SS&C and SS&C SARL are required to make scheduled quarterly payments of approximately 0.25% of the remaining principal amount of the Term B-1 Loan with the balance due and payable on July 8, 2022. SS&C and SS&C SARL are required to make scheduled quarterly payments of 0.25% of the original principal amount of the Term B-3 Loan, Term B-4 Loan and Term B-5 Loan, with the balance due and payable on April 16, 2025. No amortization is required under the Revolving Credit Facility.

SS&C's and SS&C SARL's obligations under the Term Loans are guaranteed by (i) our existing and future U.S. wholly-owned restricted subsidiaries, in the case of the Term B-1 Loan, Term B-3 Loan, Term B-5 Loan and the Revolving Credit Facility and (ii) our existing and future wholly-owned restricted subsidiaries, in the case of the Term B-4 Loan.

The obligations of the U.S. loan parties under the Credit Agreement are secured by substantially all of the assets of such persons (subject to customary exceptions and limitations), including a pledge of all of the capital stock of substantially all of the U.S. wholly-owned restricted subsidiaries of such persons (with customary exceptions and limitations) and 65% of the capital stock of certain foreign restricted subsidiaries of such persons (with customary exceptions and limitations). All obligations of the non-U.S. loan parties under the Credit Agreement are secured by substantially all of our and the other guarantors' assets (subject to customary exceptions and limitations), including a pledge of all of the capital stock of substantially all of our wholly-owned restricted subsidiaries (with customary exceptions and limitations).

The Credit Agreement includes negative covenants that, among other things and subject to certain thresholds and exceptions, limit our ability and the ability of its restricted subsidiaries to incur debt or liens, make investments (including in the form of loans and acquisitions), merge, liquidate or dissolve, sell property and assets, including capital stock of its subsidiaries, pay dividends on its capital stock or redeem, repurchase or retire its capital stock, alter the business we conduct, amend, prepay, redeem or purchase subordinated debt, or engage in transactions with its affiliates. The Credit Agreement also contains customary representations and warranties, affirmative covenants and events of default, subject to customary thresholds and exceptions. In addition, the Credit Agreement contains a financial covenant for the benefit of the Revolving Credit Facility requiring us to maintain a minimum consolidated net secured leverage ratio. In addition, under the Credit Agreement, certain defaults under agreements governing other material indebtedness could result in an event of default under the Credit Agreement, in which case the lenders could elect to accelerate payments under the Credit Agreement and terminate any commitments they have to provide future borrowings.

Senior Notes

On April 16, 2018, we redeemed all of the outstanding principal amount of our Senior Notes utilizing a portion of the proceeds from the Initial Term Loans described above. The redemption of the Senior Notes required the payment of a "make whole" premium calculated pursuant to the indenture governing the Senior Notes. See *Loss on extinguishment of debt* section below. In addition, on May 1, 2018, we redeemed senior notes of DST that were acquired as a part of the acquisition of DST utilizing a portion of the proceeds from the Initial Term Loans described above. The redemption of DST's senior notes totaled \$600.4 million, which included a "make whole" premium.

Other indebtedness

In connection with the acquisition of DST, we assumed a mortgage with a principal amount of £21.0 million, which matures in October 2020 ("U.K. Mortgage") and a \$4.1 million mortgage on property in the U.S. The outstanding amount under the U.K. Mortgage was \$24.2 million at December 31, 2018 with a fixed interest rate of 3.1%. Principal payments of £1.0 million are payable semi-annually in April and October of each year and accrued interest payable quarterly, with the outstanding balance due at maturity.

Debt issuance costs

In connection with the Credit Agreement, we capitalized an aggregate of \$55.3 million in financing costs in 2018. Other costs incurred in connection with the Credit Agreement, which did not meet the criteria for capitalization, are included in Transaction expenses in the Consolidated Statement of Comprehensive (Loss) Income.

Loss on extinguishment of debt

We recorded a \$44.4 million loss on extinguishment of debt in connection with the entry into the Credit Agreement and redemption of the Senior Notes during 2018. The loss on early extinguishment of debt includes the write-off of a portion of the unamortized capitalized financing fees and the unamortized original issue discount related to the Prior Credit Agreement for amounts accounted for as a debt extinguishment, a make-whole premium paid in connection with the redemption of the Senior Notes and the write-off of all unamortized capitalized financing fees and unamortized original issue discount related to the Senior Notes. During the fourth quarter of 2018, we purchased \$45.0 million principal amount of our Term Loans in privately negotiated transactions, which resulted in a gain on extinguishment of debt totaling \$1.1 million.

Fair value of debt

The carrying amounts and fair values of financial instruments are as follows (in millions):

	December 31, 2018		December 31, 2017	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
Financial liabilities:				
Senior secured credit facilities	\$ 8,319.1	\$ 7,847.4	\$ 1,492.2	\$ 1,500.8
5.875% senior notes due 2023	—	—	600.0	631.3
Other indebtedness	28.2	28.3	—	—

The above fair values, which are Level 2 liabilities, were computed based on comparable quoted market prices. The fair values of cash, accounts receivable, net, short-term borrowings, and accounts payable approximate the carrying amounts due to the short-term maturities of these instruments.

Future maturities of debt

At December 31, 2018, annual maturities of long-term debt during the next five years and thereafter are as follows (in millions):

Year ending December 31,	
2019	\$ 87.4
2020	106.5
2021	84.8
2022	578.4
2023 and thereafter	7,490.2
Total	<u>\$ 8,347.3</u>

Note 10—Stockholders' Equity

Two-for-one Stock Split. On May 25, 2016, our Board of Directors approved a two-for-one stock split to be effected in the form of a stock dividend. The record date for the stock split was June 7, 2016 and the payment date was June 24, 2016. All share and per share amounts (other than for our Class A non-voting common stock) have been retroactively restated for all periods presented to reflect the stock split.

Conversion of Class A Common Stock. On March 30, 2016, William C. Stone converted 2.7 million shares of Class A non-voting stock into 2.7 million shares of our common stock, or 5.4 million shares of common stock on a post-split basis. Each share of Class A non-voting common stock converted automatically into one share of our common stock upon the expiration of the applicable waiting period under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended.

Public offering. In April 2018, we completed a public offering of our common stock. The offering included 30.3 million newly issued shares of common stock sold by us (including 3.9 million shares of common stock sold pursuant to the underwriters' option to purchase additional shares) at an offering price to the public of \$47.50 per share for which we received total net proceeds of approximately \$1.4 billion.

Other Common Stock Issuance. In November 2018, we issued 9.9 million shares in connection with our acquisition of Intralinks.

Dividends. In 2018, we paid a quarterly cash dividend of \$0.07 per share of common stock on March 15, 2018 and June 15, 2018 and \$0.08 per share of common stock on September 18, 2018 and December 17, 2018 to stockholders of record as of the close of business on March 1, 2018, June 1, 2018, September 4, 2018 and December 1, 2018, respectively, totaling \$70.9 million. In 2017, we paid a quarterly cash dividend of \$0.0625 per share of common stock on March 15, 2017, June 15, 2017 and \$0.07 per share of common stock on September 15, 2017 and December 15, 2017 to stockholders of record as of the close of business on March 1, 2017, June 1, 2017, September 1, 2017 and December 1, 2017, respectively, totaling \$54.4 million.

Other comprehensive loss. Accumulated other comprehensive loss balances, net of tax consist of the following (in millions):

	Foreign Currency Translation	Accumulated Other Comprehensive Loss
Balance, December 31, 2016	\$ (139.1)	\$ (139.1)
Net current period other comprehensive income	56.4	56.4
Balance, December 31, 2017	\$ (82.7)	\$ (82.7)
Net current period other comprehensive loss	(260.3)	(260.3)
Balance, December 31, 2018	<u>\$ (343.0)</u>	<u>\$ (343.0)</u>

Adjustments to accumulated other comprehensive (loss) income attributable to us are as follows (in millions):

	Year Ended December 31, 2018		Year Ended December 31, 2017		Year Ended December 31, 2016	
	Pretax	Tax Effect	Pretax	Tax Effect	Pretax	Tax Effect
Cumulative translation adjustments						
Current period translation adjustments	\$ (260.9)	\$ 0.6	\$ 56.9	\$ (0.5)	\$ (55.7)	\$ (0.2)
Net cumulative translation adjustments	(260.9)	0.6	56.9	(0.5)	(55.7)	(0.2)
Total other comprehensive (loss) income	<u>\$ (260.9)</u>	<u>\$ 0.6</u>	<u>\$ 56.9</u>	<u>\$ (0.5)</u>	<u>\$ (55.7)</u>	<u>\$ (0.2)</u>

Note 11—Revenue

Adoption of ASC Topic 606, “Revenue from Contracts with Customers”

On January 1, 2018, we adopted ASC 606 using the modified retrospective method for those contracts that were not completed as of the date of adoption. Results for reporting periods beginning after January 1, 2018 are presented under ASC 606, while prior period amounts continue to be reported in accordance with ASC 605 and 985. The most significant impact of the standard to us relates to the timing of revenue recognition for arrangements involving term licenses. Under ASC 606, we are required to recognize term license revenues upon the transfer of the license and recognize the associated maintenance revenues over the contract period, as opposed to our prior practice of recognizing both the term license and maintenance revenues ratably over the contract period. In addition, we are required to capitalize and amortize incremental costs of obtaining a contract, such as certain sales commission costs, over the expected customer relationship period if we expect to recover those costs. We previously expensed these costs over the length of the initial contract excluding any renewals.

We recorded an increase to retained earnings of \$65.8 million, or \$47.9 million net of tax, as of January 1, 2018 due to the cumulative impact of adopting ASC 606, with the impact primarily related to our term license revenues. The impact to revenues for the year ended December 31, 2018 related to these adjustments was a decrease of \$39.9 million.

The impact of adoption of ASC 606 on our Consolidated Statement of Comprehensive (Loss) Income was as follows (in millions):

	Year Ended December 31, 2018		
	As Reported	Without adoption of ASC 606	Effect of Change
Revenues:			
License, maintenance and related	\$ 622.2	\$ 590.0	\$ 32.2
Operating expenses:			
Selling and marketing	\$ 211.0	\$ 214.4	\$ (3.4)

The impact of adoption of ASC 606 on our Consolidated Balance Sheet was as follows (in millions):

	As of December 31, 2018		
	As Reported	Balance without adoption of ASC 606	Effect of Change
Assets:			
Accounts receivable, net	\$ 681.7	\$ 686.8	\$ (5.1)
Contract asset (current)	18.5	—	18.5
Prepaid expenses and other current assets	154.5	147.9	6.6
Contract asset (non-current)	31.5	—	31.5
Liabilities:			
Deferred revenue	\$ 245.7	\$ 295.8	\$ (50.1)
Other long-term liabilities	235.5	233.3	2.2

The adoption of ASC 606 had no impact on our total cash flows from operations.

Deferred revenues primarily represents unrecognized fees billed or collected for maintenance and professional services. Deferred revenues are recognized as (or when) we perform under the contract. Deferred revenues are recorded on a net basis with contract assets at the contract level. Accordingly, as of December 31, 2018, approximately \$32.4 million of deferred revenue is presented net within contract assets arising from the same contracts. The amount of revenues recognized in the period that was included in the opening deferred revenues balance was \$208.7 million for the year ended December 31, 2018.

As of December 31, 2018, revenue of approximately \$357.0 million is expected to be recognized from remaining performance obligations for license, maintenance and related revenues, of which \$233.5 million is expected to be recognized over the next twelve months.

Revenue Disaggregation

The following table disaggregates our revenues by geography (in millions):

	Year Ended December 31,		
	2018	2017 (1)	2016 (1)
United States	\$ 2,479.8	\$ 1,222.4	\$ 1,081.3
United Kingdom	503.9	115.8	105.3
Asia-Pacific and Japan	145.8	112.7	90.1
Europe (excluding United Kingdom), Middle East and Africa	145.4	102.1	101.3
Canada	96.3	76.4	65.7
Americas, excluding United States and Canada	49.9	45.9	37.7
Total	\$ 3,421.1	\$ 1,675.3	\$ 1,481.4

(1) As noted above, prior period amounts have not been adjusted under the modified retrospective method.

The following table disaggregates our revenues by source (in millions):

	Year Ended December 31,		
	2018	2017 (1)	2016 (1)
Software-enabled services	\$ 2,798.9	\$ 1,114.0	\$ 956.8
Maintenance and term licenses	508.8	463.6	414.7
Perpetual licenses	29.5	19.8	23.9
Professional services	83.9	77.9	86.0
Total	<u>\$ 3,421.1</u>	<u>\$ 1,675.3</u>	<u>\$ 1,481.4</u>

(1) As noted above, prior period amounts have not been adjusted under the modified retrospective method.

Note 12—Stock-based Compensation

In February 2016, our Board of Directors adopted the Amended and Restated 2014 Stock Incentive Plan (the “Amended 2014 Plan”), which became effective in May 2016 upon stockholder approval and which amended and restated our 2014 Stock Option Plan (the “2014 Plan”) (together with the Amended 2014 Plan, the “2014 Plans”). The Amended 2014 Plan was adopted with an initial share capacity of 24.0 million shares available for the grant of awards and was adopted with the intent of being our only equity plan by authorizing the issuance of full-value awards (that is, restricted stock awards (“RSAs”) and restricted stock units (“RSUs”)) and by expanding the class of participants to include non-employee directors. Since the adoption of the Amended 2014 Plan, we have not made any grants of equity or equity-based awards under the 2008 Stock Incentive Plan or the 2006 Equity Incentive Plan.

The 2014 Plan authorizes stock options to be granted for up to 6.0 million shares of our common stock. Under the 2014 Plan, the exercise price of stock options is set on the grant date and may not be less than the fair market value per share on such date. Generally, stock options expire ten years from the date of grant. We have granted time-based stock options under the 2014 Plan.

In April 2008, our Board of Directors adopted, and our stockholders approved, an equity-based incentive plan (“the 2008 Plan”), which authorizes equity awards to be granted for up to 21.8 million shares of our common stock, which was calculated based on an initial authorization of 2.8 million shares of our common stock and an annual increase to be added on the first day of each of our fiscal years during the term of the 2008 Plan beginning in fiscal 2009 equal to the lesser of (i) 2.8 million shares of common stock, (ii) 2% of the outstanding shares on such date or (iii) an amount determined by our Board of Directors. Under the 2008 Plan, which became effective in July 2008, the exercise price of awards is set on the grant date and may not be less than the fair market value per share on such date. Generally, awards expire ten years from the date of grant. We have granted time-based options and RSUs under the 2008 Plan.

In August 2006, our Board of Directors adopted an equity-based incentive plan (“the 2006 Plan”), which authorizes equity awards to be granted for up to 22.3 million shares of our common stock. Under the 2006 Plan, the exercise price of awards is set on the grant date and may not be less than the fair market value per share on such date. Generally, awards expire ten years from the date of grant. We have granted RSAs of our common stock and both time-based and performance-based options under the 2006 Plan.

We generally settle RSUs, RSAs, stock appreciation rights (“SARs”) and stock option exercises with newly issued common shares.

Restricted stock units. During the year ended December 31, 2018, we granted 24,970 RSUs under the 2014 Plan, which vest 50% at the time of granting and continue to vest 1/36th of the remaining balance each month thereafter for 36 months. We did not grant any RSUs during the year ended December 31, 2017. At December 31, 2018 and 2017, there was approximately \$0.6 million and \$1.5 million, respectively, of unearned non-cash stock-based compensation related to the RSUs that we expect to recognize as expense over a remaining period of approximately 1.8 and 0.8 years, respectively.

Restricted stock awards. We did not grant any RSAs during the years ended December 31, 2018 and 2017. The RSAs vest in full upon a change in control, subject to certain conditions. At both December 31, 2018 and 2017, there was less than \$0.1 million of unearned non-cash stock-based compensation related to the RSAs that we expect to recognize as expense over a weighted average remaining period of approximately 3 months and 15 months, respectively.

Time-based options and SARs. Time-based options and SARs granted under the 2006 Plan, the 2008 Plan, the 2014 Plans generally vest 25% on the first anniversary of the grant date and 1/36th of the remaining balance each month thereafter for 36 months. All outstanding time-based options and SARs vest upon a change in control, subject to certain conditions. Time-based options and SARs granted during 2018, 2017 and 2016 have a weighted-average grant date fair value of \$10.38, \$7.86 and \$6.62 per share,

respectively, based on the Black-Scholes option pricing model. Compensation expense is recorded on a straight-line basis over the requisite service period. The fair value of time-based options and SARs vested during the years ended December 31, 2018, 2017 and 2016 was approximately \$50.4 million, \$32.1 million and \$41.4 million, respectively. At December 31, 2018 and 2017, there was approximately \$165.2 million and \$117.9 million, respectively, of unearned non-cash stock-based compensation related to time-based options and SARs that we expect to recognize as expense over a weighted average remaining period of approximately 3.3 and 3.1 years, respectively.

For the time-based options and SARs valued using the Black-Scholes option-pricing model, we used the following weighted-average assumptions:

	Time-Based awards		
	2018	2017	2016
Expected term to exercise (years)	4.0	4.0	4.0
Expected volatility	25.26%	25.61%	27.64%
Risk-free interest rate	2.67%	1.92%	1.30%
Expected dividend yield	0.70%	0.73%	0.82%

Total stock options, SARs, RSUs and RSAs. The amount of stock-based compensation expense recognized in our Consolidated Statements of Comprehensive (Loss) Income for the years ended December 31, 2018, 2017 and 2016 was as follows (in millions):

Consolidated Statements of Comprehensive (Loss) Income Classification	Year Ended December 31, 2018				Year Ended December 31, 2017				Year Ended December 31, 2016			
	Options, SARs	RSUs	RSAs	Total	Options, SARs	RSUs	RSAs	Total	Options, SARs	RSUs	RSAs	Total
Cost of software-enabled services	\$ 25.7	\$ 13.7	\$ —	\$ 39.4	\$ 11.1	\$ 0.1	\$ —	\$ 11.2	\$ 10.1	\$ 0.1	\$ —	\$ 10.2
Cost of license, maintenance and other related	3.9	0.8	—	4.7	3.6	0.6	—	4.2	3.5	1.5	—	5.0
Total cost of revenues	29.6	14.5	—	44.1	14.7	0.7	—	15.4	13.6	1.6	—	15.2
Selling and marketing	7.3	4.5	—	11.8	8.5	1.0	0.1	9.6	8.9	2.4	0.2	11.5
Research and development	8.0	1.0	—	9.0	6.2	1.3	—	7.5	6.0	2.3	—	8.3
General and administrative	16.1	15.9	—	32.0	8.6	0.4	—	9.0	11.3	4.2	—	15.5
Total operating expenses	31.4	21.4	—	52.8	23.3	2.7	0.1	26.1	26.2	8.9	0.2	35.3
Total stock-based compensation expense	\$ 61.0	\$ 35.9	\$ —	\$ 96.9	\$ 38.0	\$ 3.4	\$ 0.1	\$ 41.5	\$ 39.8	\$ 10.5	\$ 0.2	\$ 50.5

The associated future income tax benefit recognized was \$33.7 million, \$10.3 million and \$18.4 million for the years ended December 31, 2018, 2017 and 2016, respectively.

For the year ended December 31, 2018, the amount of cash received from the exercise of stock options was \$84.9 million, with an associated tax benefit from stock awards realized of \$34.6 million. The intrinsic value of options and SARs exercised during the year ended December 31, 2018 was approximately \$107.6 million. For the year ended December 31, 2017, the amount of cash received from the exercise of stock options was \$60.2 million, with an associated tax benefit from stock awards realized of \$25.0 million. The intrinsic value of options and SARs exercised during the year ended December 31, 2017 was approximately \$71.1 million. For the year ended December 31, 2016, the amount of cash received from the exercise of stock options was \$39.2 million, with an associated tax benefit from stock awards realized of \$62.1 million. The intrinsic value of options and SARs exercised during the year ended December 31, 2016 was approximately \$141.2 million.

In connection with our acquisition of DST in April 2018, we converted DST's unvested stock options, unvested RSUs and unvested PSUs into equity awards and rights to receive our common stock. During the year ended December 31, 2018, we recognized stock-based compensation expense of \$49.3 million related to these assumed awards, of which \$31.1 million related to one-time charges for the accelerated vesting of certain awards.

The following table summarizes stock option and SAR activity as of and for the years ended December 31, 2018, 2017 and 2016 (share data in millions):

	Shares	Weighted Average Exercise Price
Outstanding at December 31, 2015	30.2	\$ 20.64
Granted (1)	2.4	\$ 30.39
Cancelled/forfeited	(1.6)	\$ 31.15
Exercised	(6.0)	\$ 7.53
Outstanding at December 31, 2016	25.0	\$ 24.04
Granted (2)	11.5	\$ 36.63
Cancelled/forfeited	(1.4)	\$ 31.59
Exercised	(3.8)	\$ 19.08
Outstanding at December 31, 2017	31.3	\$ 28.92
Granted (2)	13.2	\$ 47.50
Equity awards assumed from DST	0.7	\$ 48.85
Cancelled/forfeited	(1.4)	\$ 38.56
Exercised	(4.0)	\$ 24.71
Outstanding at December 31, 2018	<u>39.8</u>	<u>\$ 35.48</u>

(1) Of the grants during 2016, 1.0 million were granted under the Amended 2014 Plan and 1.4 million were granted under the 2008 Plan.

(2) Granted under the Amended 2014 Plan.

The following table summarizes RSU activity as of and for the years ended December 31, 2018, 2017 and 2016 (share data in millions):

	Shares	Weighted Average Grant Date Fair Value
Outstanding at December 31, 2015	1.0	\$ 31.01
Granted	—	\$ —
Cancelled/forfeited	(0.1)	\$ 31.22
Vested	(0.5)	\$ 30.95
Outstanding at December 31, 2016	0.4	\$ 31.06
Granted	—	\$ —
Cancelled/forfeited	—	\$ 31.36
Vested	(0.2)	\$ 31.03
Outstanding at December 31, 2017	0.2	\$ 31.04
Granted	—	\$ 50.62
Equity awards assumed from DST	2.0	\$ 50.71
Cancelled/forfeited	—	\$ 48.71
Vested	(0.8)	\$ 46.45
Outstanding at December 31, 2018	<u>1.4</u>	<u>\$ 50.44</u>

The following table summarizes information about vested stock options and SARs outstanding that are currently exercisable and stock options and SARs outstanding that are expected to vest at December 31, 2018:

Outstanding, Vested Stock Options and SARs Currently Exercisable				Outstanding Stock Options and SARs Expected to Vest			
Shares	Weighted Average Exercise Price	Aggregate Intrinsic Value	Weighted Average Remaining Contractual Term	Shares	Weighted Average Exercise Price	Aggregate Intrinsic Value	Weighted Average Remaining Contractual Term
(In millions)		(In millions)	(Years)	(In millions)		(In millions)	(Years)
17.5	\$ 25.85	\$ 338.0	5.90	39.8	\$ 35.47	\$ 419.4	7.75

Note 13—Defined Contribution Plans

We sponsor defined contribution plans that cover our domestic and non-domestic employees following the completion of an eligibility period. During the years ended December 31, 2018, 2017 and 2016, we incurred \$60.8 million, \$18.1 million and \$14.8 million, respectively, of employer contribution expenses under these plans. Additionally, we sponsor a defined benefit pension plan in the United Kingdom, which has a net benefit asset as of December 31, 2018 of \$0.8 million.

Note 14—Basic and diluted earnings per share

Earnings per share (“EPS”) is calculated in accordance with the relevant standards. Basic EPS includes no dilution and is computed by dividing income available to our common stockholders by the weighted average number of common shares outstanding during the period. Diluted EPS is computed by dividing net income by the weighted average number of common and common equivalent shares outstanding during the period. Common equivalent shares consist of stock options, SARs and RSUs and RSAs using the treasury stock method. Common equivalent shares are excluded from the computation of diluted earnings per share if the effect of including such common equivalent shares is anti-dilutive because their total assumed proceeds exceed the average fair value of common stock for the period. We have two classes of common stock, each with identical participation rights to earnings and liquidation preferences, and therefore the calculation of EPS as described above is identical to the calculation under the two-class method.

The following table sets forth the computation of basic and diluted EPS (in millions, except per share amounts):

	Year Ended December 31,		
	2018	2017	2016
Net income	\$ 103.2	\$ 328.9	\$ 131.0
Shares:			
Weighted average common shares outstanding — used in calculation of basic EPS	232.5	204.9	200.3
Weighted average common stock equivalents — options and restricted shares	11.2	6.7	5.5
Weighted average common and common equivalent shares outstanding — used in calculation of diluted EPS	243.7	211.6	205.8
Earnings per share - Basic	\$ 0.44	\$ 1.60	\$ 0.65
Earnings per share - Diluted	\$ 0.42	\$ 1.55	\$ 0.64

Weighted average stock options, SARs, RSUs and RSAs representing 5.5 million, 10.6 million and 14.1 million shares were outstanding for the years ended December 31, 2018, 2017 and 2016, respectively, but were not included in the computation of diluted EPS because the effect of including them would be anti-dilutive.

Note 15—Income Taxes

The sources of income before income taxes were as follows (in millions):

	Year Ended December 31,		
	2018	2017	2016
U.S.	\$ (10.9)	\$ 153.8	\$ 68.2
Foreign	136.0	128.9	95.4
Income before income taxes	\$ 125.1	\$ 282.7	\$ 163.6

The income tax provision (benefit) consists of the following (in millions):

	Year Ended December 31,		
	2018	2017	2016
Current:			
Federal	\$ 66.4	\$ 81.1	\$ 47.6
Foreign	37.8	21.4	18.9
State	23.5	3.3	13.9
Total	<u>127.7</u>	<u>105.8</u>	<u>80.4</u>
Deferred:			
Federal	(75.4)	(144.7)	(38.6)
Foreign	0.2	(2.8)	(4.1)
State	(30.6)	(4.5)	(5.1)
Total	<u>(105.8)</u>	<u>(152.0)</u>	<u>(47.8)</u>
Total	<u>\$ 21.9</u>	<u>\$ (46.2)</u>	<u>\$ 32.6</u>

The reconciliation between the expected tax expense and the actual tax provision (benefit) is computed by applying the U.S. federal corporate income tax rate of 21% (35% for years ended December 31, 2017 and 2016) to income before income taxes as follows (in millions):

	Year Ended December 31,		
	2018	2017	2016
Computed "expected" tax expense	\$ 26.3	\$ 98.9	\$ 57.3
(Decrease) increase in income tax expense resulting from:			
State income taxes (net of federal income tax benefit)	(6.0)	7.5	5.6
Foreign operations	10.7	(36.2)	(33.6)
Enactment of Tax Act	—	(88.0)	—
Effects of stock based compensation	(14.6)	(13.6)	—
Effect of valuation allowance	4.6	(3.3)	2.1
Uncertain tax positions	(0.9)	(8.2)	6.5
Tax credits	(4.0)	(0.6)	(3.7)
Other	5.8	(2.7)	(1.6)
Provision (benefit) provision for income taxes	<u>\$ 21.9</u>	<u>\$ (46.2)</u>	<u>\$ 32.6</u>

On December 22, 2017, the Tax Act was enacted into law, reducing the U.S. corporate income tax rate from 35% to 21%. In accordance with SAB 118, we made a provisional beneficial estimate of \$88.0 million in the fourth quarter of 2017 to account for specific income tax effects of the Tax Act. Pursuant to SAB 118, we were allowed a measurement period of up to one year after the enactment date of the Tax Act to finalize the accounting of the related tax impacts. We completed our accounting of the Tax Act in the fourth quarter of 2018 and made no significant adjustments to the provisional estimates made in the prior year.

The components of deferred income taxes at December 31, 2018 and 2017 are as follows (in millions):

	2018		2017	
	Deferred Tax Assets	Deferred Tax Liabilities	Deferred Tax Assets	Deferred Tax Liabilities
Net operating loss carryforwards	54.8	—	24.2	—
Deferred compensation	47.6	—	22.4	—
Tax credit carryforwards	34.6	—	26.3	—
Accrued expenses	25.3	—	13.3	—
Other	24.8	—	0.9	—
Customer relationships	—	834.4	—	220.8
Other intangible assets	—	204.5	—	53.7
Unconsolidated investments	—	134.4	0.6	—
Acquired technology	—	66.5	—	53.3
Trade names	—	49.9	—	6.3
Property and equipment	—	43.4	—	6.3
Unremitted foreign earnings	—	9.0	—	7.2
Deferred revenue	—	5.7	—	0.2
Total	187.1	1,347.8	87.7	347.8
Valuation allowance	(36.2)	—	(21.1)	—
Total	\$ 150.9	\$ 1,347.8	\$ 66.6	\$ 347.8

At December 31, 2018 and 2017, we had accrued a deferred income tax liability for foreign withholding taxes of \$9.0 million and \$7.2 million, respectively, on the unremitted earnings of our major Canadian subsidiary and certain unconsolidated foreign affiliates we do not control and whose earnings cannot be considered permanently reinvested. We have not accrued any deferred income taxes for withholding, foreign local or U.S. state income taxes on the unremitted earnings of other foreign subsidiaries as those earnings are permanently reinvested.

At December 31, 2018, we have domestic federal net operating loss carryforwards of \$93.3 million, which will begin to expire in 2021 and state net operating loss carryforwards of \$90.6 million, which will begin to expire in 2021. At December 31, 2018, we have foreign net operating loss carryforwards of \$123.7 million, of which \$66.6 million can be carried forward indefinitely. The remaining \$57.1 million will begin to expire in 2019.

At December 31, 2018, we have tax credit carryforwards of \$34.6 million relating to domestic and foreign jurisdictions, of which \$27.6 million relate to domestic tax credits that are expected to be utilized before they begin to expire in 2019, \$4.5 million relate to domestic tax credits that are not expected to be utilized before they begin to expire in 2022, \$1.4 million relate to foreign jurisdictions that are expected to be utilized before they begin to expire in 2025 and \$1.1 million relate to foreign jurisdictions not expected to be utilized before they begin to expire in 2026. The domestic credits consist primarily of federal and state R&D credits, while the foreign credits consist primarily of minimum alternative tax credit carryforwards at our India operations.

A valuation allowance is recorded against deferred tax assets if, based on the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. We have recorded valuation allowances of \$36.2 million at December 31, 2018 related primarily to certain foreign and state net operating loss carryforwards and tax credit carryforwards and \$21.1 million at December 31, 2017 related to certain foreign net operating loss carryforwards and tax credit carryforwards. Of the \$36.2 million valuation allowance recorded at December 31, 2018, \$12.4 million relates to foreign net operating losses that do not expire. The change in the valuation allowance from 2017 to 2018 is primarily due to foreign and state net operating losses generated but not expected to be utilized as well as the acquisition of foreign net operating loss and tax credit carryforwards not expected to be utilized, due in part to the utilization of the tax attributes being limited to offset only income with certain characteristics.

The following table summarizes the activity related to our unrecognized tax benefits for the years ended December 31, 2018 and 2017 (in millions):

Balance at December 31, 2016	\$	63.0
Increases related to current year tax positions		7.6
Decreases related to prior tax positions		(4.8)
Settlements		(6.0)
Lapse in statute of limitation		(2.8)
Foreign exchange translation adjustment		0.6
Balance at December 31, 2017	\$	57.6
Increases related to current year tax positions		6.5
Increases related to prior tax positions		2.6
Increases related to acquired tax positions		83.3
Lapse in statute of limitation		(9.0)
Foreign exchange translation adjustment		(0.5)
Balance at December 31, 2018	\$	140.5

We accrued potential penalties and interest on the unrecognized tax benefits of \$2.3 million and \$0.5 million during 2018 and 2017, respectively, and have recorded a total liability for potential penalties and interest, including penalties and interest related to acquired unrecognized tax benefits, of \$25.2 million and \$3.6 million at December 31, 2018 and 2017, respectively. Our unrecognized tax benefits decreased from 2016 to 2017 due to settlements with federal and state tax authorities, a lapse in the statute of limitations for certain domestic tax filings and decreases in prior tax positions, offset partially by an increase related to current tax positions. Our unrecognized tax benefits increased from 2017 to 2018 due to acquired uncertain tax positions, primarily consisting of domestic tax positions, and an increase in current and prior year tax positions, offset partially by a lapse in the statute of limitations for certain domestic tax filings. Our unrecognized tax benefits as of December 31, 2018 relate to domestic and foreign taxing jurisdictions and are recorded in other long-term liabilities on our Consolidated Balance Sheet at December 31, 2018.

We are subject to examination by tax authorities throughout the world, including such major jurisdictions as the U.S., United Kingdom, India, California, Massachusetts, Missouri and New York. In these major jurisdictions, we are no longer subject to examination by tax authorities prior to tax years ending 2010, 2016, 2016, 2007, 2015, 2015 and 2011, respectively. Our U.S. federal income tax returns are currently under audit or in appeals for the tax periods ended December 31, 2010 through December 31, 2015. Our India income tax returns are currently under audit for tax periods ending March 31, 2016 through March, 2017. Our California state income tax returns are currently under audit or in appeals for the tax periods ended December 31, 2007 through 2016. Our New York state income tax returns are currently under audit for the tax periods ended December 31, 2011 through 2014.

Note 16—Commitments and Contingencies

Our contractual cash obligations for our operations including future minimum lease payments for the non-cancelable term of all operating leases and committed purchase obligations, excluding future sublease income, as of December 31, 2018, are as follows (in millions):

<u>December 31,</u>	<u>Operating Leases</u>	<u>Purchase Obligations</u>	<u>Total</u>
2019	\$ 83.8	\$ 101.8	\$ 185.6
2020	76.5	46.7	123.2
2021	71.2	36.8	108.0
2022	61.6	12.7	74.3
2023 and thereafter	257.8	—	257.8
Total	\$ 550.9	\$ 198.0	\$ 748.9

Total rental expense was \$72.0 million, \$47.4 million and \$33.3 million for the years ended December 31, 2018, 2017 and 2016, respectively. We sublease office space to other parties under noncancelable leases and we received rental income under these leases of \$5.4 million, \$5.4 million and \$1.3 million for the years ended December 31, 2018, 2017 and 2016, respectively. Future minimum lease receipts under these leases as of December 31, 2018 are as follows (in millions):

2019	\$	5.2
2020		6.0
2021		4.4
2022		2.7
2023 and thereafter		2.6
Total	\$	<u>20.9</u>

Legal Proceedings

From time to time, we are subject to legal proceedings and claims. In our opinion, we are not involved in any litigation or proceedings that would have a material adverse effect on us or our business.

A putative class action suit was filed against DST, the Compensation Committee of DST’s Board of Directors, the Advisory Committee of DST Systems, Inc. 401(k) Profit Sharing Plan (the “Plan”) and certain of DST’s present and/or former officers and directors, alleging breach of fiduciary duties and other violations of the Employee Retirement Income Security Act. On September 1, 2017, a complaint was filed purportedly on behalf of the Plan in the Southern District of New York, captioned Ferguson, et al v. Ruane Cunniff & Goldfarb Inc., et al., naming as defendants the DST, the Compensation Committee of DST’s Board of Directors, the Advisory Committee of the Plan and certain of DST’s present and/or former officers and directors. We intend to defend this case vigorously, and, because it is still in its preliminary stages, has not yet determined what effect this lawsuit will have, if any, on its financial position or results of operations.

In connection with an investigation of the Plan and the activities of its fiduciaries, the U.S. Department of Labor through its Employee Benefits Security Administration issued a letter dated February 23, 2018 stating that, based on facts gathered, it appeared that certain fiduciaries of the Plan may have breached their fiduciary obligations and violated certain provisions of the Employee Retirement Income Security Act in connection with the administration of the Plan. The letter stated that if the fiduciaries fail to take corrective action, the matter may be referred to the Office of the Solicitor of Labor for possible legal action. The letter further stated that if the fiduciaries take proper corrective action based on a settlement agreement with the Department of Labor, it will not bring a lawsuit with regard to these issues, and close its investigation without further action. We have not yet determined what effect this letter will have, if any, on its financial position or results of operations.

On September 28, 2018, a complaint was filed in the United States District Court for the Southern District of New York captioned Robert Canfield, et al. v. SS&C Technologies Holdings, Inc., et al., Case No. 18-cv-8913, on behalf of five individual plaintiffs. The Complaint names as defendants SS&C Technologies Holdings, Inc., DST Systems, Inc., The Advisory Committee of the DST Systems, Inc. 401(k) Profit Sharing Plan, The Compensation Committee of the Board of Directors of DST Systems, Inc., and Ruane, Cuniff & Goldfarb, Inc. The underlying claim is the same as in the above-described Ferguson matter, with the exception that it is an individual action and not a putative class action.

On November 5, 2018, a complaint was filed in the United States District Court for the Southern District of New York captioned Mark Mendon and Jill Pehlman v. SS&C Technologies Holdings, Inc., et al. individually and on behalf of the DST Systems, Inc. 401(k) Profit Sharing Plan. The Complaint names as defendants SS&C Technologies Holdings, Inc., DST Systems, Inc., The Advisory Committee of the DST Systems, Inc. 401 (k) Profit Sharing Plan, The Compensation Committee of the Board of Directors of DST Systems, Inc., and Ruane, Cuniff & Goldfarb, Inc. The underlying claim is the same as in the above-described Ferguson matter, with the exception that it is an individual action and not a putative class action.

DST Systems, Inc., the Advisory Committee of the Plan, and the Compensation Committee of DST’s Board of Directors have been named in approximately 278 substantially similar individual demands for arbitration through February 22, 2019, by former and current DST employees demanding arbitration under the DST Employee Arbitration Program and Agreement. The underlying claim in each is the same as in the above-described Ferguson matter, with the exception that each is an individual claim and not a putative class action. As of February 22, 2019, the parties have jointly submitted 21 of the demands for arbitration to the American Arbitration Association. The remaining demands for arbitration have not yet been submitted.

Note 17—Segment and Geographic Information

We operate in one operating segment. Our geographic regions consist of the United States, Canada, Americas excluding the United States and Canada, Europe and Asia Pacific and Japan.

Long-lived assets as of December 31, were (in millions):

	2018	2017	2016
United States	\$ 425.2	\$ 97.2	\$ 76.9
Europe, Middle East and Africa	108.5	4.6	4.2
Asia-Pacific and Japan	24.7	6.0	6.4
Canada	6.0	7.9	6.9
Americas, excluding United States and Canada	0.4	0.4	0.8
Total	<u>\$ 564.8</u>	<u>\$ 116.1</u>	<u>\$ 95.2</u>

Note 18—Selected Quarterly Financial Data (Unaudited)

The following tables set forth selected unaudited quarterly Consolidated Statements of Comprehensive (Loss) Income data for each of the quarters indicated. The unaudited information should be read in conjunction with our Consolidated Financial Statements and related notes included elsewhere in this report. We believe that the following unaudited information reflects all normal recurring adjustments necessary for a fair presentation of the information for the periods presented. The operating results for any quarter are not necessarily indicative of results for any future period.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
	(\$ in millions, except per share data)			
2018				
Revenues	\$ 421.9	\$ 895.8	\$ 992.4	\$ 1,111.0
Gross profit	192.4	292.3	412.3	473.0
Operating income (loss)	86.8	(50.7)	180.6	212.4
Net income (loss)	51.2	(63.7)	57.0	58.7
Basic earnings (loss) per share	\$ 0.25	\$ (0.27)	\$ 0.24	\$ 0.24
Diluted earnings (loss) per share	\$ 0.24	\$ (0.27)	\$ 0.23	\$ 0.23
Cash dividends declared and paid per common share	\$ 0.07	\$ 0.07	\$ 0.08	\$ 0.08

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
	(\$ in millions, except per share data)			
2017				
Revenues	\$ 407.7	\$ 411.0	\$ 418.2	\$ 438.4
Gross profit	190.2	187.3	198.4	213.0
Operating income	89.7	89.9	103.9	113.3
Net income	48.1	51.1	64.2	165.4
Basic earnings per share	\$ 0.24	\$ 0.25	\$ 0.31	\$ 0.80
Diluted earnings per share	\$ 0.23	\$ 0.24	\$ 0.30	\$ 0.77
Cash dividends declared and paid per common share	\$ 0.0625	\$ 0.0625	\$ 0.07	\$ 0.07

Note 19—Subsequent Event

Dividend declared. On February 12, 2019, our Board of Directors declared a quarterly cash dividend of \$0.10 per share of common stock payable on March 15, 2019 to stockholders of record as of the close of business on March 1, 2019.

Item 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

Item 9A. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer (our principal executive officer and principal financial officer, respectively), evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2018. The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, or Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the rules and forms of the Securities and Exchange Commission. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2018, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Report of Management on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting for the Company. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Internal control over financial reporting includes policies and procedures that: 1) pertain to maintaining records that in reasonable detail accurately and fairly reflect our transactions and dispositions of assets; 2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of our financial statements in accordance with generally accepted accounting principles and that receipts and expenditures are made in accordance with management and board of director authorization; and 3) provide reasonable assurance regarding the prevention or timely detection of unauthorized acquisition, use or disposition of company assets that could have a material effect on our financial statements. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in *Internal Control – Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, management concluded that our internal control over financial reporting was effective as of December 31, 2018. In April 2018, we acquired the assets of DST, in June 2018, we acquired the assets of Eze and in November 2018, we acquired the assets of Intralinks. Management has excluded DST, Eze and Intralinks from its assessment of internal control over financial reporting as of December 31, 2018 because they were acquired by us in a purchase business combination during 2018. DST, Eze and Intralinks, and their related entities are our wholly-owned subsidiaries whose total assets and total revenues represent 17% and 50%, respectively, of the Consolidated Financial Statement amounts as of and for the year ended December 31, 2018.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which is included herein.

Changes in Internal Control Over Financial Reporting

There have not been any changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the fiscal quarter ended December 31, 2018, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. OTHER INFORMATION

None.

PART III

Item 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Incorporated by reference from the information in the Company's proxy statement for the 2019 annual meeting of stockholders, which the Company intends to file within 120 days after the end of the fiscal year to which this annual report on Form 10-K relates.

Item 11. EXECUTIVE COMPENSATION

Incorporated by reference from the information in the Company's proxy statement for the 2019 annual meeting of stockholders, which the Company intends to file within 120 days after the end of the fiscal year to which this annual report on Form 10-K relates.

Item 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Incorporated by reference from the information in the Company's proxy statement for the 2019 annual meeting of stockholders, which the Company intends to file within 120 days after the end of the fiscal year to which this annual report on Form 10-K relates.

Item 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Incorporated by reference from the information in the Company's proxy statement for the 2019 annual meeting of stockholders, which the Company intends to file within 120 days after the end of the fiscal year to which this annual report on Form 10-K relates.

Item 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Incorporated by reference from the information in the Company's proxy statement for the 2019 annual meeting of stockholders, which the Company intends to file within 120 days after the end of the fiscal year to which this annual report on Form 10-K relates.

PART IV

Item 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

- (a) The following documents are filed as part of this Report.
- (1) Financial Statements — See Index to Financial Statements in Item 8 of this Report.
 - (2) Financial Statement Schedules — All financial statement schedules are not submitted because they are not applicable, not required or the information is included in our Consolidated Financial Statements.
 - (3) Exhibits — See the Exhibit listing below.

Exhibit Number	Description of Exhibit
2.1†	<u>Agreement and Plan of Merger, dated as of January 11, 2018, by and among DST Systems, Inc., SS&C Technologies Holdings, Inc. and Diamond Merger Sub, Inc. is incorporated herein by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K, filed on January 11, 2018 (File No. 001-34675)</u>
2.2†	<u>Membership Interest Purchase Agreement dated as of September 6, 2018, by and between Impala Private Holdings I, LLC and SS&C Technologies Holdings, Inc. is incorporated herein by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed on September 6, 2018 (File No. 001-34675)</u>
3.1	<u>Restated Certificate of Incorporation of the Registrant is incorporated herein by reference to Exhibit 3.1 to the Company's Quarterly Report on Form 10-Q, filed on August 5, 2016 (File No. 001-34675)</u>
3.2	<u>Amended and Restated Bylaws of the Registrant are incorporated herein by reference to Exhibit 3.4 to the Form S-1, as amended (File No. 333-164043) (the "2010 Form S-1")</u>

Exhibit Number	Description of Exhibit
10.1	Credit Agreement, dated as of July 8, 2015, by and among SS&C Technologies Holdings, Inc., SS&C Technologies, Inc., SS&C European Holdings S.a R.L, SS&C Technologies Holdings Europe S.a R.L., certain of SS&C's subsidiaries, Deutsche Bank AG New York Branch and certain Lenders and L/C Issuers party thereto is incorporated herein by reference to Exhibit 10.2 of the Registrants Current Report on Form 8-K, filed on July 8, 2015 (File No. 001-34675)
10.2	Amendment No. 1 to the Credit Agreement, dated as of March 2, 2017, by and among SS&C Technologies Holdings, Inc., SS&C Technologies, Inc., SS&C European Holdings S.a R.L, SS&C Technologies Holdings Europe S.a R.L., certain of SS&C's subsidiaries, Deutsche Bank AG New York Branch and certain Lenders and L/C Issuers party thereto is incorporated herein by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed on March 6, 2017 (File No. 001-34675)
10.3	Second Amendment to Credit Agreement, dated as of March 9, 2018, among SS&C Technologies Holdings, Inc., SS&C Technologies, Inc., SS&C European Holdings S.a R.L, SS&C Technologies Holdings Europe S.a R.L., the Company's other subsidiaries party thereto, Credit Suisse AG, Cayman Islands Branch, as administrative agent, and the lenders and L/C issuers party thereto (Exhibit A thereto is incorporated herein by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed on April 16, 2018 (File No. 001-34675))
10.4	Commitment Increase Amendment, dated as of October 1, 2018, among SS&C Technologies Holdings, Inc., certain of its subsidiaries and Credit Suisse AG, Cayman Islands Branch, as administrative agent and lender is incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed on October 5, 2018 (File No. 001-34675)
10.5	Commitment Increase Amendment dated as of November 16, 2018, among SS&C Technologies Holdings, Inc., certain of its subsidiaries, Credit Suisse AG, Cayman Islands Branch, as administrative agent, and Deutsche Bank AG New York Branch, as lender
10.6	Stockholders Agreement, dated as of November 23, 2005, by and among the Registrant, Carlyle Partners IV, L.P., CP IV Coinvestment, L.P., William C. Stone and Other Executive Stockholders (as defined therein) is incorporated herein by reference to Exhibit 10.5 to SS&C Technologies, Inc's Registration Statement on Form S-4, as amended (File No. 333-135139) (the "2006 Form S-4")
10.7	Amendment No. 1, dated April 22, 2008, to the Stockholders Agreement dated as of November 23, 2005, by and among the Registrant, Carlyle Partners IV, L.P., CP IV Coinvestment, L.P. and William C. Stone is incorporated herein by reference to Exhibit 10.28 to the Registrant's Registration Statement on Form S-1, as amended (File No. 333-143719) (the "2008 Form S-1")
10.8	Amendment No. 2, dated March 2, 2010, to the Stockholders Agreement dated as of November 23, 2005, as amended by Amendment No. 1 to the Stockholders Agreement dated April 22, 2008, by and among the Registrant, Carlyle Partners IV, L.P., CP IV Coinvestment, L.P. and William C. Stone is incorporated herein by reference to Exhibit 10.1 to SS&C Technologies, Inc.'s Current Report on Form 8-K, filed on March 2, 2010 (File No. 000-28430) (the "March 2, 2010 8-K")
10.9	Amendment No. 3, dated March 10, 2011, to the Stockholders Agreement dated as of November 23, 2005, as amended by Amendment No. 1 to the Stockholders Agreement dated April 22, 2008, and Amendment No. 2 to the Stockholders Agreement dated March 2, 2010, by and among the Registrant, Carlyle Partners IV, L.P., CP IV Coinvestment, L.P. and William C. Stone is incorporated herein by reference to Exhibit 10.35 to SS&C Technologies, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2010 (File No. 000-28430)
10.10	Registration Rights Agreement, dated as of November 23, 2005, by and among the Registrant, Carlyle Partners IV, L.P., CP IV Coinvestment, L.P., William C. Stone and Other Executive Investors (as defined therein) is incorporated herein by reference to Exhibit 10.6 to the 2006 Form S-4
10.11	Registration Rights Agreement, dated November 16, 2018, by and between the Impala Private Holdings I, LLC and SS&C Technologies Holdings, Inc. is incorporated herein by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed on November 16, 2018 (File No. 001-34675)
10.12*	Employment Agreement, dated as of March 11, 2010, by and among William C. Stone, the Registrant and SS&C Technologies, Inc. is incorporated herein by reference to Exhibit 10.27 to the 2010 Form S-1

Exhibit Number	Description of Exhibit
10.13*	First Amended and Restated Employment Agreement, dated as of March 31, 2015, between SS&C Technologies Holdings, Inc. and William C. Stone is incorporated herein by reference to Exhibit 99.1 to the Registrant’s Current Report on Form 8-K, filed on April 1, 2015 (File No. 001-34675)
10.14*	Employment Agreement, dated as of February 8, 2018, among SS&C Technologies Holdings, Inc, SS&C Technologies, Inc. and Joseph J. Frank is incorporated herein by reference to Exhibit 10.2 to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 (File No. 001-34675)
10.15*	Employment Agreement, dated as of February 8, 2018, among SS&C Technologies Holdings, Inc, SS&C Technologies, Inc. and Joseph J. Frank is incorporated herein by reference to Exhibit 10.2 to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 (File No. 001-34675)
10.16*	Form of Director Indemnification Agreement is incorporated herein by reference to Exhibit 10.35 to the 2010 Form S-1
10.17*	2006 Equity Incentive Plan is incorporated herein by reference to Exhibit 10.1 to SS&C Technologies, Inc.’s Current Report on Form 8-K, filed on August 15, 2006 (File No. 000-28430) (the “August 15, 2006 8-K”)
10.18*	Forms of 2006 Equity Incentive Plan Amended and Restated Stock Option Grant Notice and Amended and Restated Stock Option Agreement are incorporated herein by reference to Exhibit 10.2 to the March 2, 2010 8-K
10.19*	Form of Stock Award Agreement is incorporated herein by reference to Exhibit 10.4 to the August 15, 2006 8-K
10.20*	2008 Stock Incentive Plan is incorporated herein by reference to Exhibit 10.26 to the 2008 Form S-1
10.21*	Form of 2008 Stock Incentive Plan Stock Option Grant Notice and Stock Option Agreement is incorporated herein by reference to Exhibit 10.26 to the 2010 Form S-1
10.22*	Form of Restricted Stock Award Agreement under 2006 Equity Incentive Plan is incorporated herein by reference to Exhibit 10.2 to the Registrant’s Quarterly Report on Form 10-Q for the Quarter ended June 30, 2013 (File No. 001-34675)
10.23*	Amended and Restated 2014 Stock Incentive Plan of SS&C Technologies Holdings, Inc. is incorporated herein by reference to Exhibit 10.1 to the Registrant’s Current Report on Form 8-K, filed on May 26, 2016 (File No. 001-34675)
10.24*	SS&C Technologies Holdings, Inc. Executive Bonus Plan is incorporated herein by reference to Appendix B to the Company’s definitive proxy statement on Schedule 14A, filed on April 16, 2014 (File No. 001-34675)
10.25*	2014 Stock Option Plan Form of Stock Option Agreement is incorporated herein by reference to Exhibit 10.3 to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended June 30, 2014 (File No. 001-34675)
10.26*	Form of Restricted Stock Unit Award Agreement under Amended and Restated 2014 Stock Incentive Plan of SS&C Technologies Holdings, Inc. is incorporated herein by reference to Exhibit 10.5 to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 (File No. 001-34675)
10.27*	Restricted Stock Unit Award Agreement, dated as of March 9, 2018, among SS&C Technologies Holdings, Inc and Joseph J. Frank is incorporated herein by reference to Exhibit 10.4 to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 (File No. 001-34675)
21**	Subsidiaries of the Registrant
23.1**	Consent of PricewaterhouseCoopers LLP
31.1**	Certifications of the Registrant’s Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2**	Certifications of the Registrant’s Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32**	Certification of the Registrant’s Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1351, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (furnished and not filed for purposes of sections 11 or 12 of the Securities Act and section 18 of the Exchange Act)
101.INS**	XBRL Instance Document.
101.SCH**	XBRL Taxonomy Extension Schema Document.

Exhibit Number	Description of Exhibit
101.CAL**	XBRL Taxonomy Calculation Linkbase Document.
101.LAB**	XBRL Taxonomy Label Linkbase Document.
101.PRE**	XBRL Taxonomy Presentation Linkbase Document.
101.DEF**	XBRL Taxonomy Extension Definition Linkbase Document.
101.REF**	XBRL Taxonomy Reference Linkbase Document.
†	Schedules have been omitted from this filing pursuant to Item 601(b)(2) of Regulation S-K. The Registrant agrees to furnish supplementally a copy of any omitted schedule to the Securities and Exchange Commission upon its request; provided, however, that the Registrant may request confidential treatment pursuant to Rule 24b-2 of the Exchange Act for any schedule so furnished.
*	Management contract or compensatory plan or arrangement filed herewith in response to Item 15(a)(3) of the Instructions to the Annual Report on Form 10-K.
**	Submitted electronically herewith.

Attached as Exhibit 101 to this report are the following formatted in XBRL (Extensible Business Reporting Language): (i) Consolidated Balance Sheets at December 31, 2018 and 2017, (ii) Consolidated Statements of Comprehensive (Loss) Income for the years ended December 31, 2018, 2017 and 2016, (iii) Consolidated Statements of Cash Flows for the years ended December 31, 2018, 2017 and 2016, (iv) Consolidated Statements of Changes in Stockholders' Equity for the years ended December 31, 2018, 2017 and 2016 and (v) Notes to Consolidated Financial Statements.

Item 16 . FORM 10-K SUMMARY

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

SS&C TECHNOLOGIES HOLDINGS, INC.

By: /s/ William C. Stone
William C. Stone
Chairman of the Board and Chief Executive Officer

Date: March 1, 2019

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

<u>Signatures</u>	<u>Title</u>	<u>Date</u>
<u>/s/ William C. Stone</u> William C. Stone	Chairman of the Board and Chief Executive Officer (Principal Executive Officer)	March 1, 2019
<u>/s/ Patrick J. Pedonti</u> Patrick J. Pedonti	Senior Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)	March 1, 2019
<u>/s/ Normand A. Boulanger</u> Normand A. Boulanger	Director	March 1, 2019
<u>/s/ Smita Conjeevaram</u> Smita Conjeevaram	Director	March 1, 2019
<u>/s/ Michael E. Daniels</u> Michael E. Daniels	Director	March 1, 2019
<u>/s/ Jonathan E. Michael</u> Jonathan E. Michael	Director	March 1, 2019
<u>/s/ David A. Varsano</u> David A. Varsano	Director	March 1, 2019
<u>/s/ Michael J. Zamkow</u> Michael J. Zamkow	Director	March 1, 2019

NAME	JURISDICTION OF ORGANIZATION
Financial Models Company Ltd.	New York
SS&C Financial Services LLC	Delaware
SS&C Technologies Connecticut LLC	Connecticut
SS&C Technologies, Inc.	Delaware
Advent Software, Inc.	Delaware
Hub Data, Inc.	Massachusetts
Second Street Securities, Inc.	Delaware
Advent Software (Middle East) Limited	United Arab Emirates
Advent Software (Asia) Ltd.	Hong Kong
Advent Software (Beijing) Co. Ltd.	China
Advent Software (Singapore) Pte. Ltd.	Singapore
Advent Software ApS	Denmark
Advent Norway AS	Norway
Advent Sweden AB	Sweden
Advent Software Luxembourg S.a.r.l.	Luxembourg
Primatics Financial (Pvt) Ltd.	Pakistan
Financial Models Corporation Limited	United Kingdom
FMC Global Investments Limited	Barbados
SS&C Fund Services (Cayman) Ltd.	Cayman Islands
GlobeOp Financial Services (India) Private Limited	India
SS&C Financial Services (Ireland) Limited	Ireland
SS&C Financial Services Limited	United Kingdom
GlobeOp Financial Services (Switzerland) GmbH	Switzerland
GlobeOp Financial Services Technologies (India) Private Limited	India
GlobeOp Holding Company (Mauritius) Private Limited	Mauritius
SS&C Depository Services Limited	United Kingdom
SS&C Fund Services (Bermuda) Ltd.	Bermuda
SS&C Services Limited	Bermuda
SS&C Fund Administration Company	Nova Scotia
SS&C European Holdings S.a.r.l.	Luxembourg
SS&C Technologies (s) Pte Ltd.	Singapore
SS&C Technologies Australia Pty Ltd	Australia
SS&C Technologies B.V.	Netherlands
SS&C Technologies Canada Corp.	Nova Scotia
SS&C Technologies Holdings Europe S.a.r.l.	Luxembourg
SS&C Technologies Hong Kong Limited	Hong Kong
SS&C Technologies India Private Limited	India
SS&C Technologies Ireland Limited	Ireland
SS&C Technologies Sdn. Bhd.	Malaysia
SS&C Luxembourg S.a.r.l.	Luxembourg
DST Global Solutions LLC	Delaware
Global Solutions (Thailand) Limited	Thailand
SS&C Guernsey Limited	Guernsey
SS&C Solutions Limited	United Kingdom
SS&C Solutions Singapore Pte. Ltd	Singapore
SS&C Solutions Pty Limited	Australia
SS&C Solutions Hong Kong Limited	Hong Kong
SS&C Solutions NZ Limited	New Zealand
SS&C Technologies Shanghai Limited	China
PT DST Global Solutions Indonesia	Indonesia
SS and C Technologies South Africa (Pty) Ltd	South Africa
Conifer Asset Solutions Pte. Ltd.	Singapore
SSC Jersey Limited	United Kingdom
SS&C Fund Services (UK) Limited	United Kingdom
SS&C Fund Services (Asia) Limited	Hong Kong

SS&C Fund Services (Asia) Pte Ltd.	Singapore
SS&C (USA) Inc.	Delaware
SS&C (Canada) Limited	New Brunswick
SS&C Financing LLC	Delaware
DST Systems, Inc.	Delaware
DST Pershing Realty, Inc.	Missouri
Pershing Road Development Company, LLC	Missouri
C&T Acquisition Limited	United Kingdom
DST Healthcare Holdings, Inc.	Delaware
DST Health Solutions, LLC	Delaware
Intellisource Solutions, LLC	Pennsylvania
DST Pharmacy Solutions, Inc.	Delaware
Pacific Ventures (Mauritius)	Mauritius
DST Worldwide Services India Private Limited	India
DST Insurance Solutions, LLC	Delaware
DST Output Summit Development Corporation	Missouri
DST Wealth Management Systems, Inc.	New Jersey
ALPS Holdings, Inc.	Delaware
ALPS Advisors, Inc.	Colorado
ALPS Distributors, Inc.	Colorado
ALPS Fund Services, Inc.	Colorado
ALPS Portfolio Solutions Distributor, Inc.	Colorado
Red Rocks Capital, LLC	Colorado
ALPS Alternative Investment Services, LLC	Delaware
ALPS Alternative Investment Services, Ltd.	Cayman Islands
Vermont Western Assurance, Inc.	Missouri
DST Technologies, Inc.	Missouri
DST Brokerage Solutions, LLC	Missouri
DST Global Solutions North America, LLC	Delaware
DST Research, Analytics and Consulting, LLC	New York
DST Worldwide Services, LLC	Missouri
DST Worldwide Services (Thailand) Limited	Thailand
DST Systems of California, LLC	Delaware
DST Realty of California, Inc.	California
DST Market Services, LLC	New York
IFDS GP, Inc.	Missouri
DST Retirement Solutions, LLC	Delaware
LTM Publishing, Inc.	New York
McKay Hochman Co., Inc.	New York
Third Party Educational Systems, Inc.	Minnesota
DST Realty, Inc.	Missouri
Broadway Development, L.L.C.	Missouri
DST UK Realty, LLC	Delaware
DST UK Leasing I, LLC	Delaware
DST UK Leasing II, LLC	Delaware
Eleventh Street Corridor Development Corporation	Missouri
Hillside Properties Corporation	Missouri
Kansas City Downtown Hotel Group, L.L.C.	Missouri
Lewis Real Estate, LLC	Missouri
The Broadway Condominiums, LLC	Missouri
Winchester Business Center, Inc.	Missouri
Broadway Square Partners, LLP	Missouri
1400 Baltimore, LLC	Missouri
Penn Seven, L.L.C.	Missouri
Kirkwood Realty Company, LLC	Missouri
MC Realty Group, LLC	Missouri
Winchester Ventures II, LLC	Missouri

International Financial Data Services Limited Partnership	Massachusetts
IFDS Luxembourg S.A.	Luxembourg
International Financial Data Services (Canada) Limited	Canada
International Financial Data Services (Ireland) Limited	Ireland
MobilCo Solutions, LLC	Delaware
DSTi US, LLC	Delaware
DST Realty of New York, Inc.	New York
West Side Investment Management, Inc.	Nevada
DST Asset Manager Solutions, Inc.	Massachusetts
DST Realty Masskan, LLC	Massachusetts
SS&C DST Holdings Limited	United Kingdom
DSTi Group LLP	United Kingdom
DSTi Holdings Limited	United Kingdom
DST Bluedoor Holdings Pty Ltd.	Australia
Bluedoor Technologies Pty Limited	Australia
DST Bluedoor Pty Limited	Australia
DST Process Solutions (Australia) Pty Limited	Australia
DST Financial Services International Limited	United Kingdom
IFDS Financial Services Limited	United Kingdom
DST Financial Services Europe Limited	United Kingdom
The Administration Partnership Limited	United Kingdom
DST Financial Services Ireland Limited	Ireland
DST International Managed Services Limited	Ireland
DST Process Solutions Limited	United Kingdom
DST Process Solutions SA (Pty) Ltd	South Africa
DST Global Solutions (Realty) Limited	United Kingdom
DST (Hong Kong) Limited	Hong Kong
Pensions and Actuarial Services Limited	United Kingdom
Eze Castle Software LLC	Delaware
EzeSoftware India Private Limited (India)	India
EzeSoftware Group Brasil Tecnologias de Investimento Ltda. (Brazil)	Brazil
Eze Software Asia Pacific Limited (Hong Kong)	Hong Kong
Eze Software Group Pty Limited (Australia)	Australia
Eze Castle Transaction Services LLC	Delaware
Eze Software EMEA Limited (United Kingdom)	United Kingdom
Eze Software Europe Limited (United Kingdom)	United Kingdom
Eze Castle Software Singapore Pte. Ltd. (Singapore)	Singapore
Intralinks, Inc.	Delaware
Intralinks Ltd. (England)	United Kingdom
IntraLinks Goudou Kaisha (Japan)	Japan
Intralinks Servicios de Tecnologia de Mexico, S de R.L. de C.V. (Mexico)	Mexico
IntraLinks Servicios de Informatica Ltda. (Brazil)	Brazil
Intralinks International Holdings, LLC	Delaware
IntraLinks Pty Limited (Australia)	Australia
IntraLinks Canada, Inc. (Canada)	Canada
IntraLinks EMEA Holdings B.V. (Netherlands)	Netherlands
IntraLinks SRL (Romania)	Romania
Intralinks Asia Pacific Pte. Ltd. (Singapore)	Singapore
IntraLinks GmbH (Germany)	Germany
IntraLinks Spain SLU (Spain)	Spain
IntraLinks EMEA France SARL (France)	France
Intralinks India Solutions Pvt. Limited (India)	India

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (No. 333-224390, No. 333-205705, No. 333-197943, No. 333-187599, No. 333-167796 and No. 333-165810) and Form S-3 (No. 333-228087) of SS&C Technologies Holdings, Inc. of our report dated March 1, 2019 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

March 1, 2019
Hartford, Connecticut

CERTIFICATION

I, William C. Stone, certify that:

1. I have reviewed this annual report on Form 10-K of SS&C Technologies Holdings, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2019

/s/ William C. Stone

William C. Stone
Chairman of the Board and Chief Executive Officer
(Principal Executive Officer)

CERTIFICATION

I, Patrick J. Pedonti, certify that:

1. I have reviewed this annual report on Form 10-K of SS&C Technologies Holdings, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2019

/s/ Patrick J. Pedonti

Patrick J. Pedonti
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the annual report on Form 10-K of SS&C Technologies Holdings, Inc. (the "Company") for the year ended December 31, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned officers of the Company hereby certify to their knowledge, pursuant to 18 U.S.C. Section 1350, that:

- (1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2019

By: /s/ William C. Stone
William C. Stone
Chairman of the Board and
Chief Executive Officer
(Principal Executive Officer)

Date: March 1, 2019

By: /s/ Patrick J. Pedonti
Patrick J. Pedonti
Senior Vice President and
Chief Financial Officer
(Principal Financial Officer)