

# Descartes Systems Group Inc. (DSGX-Q, DSG-T)

I am initiating coverage on Descartes Systems Group Inc. with a Buy rating and a 6-12 month share price target of \$27.69.

The firm's consistent revenue growth, supported by ~95% recurring revenue, alongside high margins (adjusted EBITDA margins were ~32% on average for the last 4 fiscal years) are among some of the highlights that have convinced me to adopt an optimistic view with respect to the firm's future performance. Descartes is well-positioned to take advantage of positive momentum in trade and transportation by leveraging its core business for organic growth as well as keeping an eye out for attractive and accretive acquisitions, as management has been doing in the past.

## Investment Thesis

- **Economic Moat** surrounding the firm based on the foundation created by the Descartes' Global Logistics Network; perhaps the world's largest multi-modal and neutral logistics network designed to automate and enhance supply chain management and logistical processes for a market worth approximately \$4 trillion.
- **Favorable Trends** across relevant markets such as heightened regulatory compliance requirements, growth in omni-channel retail and e-commerce, and the increasing need of real-time data in supply-chain focused processes present opportunities for significant growth. Macroeconomic indicators for global trade and transportation activity highlight positive momentum, presenting an avenue for further organic growth.
- **Disciplined M&A Strategy** exemplified through 34 acquisitions of small-to-medium businesses since 2006. Managerial expertise has enabled the firm to integrate these acquisitions effectively, stimulating growth in margins and allowing the firm to offer a more refined line of solutions for its existing and potential customers.
- **Strong Balance Sheet and Recurring Revenues** provide the financial stability required to continue implementing the firm's acquisitive strategies. The firm currently holds no debt, holds approximately \$38 million in cash, has access to a revolving credit line of \$150 million (all of which is unwithdrawn as of now), and recently filed a Mixed-Shelf prospectus allowing the firm to access additional capital worth \$500 million through issuing a mix of securities.

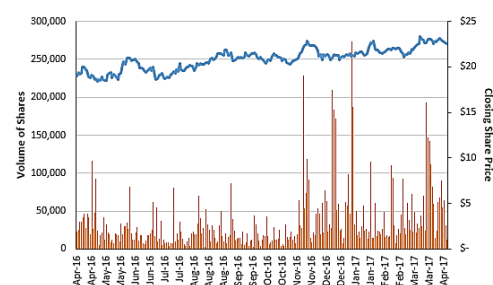
## Valuation

Descartes is currently trading at a FY17 EV/Revenue multiple of 8.3x, EV/EBITDA multiple of 26.4x and P/E multiple of 72.7x. Comparatively, its closest peers in the supply chain and logistics management industry are trading at a median LTM EV/Revenue multiple of 4.5x, EV/EBITDA multiple of 24.4x and a P/E multiple of 29x.

<b>Rating</b>	<b>BUY</b>
<b>Price Target</b>	<b>\$ 27.69</b>
<b>Last Price</b>	<b>\$ 22.60</b>
<b>Potential Upside</b>	<b>22.52%</b>
<b>Ticker</b>	<b>DSGX</b>
<b>Industry</b>	<b>Technology</b>
<b>Sector</b>	<b>Enterprise Software</b>

### Market Data

Market Capitalization (\$M)	\$ 1,714.77
Enterprise Value (\$M)	\$ 1,714.73
52-Week Range	\$23.75 - \$18.00
Shares Outstanding (M)	75.87
Average Weekly Volume (Th)	45.79
Last Fiscal Year Ended	1/31/2017
Currency	USD



### Trading Multiples

	FY 17	FY 18E	FY 19E
EV / Revenue	8.3 x	7.4 x	6.6 x
EV / EBITDA	26.4 x	23.5 x	20.4 x
P / E	72.7 x	63.5 x	50.8 x

### Key Financial Data

	FY 17	FY 18E	FY 19E
Revenue (\$M)	\$ 203.78	\$ 228.23	\$ 255.62
EBITDA (\$M)	\$ 64.33	\$ 72.03	\$ 83.01
EPS (Basic)	\$ 0.31	\$ 0.36	\$ 0.45
FCF (\$M)	\$ 67.06	\$ 59.58	\$ 72.25

### Company Description

Descartes Systems Group Inc is a global provider of federated network and global logistics technology solutions that help its customers automate and enhance their supply chain and logistic processes.

## Company Description

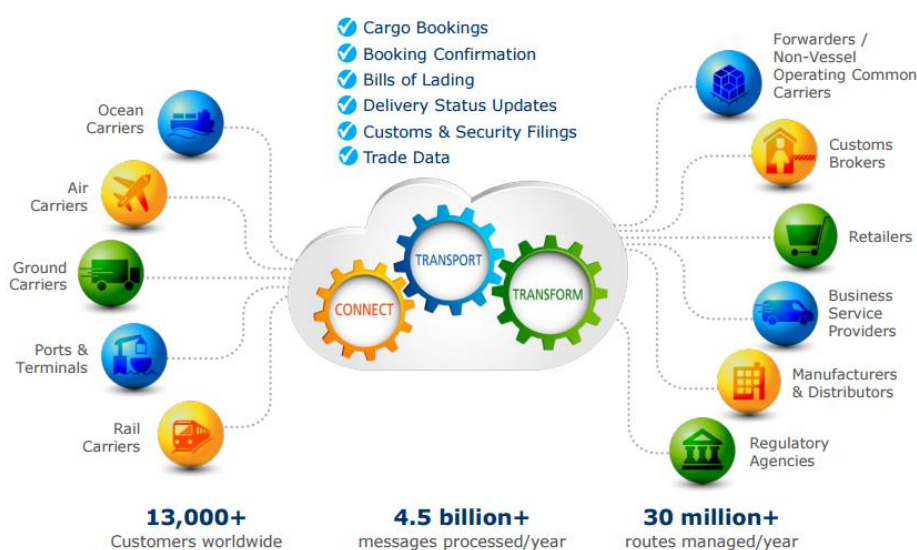
Descartes Systems Group Inc. is a Waterloo, Canada based firm focused on the provision of global logistics solutions as well as supply chain management for business processes. Their customers use their SaaS (Software as a Service) solutions to route, schedule, track and measure delivery resources; plan, allocate and execute shipments; rate, audit and pay transportation invoices; access and leverage global trade and restricted party data, and file customs and security documents for imports and exports. Their customer base consists of transportation providers (air, ocean and truck modes), logistics service providers (i.e. freight forwarders and customs brokers) and distribution intensive companies.

Descartes Systems Group Inc. aims to unite the global community of logistic-focused parties through its Logistics Technology Platform, which is designed to accelerate time-to-value and increase productivity and performance for businesses of all sizes. The underlying foundation of this platform is the Global Logistics Network (GLN). GLN manages the flow of documents and data that track and control inventory, assets and people in motion. This network extends to over 13,000 customers, and provides a connection with over 172,000 parties across 160 countries. Fused to this network is the Descartes Logistics Application Suite which offers a wide array of modular cloud-based, interoperable web and wireless logistics management applications. This comprehensive suite of solutions includes:

- Routing, Mobile and Telematics
- Transportation management and e-commerce enablement
- Customs and Regulatory Compliance
- Trade Data
- Global Logistics Network Services
- Broker and Forwarder Enterprise Systems

The firm is headquartered in Waterloo, Ontario, and has offices across Asia Pacific, EMEA and the Americas. It currently employs over 1000 individuals worldwide.

**Figure – The Foundation: Descartes Global Logistics Network™**



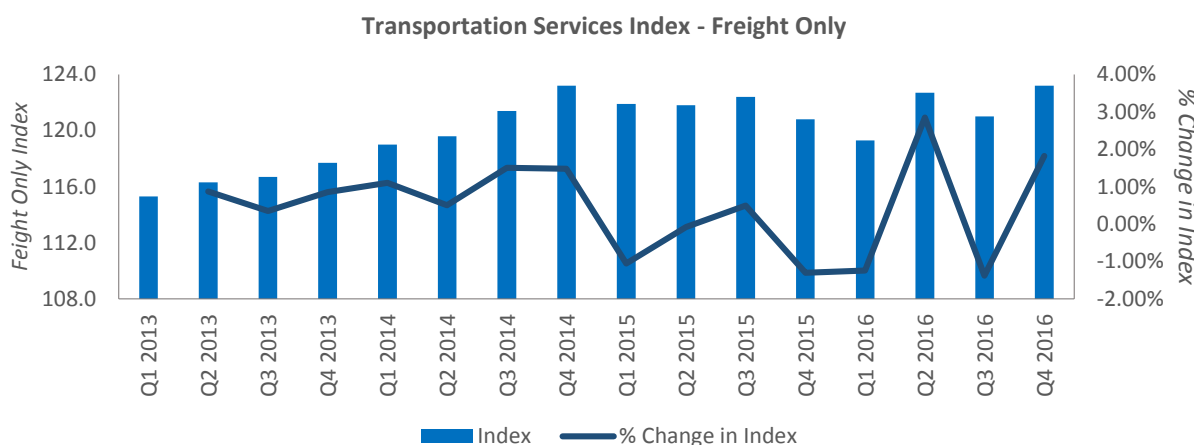
Source: Company Investor Presentation

# Industry Overview

Descartes Systems Group serves an industry that thrives on higher volumes and value of trade and transportation activity. This presents it with the opportunity to target a total addressable market of approximately \$4 trillion. With increasing global trade as well as security concerns emanating from across the globe, firms are looking to enhance and automate their supply-chain processes as well as ensure they are in compliance with global trade and customs standards. Thus, in order to effectively analyze this industry, in addition to interpreting indices designed to track the financial health of the global logistics industry, one must focus on the existing trends present in the global trade compliance area.

## Transportation

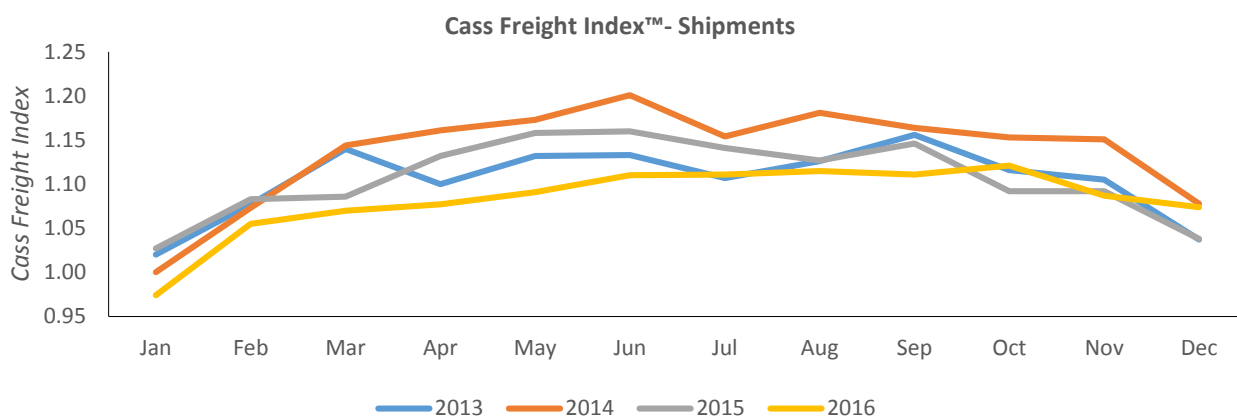
Figure – Transportation Services Index (Freight Only data)



Source: U.S. Department of Transportation - Bureau of Transportation Statistics

One of the major indicators for identifying trends in the transportation industry is the Transportation Services Index (TSI), released by the Bureau of Transportation. It tracks freight movement by all modes of transport (air, carrier, rail and ground) and thus it serves as an ideal reference for transportation trends. As can be observed by the exhibit below, freight transportation has displayed volatility during 2015 and 2016. No clear seasonal trends are observed based on the movements in the index, however one can gauge the positive increases in 2016, both in Q2 and Q4, with Q4 yielding a 4-year high of 123.2 as a result of a 1.82% increase in the index relative to the previous quarter. This is representative of strength in the transportation as well as a potential positive momentum for the near-future.

Figure – Cass Freight Index™ (Shipments)



Source: Cass Information Systems Inc.

The Cass Freight Index is a trusted measure of North American freight volumes and expenditures, and helps identify freight trends present in the region. The index covers all domestic freight modes and is derived from over \$20 billion in freight transactions processed by Cass on an annual basis on behalf of its clients. The Cass Freight Index reveals a prominent seasonality in freight volumes and expenditures with both measures peaking during the middle of the year, before declining till the start of the next year. Looking at the 2016 data, one can observe that the index surpassed 2015 levels for the last quarter of the year; activity in October improved by 2.66% YoY and activity in December yielded a 3.47% greater result on YoY basis. When viewed with the TSI data from the previous exhibit, we can conclude that the transportation industry is poised to benefit from a positive momentum, both in terms of volume and expenditure of freight shipments.

## Trade

Figure – Total World Merchandise Exports (Value in USD)



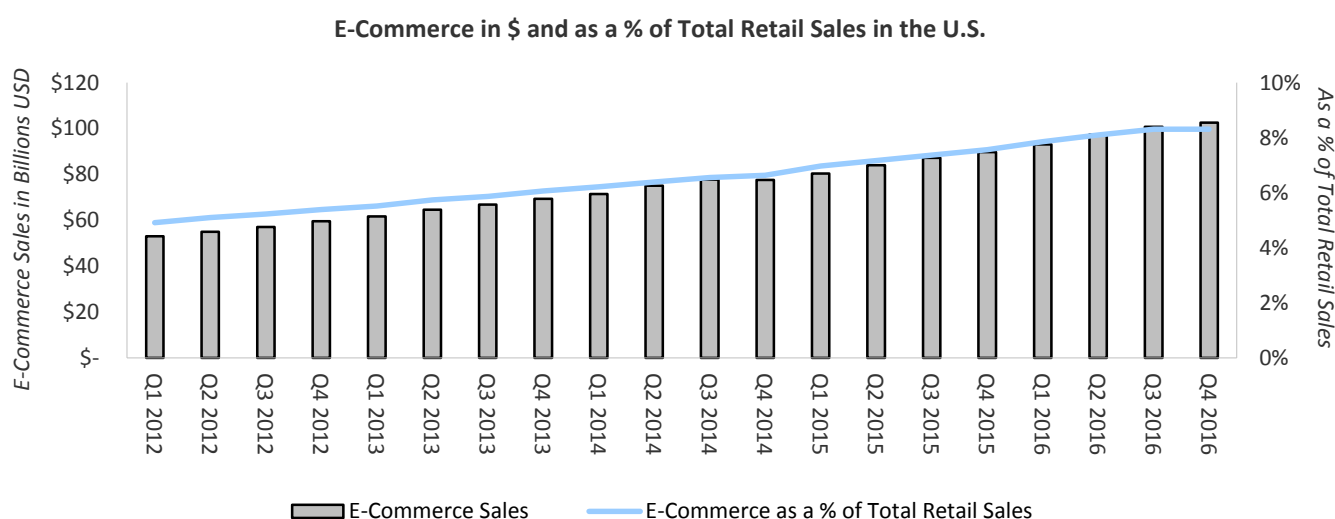
Source: World Trade Organization

According to WTO, despite the positive growth in trade volume terms, the dollar value of world merchandise exports declined by 14% in 2015 to approximately US \$16 trillion. Major reasons attributed to this decline include an economic slowdown in China, recessions in other developing countries such as Brazil, falling prices for oil and other primary commodities, strong fluctuations in exchange rates, and financial volatility driven by the monetary policies in developed countries during the period. In February 2017, WTO published a report to provide an estimate on trade momentum for the first quarter of 2017. They have set a target of a 2% increase in their World Trade Outlook indicator, which tracks trade volume based on several drivers including merchandise trade volume, export orders, International Air Freight (IATA), and more. A positive growth outlook in air freight, automobile sales, export orders, and container shipping volume presents Descartes Systems Group an opportunity for increased organic growth in the coming quarters.

## Retail

According to the Census Bureau of the U.S. Department of Commerce, e-commerce as a percentage of sales for U.S. retailers rose from 4.92% in Q1 2012 to 8.32% in Q4 2016; implying a prominent positive momentum in the trend for online shopping. The total value of e-commerce sales in the U.S. during Q4 2016 crossed \$102 billion which highlights the importance that customers are placing on the convenience offered by retailers or third-party shopping valet services. Suppliers are being faced by the pressure to provide customers with lower order-to-fulfillment periods and greater flexibility in scheduling deliveries. This need for logistical and supply chain process improvement by retailers presents a significant opportunity for Descartes to improve its customer base, especially since it has already transformed the supply chain processes for renowned firms such as Sears, Home Depot and John Lewis Partnership.

Figure – E-Commerce (in \$) and as a % of Total Retail Sales in the U.S.



Source: United States Census Bureau

## Customs and Regulatory Compliance

With an increase in global transportation activity and trade volume, as well as the implementation of stricter counter-terrorism initiatives, increasing regulatory requirements are stimulating the demand for Descartes' customs filing and government data services. This presents an avenue for further incremental revenues for Descartes, considering that the firm has an established customer base consisting of more than 13,000 customers. An example of one of the valuable solutions that Descartes' customers in the U.S. can benefit from would be the *Importer Security Filing™* offering, which facilitates the electronic submission of required data to U.S. Customs and Border Protection. Likewise, the firm's *eCellerate™* offering equips customers with an interactive dashboard that boasts a variety of modules targeting purchase order management, shipment management, denied party screening, in addition to importer security filing. Similar solution suites are available for customers based in Europe, Canada, Asia, Africa, and the Middle East. Innovative and dynamic offerings enable customers to automate a significant portion of the processes associated with regulatory requirements and compliance, thus freeing up time and resources to target the more fundamental aspects of their respective businesses.

## Markets Served

Figure – Descartes' Major Customers



Source: Company Investor Presentation

Descartes serves over 13,000 customers globally in the transportation and logistics services, manufacturing, retail, distribution, business services, and public sector.

### **Transportation and Logistics Services**

Descartes empowers its customers with cloud-based solutions for freight brokerage, supply chain management, GPS fleet tracking, route planning, transportation management and global trade compliance. Customers in this sector include air and ocean carriers, Truckload and Less-than-Truckload Carriers, Third-party logistics providers, Freight forwarders, customs brokers, and Non-vessel operating common carriers (NVOCCs).

### **Manufacturers**

Descartes provides innovative solutions to manufacturers in order to improve logistics precision and the pace of the supply chain, as well as eliminate inefficiencies associated with the supply chain processes. These solutions support firms involved in the manufacture of building products, chemicals, consumer products, food and beverages, high-tech electronics, and other discrete products.

### **Retail**

With a focus on home delivery, omni-channel retailing, inbound logistics and store distribution, Descartes employs its expertise in automation and process transformation in order to ensure increased revenues and reduced costs through its continuous optimization approach. It further allows for optimization of the flow of goods yielding lower order-to-fulfillment periods. Customers currently benefitting from these services include retailers focusing on apparel, consumer electronics, furniture, home furnishings, appliances, pharmaceutical products, and specialty products, as well as mass merchants.

### **Distribution Operators**

Firms in this sector face increasingly slim margins primarily due to the fact that they have to ensure optimal levels of customer services, focus on attracting and retaining customers, as well maintain low prices. In order to assist the firms with improving their margins, Descartes provides solutions that improve inventory, asset, personnel, and business document management. With the capabilities of a refined transportation management system, regulatory and customs compliance, and improved trading partner connectivity, Descartes ensures complete customer satisfaction. Currently, the cloud-based solutions support firms engaged in the automotive, construction, food and beverages, pharmaceutical, and energy sector.

### **Business Services Providers**

Business services providers focus on improving the efficiency and effectiveness of their operational activities. Descartes aims to assist its customers in enhancing these two key areas through its Logistics Technology Platform. Operations directed towards routing, transportation management, and customs and regulatory compliance, are all improved through the solutions that Descartes empowers its customers with. Services such as equipment rental, leasing and recycling, document retention and secure destruction, inspection/maintenance, and security and armored transport are covered by Descartes solutions suite.

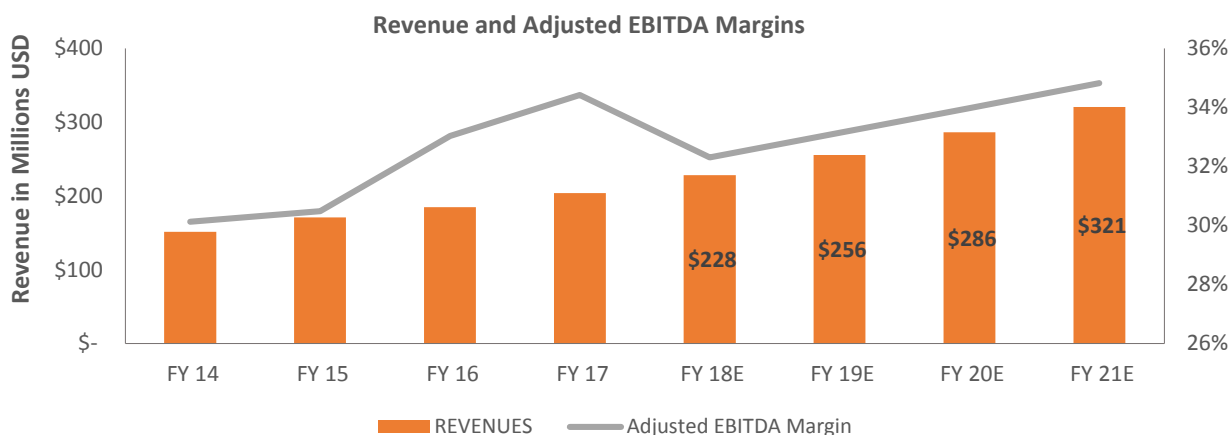
### **Public Sector**

Descartes caters towards the requirements of an array of agencies, from those involved in managing trade and transportation filing data to authorities that track buses. Descartes utilizes its Logistics Technology Platform for effective route planning, optimizing driver and vehicle performance, and compliance management.

For examples of various products that Descartes offers to its customer base, please refer to the **Example of Solutions Offered** section to enhance your understanding of how Descartes provides value to its customers.

# Financial Overview

Figure – Revenue and Adjusted EBITDA Margins

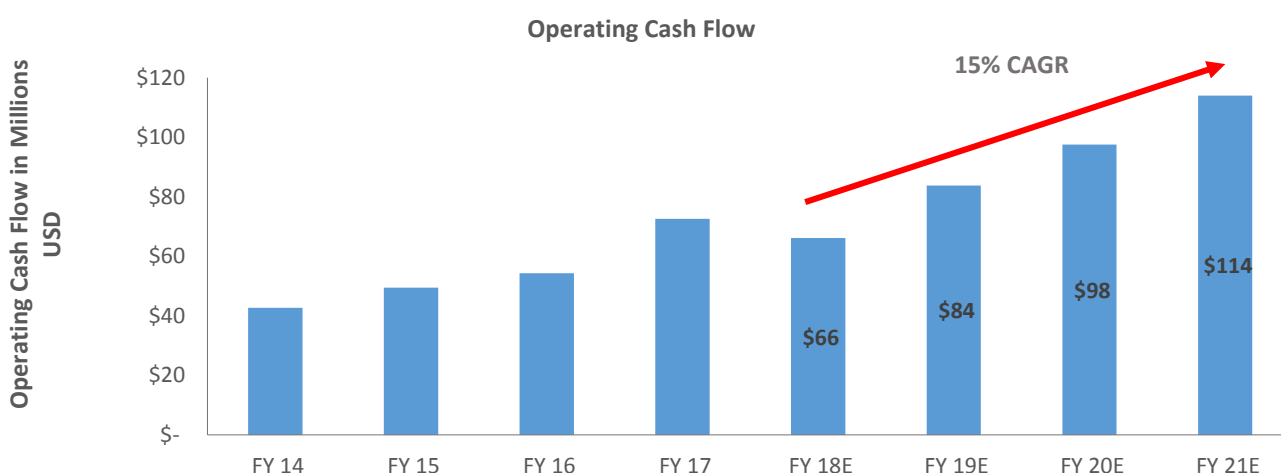


Source: Company data

Based on historical performance, management's emphasis on profitability is evident. Revenues have increased to \$203.8 million in FY17, implying a 5-year CAGR of 10%. If the negative impact of foreign exchange movements (due to appreciation of the U.S. dollar) were to be eliminated, revenue growth would have been higher during the FY16 to FY17 period by approximately 1%, thus highlighting the exchange rate risk associated with the business model of Descartes Systems Group. Presently, recurring revenues are accountable for 97% of total revenue, and management vows to increase this proportion, thereby boosting the outlook for stable revenue growth over the coming years. Adjusted EBITDA margins have been north of 30% over the course of the past 4 years; margins in FY17 were at a promising 34%. The growth in margins is associated with synergies resulting from the smooth integration of acquired businesses, which specialize in high margin product lines (such as trade data).

Based on an existing positive momentum of revenue growth and a favorable outlook in terms of trade volume, I forecast a 12% CAGR for the period FY18E - FY21E. Furthermore, as per management's guidance, I have modelled in a consistent 1% increase in gross margins which drive adjusted EBITDA margins to 35% in FY21E. The drop in adjusted EBITDA margins from 34% in FY17 to 32% in FY18E is a result of no restructuring charges forecasted for FY18E - FY21E (restructuring charges are added into adjusted EBITDA).

Figure – Operating Cash Flow

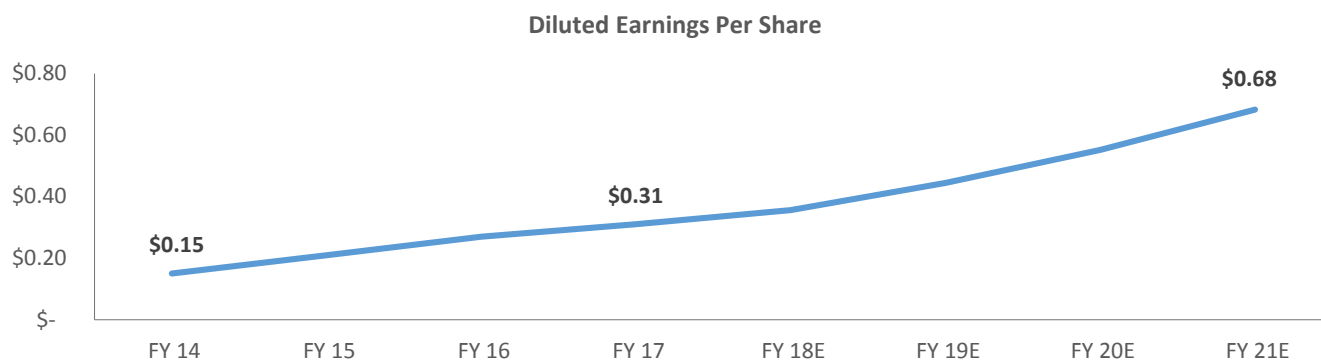


Source: Company data



Results from operations have been consistently strong throughout the past 4 years. The firm generated \$72.6 million in cash flow from operations in FY17, which is almost 1.1x times adjusted EBITDA for the period. This removes any fear of lack of internal financing for acquisitions and improvements to the capital infrastructure of the firm. The firm's capital expenditure requirements are relatively low (around 2.5% of revenue at most over the past few years). This results in the firm generating free cash flows that are, on average, 90% of operating cash flows over the past few years. These results remove concerns about lackluster cash generation and reflect the strong financial health of the firm. Growth in cash flow from operations is forecasted at a 15% CAGR for FY18E - FY21E (the decline in operating cash flows from FY16 to FY17E accounts for settlement of income tax liabilities including deferred tax liabilities).

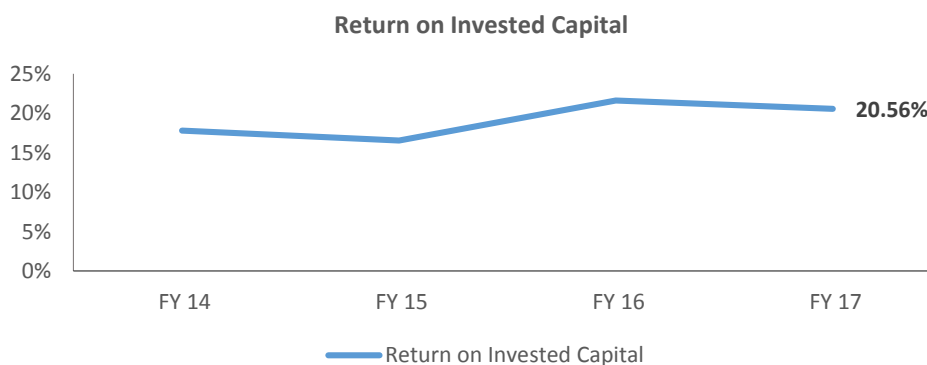
**Figure – Diluted Earnings per Share**



Source: Company data

Growth in recurring revenues, increasing margins and acquisitive synergies are major drivers for EPS growth in the last 4 years, as EPS rose from \$0.15 in FY14 to \$0.31 in FY17. The firm's limited reliance on debt plays a part here as well. Implying a 12% CAGR for revenue for the forecasted period of FY18E - FY21E and accounting for a conservative estimate of consistent growth in margins, I have forecasted an EPS of \$0.68 in FY21E. A major assumption here is that the firm will generate significant investment income from cash generated during the period as unannounced acquisitions are not modelled in.

**Figure – Return on Invested Capital**



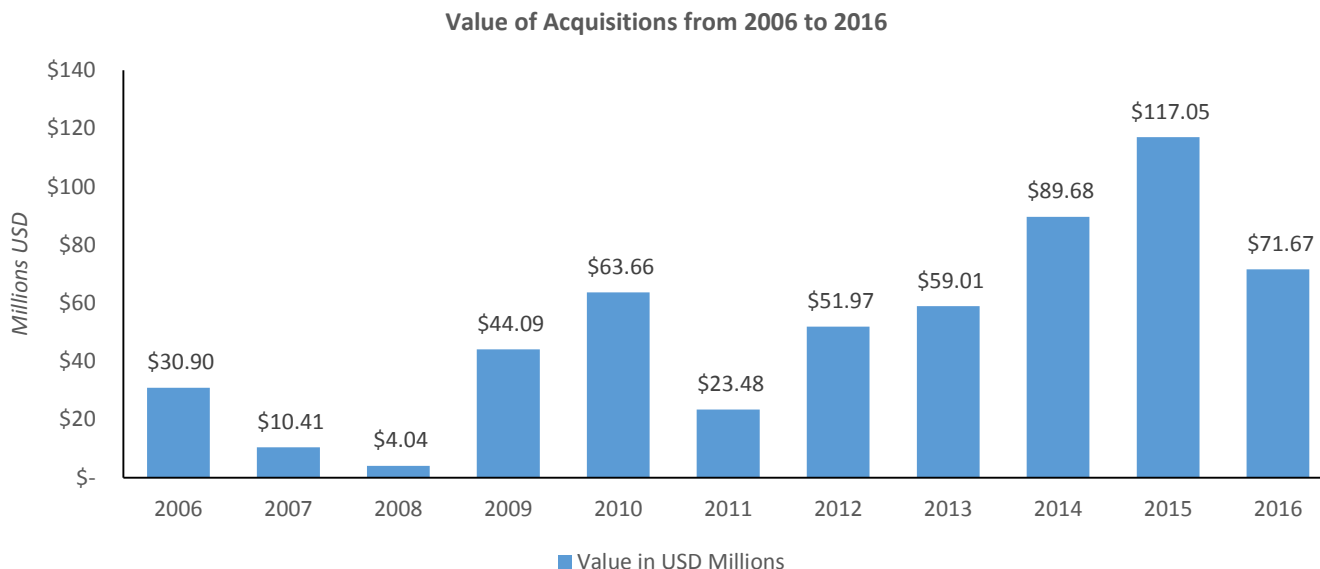
Source: Company data

The firm has had a consistent Return on Invested Capital for the past 4 years, indicating effective capital allocation. ROIC in FY17 was 20.6%, while the calculated WACC for the firm is 5.74%, implying that management is creating exceptional value for investors. Material returns above the cost of capital as highlighted by the above exhibit, indicate the existence of an economic moat for Descartes.



## M&A Strategy

Figure – Value of Acquisitions from 2006 to 2016



Source: Company Reports

Descartes acquisitive success can be gauged by its ability to integrate the acquired businesses into its Global Logistics Network, capture expense savings, and where possible, cross-sell its services to its customer base to enhance the value provided to customers. The business has been able to exemplify success in all three traits over the past 10 years by acquiring 34 businesses since FY07, with the average acquisition in a year being worth \$16.65 million. In FY17, the firm acquired pixi, Appterra, 4Solutions and Datamyne for a total of \$71.5 million. Management is determined to act on future acquisitive opportunities that could potentially allow them to enhance their service offering to clients. Historically, the firm has focused more on acquisitions aimed at enhancing the Supply-Chain Management solution suite, with 53% of acquisitions over the past 10 years complementing this division of the business. Management primarily targets businesses that can complement the existing suite of solutions offered to customers. The Datamyne acquisition provides subscribers access to claims and commercialized logistics trade data, along with the tools to analyze the data to develop sourcing strategies. The pixi acquisition enabled the firm to establish a stronger presence in Europe and enhance their expertise in e-commerce order fulfillment and warehouse management. By integrating pixi's platform with Descartes' systems, existing pixi customers are able to process three times the number of shipments as they would have with just the pixi platform. These examples illustrate the synergies associated with such accretive solutions.

The firm is well positioned to meet any future financing needs if such opportunities are presented in the coming years. Strong cash generation provides an avenue for internal financing. Close inspection of the balance sheet should remove investor concerns about any financing issues. The firm holds no debt (as at FY17), with an access to a revolving credit line valued at \$150 million, all of which remains unwithdrawn. The firm recently filed a mixed-shelf prospectus allowing it to issue a mix of securities valued at \$500 million whenever it deems fit to do so. Cash at FY17 was \$38 million, and internal cash generation is healthy as observed by the positive trend in operating cash flow figures over the past 4 years. Unannounced acquisitions are not modelled in, yet may have a significant positive impact on the core business if integration is smooth.

# Valuation

## Public Comparable Companies Analysis

Figure – Public Comparable Companies (Firms specializing in SCM)

Valuation Statistics Company Name	EV / Revenue			EV / EBITDA			EV / FCF			P / E		
	LTM	FY18	FY19	LTM	FY18	FY19	LTM	FY18	FY19	LTM	FY18	FY19
Manhattan Associates	5.7 x	5.5 x	5.1 x	15.6 x	15.6 x	14.0 x	25.9 x	23.0 x	21.2 x	28.4 x	28.3 x	25.6 x
SPS Commerce Inc	4.4 x	3.9 x	3.4 x	32.4 x	26.8 x	21.9 x	79.8 x	68.5 x	50.1 x	NMF	NMF	NMF
Kinaxis Inc	11.1 x	9.0 x	9.0 x	45.2 x	35.0 x	27.1 x	50.9 x	50.9 x	32.7 x	NMF	86.6 x	60.7 x
WiseTech Global Ltd	12.3 x	10.0 x	8.0 x	49.5 x	28.7 x	20.9 x	86.9 x	78.2 x	50.6 x	NMF	51.0 x	37.3 x
Enghouse Systems Ltd	4.5 x	4.4 x	3.9 x	16.4 x	15.3 x	13.8 x	25.2 x	20.2 x	15.9 x	29.6 x	32.4 x	28.4 x
Echo Global Logistics Ltd	0.5 x	0.4 x	0.4 x	12.9 x	11.0 x	8.8 x	61.1 x	21.3 x	21.6 x	NMF	51.1 x	21.0 x
Amber Road Inc	2.8 x	2.5 x	2.2 x	NMF	NMF	31.5 x	NMF	NMF	NMF	NMF	NMF	NMF
Maximum	12.3 x	10.0 x	9.0 x	49.5 x	35.0 x	31.5 x	86.9 x	78.2 x	50.6 x	29.6 x	86.6 x	60.7 x
75th Percentile	8.4 x	7.3 x	6.5 x	42.0 x	28.2 x	24.5 x	75.1 x	64.1 x	45.7 x	29.3 x	51.1 x	37.3 x
<b>Median</b>	<b>4.5 x</b>	<b>4.4 x</b>	<b>3.9 x</b>	<b>24.4 x</b>	<b>21.2 x</b>	<b>20.9 x</b>	<b>56.0 x</b>	<b>37.0 x</b>	<b>27.1 x</b>	<b>29.0 x</b>	<b>51.0 x</b>	<b>28.4 x</b>
25th Percentile	3.6 x	3.2 x	2.8 x	15.8 x	15.4 x	13.9 x	32.1 x	21.7 x	21.3 x	28.7 x	32.4 x	25.6 x
Minimum	0.5 x	0.4 x	0.4 x	12.9 x	11.0 x	8.8 x	25.2 x	20.2 x	15.9 x	28.4 x	28.3 x	21.0 x
<b>Descartes Systems Group</b>	<b>8.3 x</b>	<b>7.4 x</b>	<b>6.6 x</b>	<b>26.4 x</b>	<b>23.5 x</b>	<b>20.4 x</b>	<b>25.3 x</b>	<b>28.5 x</b>	<b>23.5 x</b>	<b>72.7 x</b>	<b>63.5 x</b>	<b>50.8 x</b>
<b>Over or Under Valued</b>	<b>Over</b>	<b>Over</b>	<b>Over</b>	<b>Over</b>	<b>Over</b>	<b>Under</b>	<b>Under</b>	<b>Under</b>	<b>Under</b>	<b>Over</b>	<b>Over</b>	<b>Over</b>

Source: Company data, Bloomberg

Descartes is currently trading at 72.9x P/E, which is a significant premium compared to its competitors operating in the supply chain management industry; the industry median being 29x P/E. Solely relying on a comparable company analysis would result in investors forgoing an opportunity to benefit from Descartes' growth simply because the investment seems an expensive one at first glance. The overvaluation here can be justified by the low risk associated with the firm's cash flows and robust M&A pipeline; both elements being excluded from the P/E metric.

Analyzing the EV/EBITDA multiple leads us to a similar situation. The firm trades at an EV/EBITDA multiple of 26.4x, relative to the industry median of 24.4x. However, based on the EBITDA estimates for the next two years, it would seem that Descartes' EV/EBITDA multiple moves closer to the industry average. FY19E EV/EBITDA is forecasted to be 20.5x for Descartes, while the forecast for the industry is 20.9x. Overall, the 8.33% premium firm (based on the EV/EBITDA multiple) potential investors would be paying for the firm is worth it primarily because of the future outlook of growth for the firm, both organic and through accretive acquisitions.

Going beyond the traditional multiples, I calculated an EV / Unlevered FCF multiple. Based on this multiple, Descartes seems to have a reasonable valuation. LTM EV / Unlevered FCF was 25.3x for Descartes; the median for comparable companies was 56x. As long as management continues to employ free cash flows appropriately either through acquisitions or other major investments, the firm will continue to enhance value for investors.

## Discounted Cash Flow Analysis

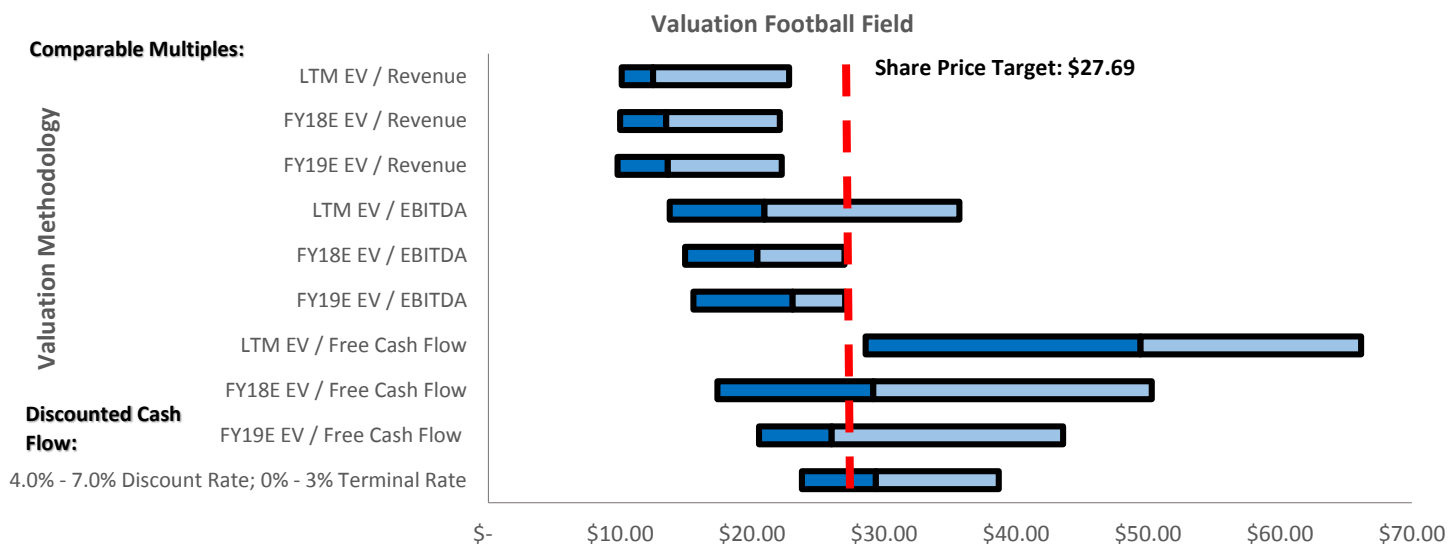
Figure – Sensitivity Tables for Discount Factor and Terminal Growth

		Terminal Growth Rate						
		0.0%	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%
Discount Factor	4.0%	\$ 30.61	\$ 34.55	\$ 39.79	\$ 47.14	\$ 58.15	\$ 76.51	\$ 113.23
	4.5%	\$ 27.18	\$ 30.19	\$ 34.07	\$ 39.24	\$ 46.48	\$ 57.34	\$ 75.44
	5.0%	\$ 24.43	\$ 26.81	\$ 29.78	\$ 33.60	\$ 38.70	\$ 45.84	\$ 56.54
	5.5%	\$ 22.18	\$ 24.10	\$ 26.45	\$ 29.38	\$ 33.15	\$ 38.17	\$ 45.21
	6.0%	\$ 20.31	\$ 21.89	\$ 23.78	\$ 26.09	\$ 28.98	\$ 32.70	\$ 37.65
	6.5%	\$ 18.73	\$ 20.04	\$ 21.60	\$ 23.46	\$ 25.74	\$ 28.59	\$ 32.26
	7.0%	\$ 17.37	\$ 18.49	\$ 19.78	\$ 21.31	\$ 23.15	\$ 25.40	\$ 28.21

Source: Author's analysis

The Discounted Cash Flow Analysis was the primary valuation methodology used to arrive at the 6-12 month share price target of **\$27.69** for Descartes Systems Group, implying a **22.5% upside potential** for investors. The discount rate was calculated to be 5.74% and terminal growth rate was assumed as 1.5%. Since the firm's capital structure is 100% equity, the discount factor is equal to the cost of equity, which is derived through the CAPM. The terminal growth rate is a conservative estimate of growth in global trade and is slightly lower than the 2% increase projected by the World Trade Outlook Indicator for 2017.

Figure – Valuation Football Field



Source: Author's Analysis

## Investment Risks

- **Adverse Impact on International Trade** could potentially hinder Descartes' ability to expand its customer base due to potential customers suffering from a loss of revenues and forgoing opportunities to partner with Descartes and optimize their supply-chain and logistical processes. Likewise, higher costs of trade and transportation for current customers in the future might result in them terminating their subscription with Descartes for the sake of cost-cutting.
- **Foreign Exchange Rate Risk** threatens stability of recurring revenues originating from Asia, Europe, Middle-East, and Africa – which represent 40% of total recurring revenue generated by the firm in 2017.
- **Inadequate Integration of Acquired Businesses** would eliminate any potential synergies that would have resulted from the transaction. Higher margins, limited retention of existing customers of target firm, and additional restructuring costs would be some of the negative implications of such a situation.
- **Change in Government Filing or Screening Requirements for Global Trade** would impact Descartes' regulatory compliance services. Primary factors to consider here include potential uncertainty surrounding trade in the Americas region. Such changes would result in the need for further adjustments in current processes thus increasing costs in the short-term.

## Conclusion

Conclusively, I reiterate my target share price for Descartes of \$27.69. Based on historical share price performance and relative valuation, one could argue that the company is fully valued at the moment. However, I believe that the firm still has room to grow and enhance share value based on the qualitative and quantitative factors highlighted in this report. An investment in Descartes Systems Group Inc. is ideal for investors with a long-term investing horizon and are looking to get involved in the Enterprise Software sector on a global scale.

# Financial Statements and Ratios

All units are in Thousands USD, except for per-share data

Year Ended	Income Statement							
	FY 14	FY 15	FY 16	FY 17	FY 18E	FY 19E	FY 20E	FY 21E
<b>REVENUES</b>	\$ 151,294.00	\$ 170,860.00	\$ 184,993.00	\$ 203,779.00	\$ 228,232.48	\$ 255,620.38	\$ 286,294.82	\$ 320,650.20
<b>COST OF REVENUES</b>	\$ 49,043.00	\$ 54,879.00	\$ 53,859.00	\$ 56,051.00	\$ 60,494.80	\$ 65,197.97	\$ 70,158.77	\$ 75,371.33
<b>GROSS MARGIN</b>	\$ 102,251.00	\$ 115,981.00	\$ 131,134.00	\$ 147,728.00	\$ 167,737.68	\$ 190,422.41	\$ 216,136.05	\$ 245,278.88
<b>EXPENSES</b>								
Sales and marketing	\$ 16,681.00	\$ 20,404.00	\$ 22,424.00	\$ 24,943.00	\$ 28,529.06	\$ 32,591.60	\$ 37,218.33	\$ 42,486.16
Research and development	\$ 25,881.00	\$ 28,077.00	\$ 31,293.00	\$ 35,566.00	\$ 38,744.33	\$ 43,393.65	\$ 48,600.89	\$ 54,432.99
General and administrative	\$ 20,509.00	\$ 20,333.00	\$ 21,607.00	\$ 23,077.00	\$ 27,650.67	\$ 30,968.75	\$ 34,685.00	\$ 38,847.20
Other charges	\$ 6,512.00	\$ 2,876.00	\$ 1,491.00	\$ 3,455.00	\$ 4,843.60	\$ 5,424.83	\$ 6,075.81	\$ 6,804.91
Amortization of intangible assets	\$ 17,999.00	\$ 21,715.00	\$ 26,222.00	\$ 30,001.00	\$ 33,055.61	\$ 35,917.17	\$ 39,373.28	\$ 43,438.20
	\$ 87,582.00	\$ 93,405.00	\$ 103,037.00	\$ 117,032.00	\$ 132,823.27	\$ 148,296.00	\$ 165,953.31	\$ 186,009.46
<b>INCOME FROM OPERATIONS</b>	\$ 14,669.00	\$ 22,576.00	\$ 28,097.00	\$ 30,696.00	\$ 34,914.41	\$ 42,126.41	\$ 50,182.74	\$ 59,269.42
<b>INTEREST EXPENSE</b>	\$ (993.00)	\$ (1,088.00)	\$ (522.00)	\$ (611.00)	\$ -	\$ -	\$ -	\$ -
<b>INVESTMENT INCOME</b>	\$ 57.00	\$ 333.00	\$ 195.00	\$ 1,415.00	\$ 1,024.71	\$ 2,743.67	\$ 5,526.81	\$ 9,577.77
<b>INCOME BEFORE TAXES</b>	\$ 13,733.00	\$ 21,821.00	\$ 27,770.00	\$ 31,500.00	\$ 35,939.12	\$ 44,870.08	\$ 55,709.55	\$ 68,847.19
<b>INCOME TAX EXPENSE</b>								
Current	\$ 1,768.00	\$ 2,784.00	\$ 1,443.00	\$ 4,022.00	\$ -	\$ -	\$ -	\$ -
Deferred	\$ 2,353.00	\$ 3,978.00	\$ 5,765.00	\$ 3,640.00	\$ -	\$ -	\$ -	\$ -
	\$ 4,121.00	\$ 6,762.00	\$ 7,208.00	\$ 7,662.00	\$ 8,625.39	\$ 10,768.82	\$ 13,370.29	\$ 16,523.33
<b>NET INCOME</b>	\$ 9,612.00	\$ 15,059.00	\$ 20,562.00	\$ 23,838.00	\$ 27,313.73	\$ 34,101.26	\$ 42,339.26	\$ 52,323.86
<b>EARNINGS PER SHARE</b>								
Basic	\$ 0.15	\$ 0.21	\$ 0.27	\$ 0.31	\$ 0.36	\$ 0.45	\$ 0.56	\$ 0.69
Diluted	\$ 0.15	\$ 0.21	\$ 0.27	\$ 0.31	\$ 0.36	\$ 0.44	\$ 0.55	\$ 0.68
<b>WEIGHTED AVERAGE SHARES OUTSTANDING</b>								
Basic	\$ 62,841.00	\$ 70,559.00	\$ 75,595.00	\$ 75,800.00	\$ 75,800.00	\$ 75,800.00	\$ 75,800.00	\$ 75,800.00
Diluted	\$ 64,370.00	\$ 71,584.00	\$ 76,409.00	\$ 76,515.00	\$ 76,714.15	\$ 76,714.15	\$ 76,714.15	\$ 76,714.15

As At	Balance Sheet							
	FY 14	FY 15	FY 16	FY 17	FY 18E	FY 19E	FY 20E	FY 21E
<b>ASSETS</b>								
<b>CURRENT ASSETS</b>								
Cash	\$ 62,705.00	\$ 118,053.00	\$ 37,213.00	\$ 38,135.00	\$ 98,492.43	\$ 175,874.80	\$ 266,270.04	\$ 372,247.91
Short-Term marketable securities	\$ -	\$ -	\$ 4,639.00	\$ -	\$ -	\$ -	\$ -	\$ -
Accounts receivable	\$ 29,003.00	\$ 25,870.00	\$ 28,745.00	\$ 29,110.00	\$ 31,264.72	\$ 34,316.16	\$ 37,649.73	\$ 41,289.20
Trade	\$ 20,558.00	\$ 22,613.00	\$ 25,614.00	\$ 25,401.00	\$ -	\$ -	\$ -	\$ -
Other	\$ 8,445.00	\$ 3,257.00	\$ 3,131.00	\$ 3,709.00	\$ -	\$ -	\$ -	\$ -
Prepaid expenses and other	\$ 3,663.00	\$ 4,327.00	\$ 4,205.00	\$ 5,149.00	\$ 5,743.14	\$ 6,412.17	\$ 7,175.65	\$ 8,042.86
Inventory	\$ 1,350.00	\$ 474.00	\$ 155.00	\$ 167.00	\$ 331.48	\$ 357.25	\$ 384.43	\$ 412.99
Deferred income taxes	\$ 13,508.00	\$ 8,572.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	\$ 110,229.00	\$ 157,296.00	\$ 74,957.00	\$ 72,561.00	\$ 135,831.77	\$ 216,960.38	\$ 311,479.85	\$ 421,992.97
OTHER LONG-TERM ASSETS	\$ -	\$ -	\$ 468.00	\$ 1,525.00	\$ 1,525.00	\$ 1,525.00	\$ 1,525.00	\$ 1,525.00
PROPERTY AND EQUIPMENT	\$ 8,792.00	\$ 7,829.00	\$ 8,604.00	\$ 10,447.00	\$ 12,094.28	\$ 13,518.96	\$ 14,651.20	\$ 15,408.88
DEFERRED INCOME TAXES	\$ 19,628.00	\$ 16,510.00	\$ 16,804.00	\$ 7,027.00	\$ 7,027.00	\$ 7,027.00	\$ 7,027.00	\$ 7,027.00
DEFERRED TAX CHARGE	\$ -	\$ -	\$ 906.00	\$ 422.00	\$ 422.00	\$ 422.00	\$ 422.00	\$ 422.00
INTANGIBLE ASSETS, NET	\$ 94,649.00	\$ 115,126.00	\$ 133,562.00	\$ 145,445.00	\$ 158,035.88	\$ 173,242.79	\$ 191,128.48	\$ 211,820.32
GOODWILL	\$ 111,179.00	\$ 147,440.00	\$ 217,486.00	\$ 263,113.00	\$ 263,113.00	\$ 263,113.00	\$ 263,113.00	\$ 263,113.00
	\$ 344,477.00	\$ 444,201.00	\$ 452,787.00	\$ 500,540.00	\$ 578,048.94	\$ 675,809.13	\$ 789,346.53	\$ 921,308.96
<b>LIABILITIES AND SHAREHOLDERS' EQUITY</b>								
<b>CURRENT LIABILITIES</b>								
Accounts payable	\$ 7,027.00	\$ 4,620.00	\$ 4,473.00	\$ 4,679.00	\$ 4,972.17	\$ 5,358.74	\$ 5,766.47	\$ 6,194.90
Accrued liabilities	\$ 16,757.00	\$ 16,695.00	\$ 16,844.00	\$ 23,247.00	\$ 24,312.64	\$ 27,144.85	\$ 30,376.93	\$ 34,048.11
Income taxes payable	\$ 2,671.00	\$ 4,112.00	\$ 2,086.00	\$ 2,170.00	\$ -	\$ -	\$ -	\$ -
Deferred revenue	\$ 9,217.00	\$ 14,720.00	\$ 16,639.00	\$ 23,728.00	\$ 27,387.90	\$ 31,952.55	\$ 37,218.33	\$ 43,287.78
Current portion of debt	\$ 8,618.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	\$ 44,290.00	\$ 40,147.00	\$ 40,042.00	\$ 53,824.00	\$ 56,672.72	\$ 64,456.14	\$ 73,361.74	\$ 83,530.79
LONG-TERM DEBT	\$ 31,787.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
LONG-TERM DEFERRED REVENUE	\$ -	\$ 589.00	\$ 941.00	\$ 421.00	\$ 421.00	\$ 421.00	\$ 421.00	\$ 421.00
LONG-TERM INCOME TAXES PAYABLE	\$ 4,418.00	\$ 3,450.00	\$ 3,672.00	\$ 5,725.00	\$ 5,725.00	\$ 5,725.00	\$ 5,725.00	\$ 5,725.00
DEFERRED INCOME TAXES	\$ 13,822.00	\$ 9,630.00	\$ 6,097.00	\$ 9,975.00	\$ 9,975.00	\$ 9,975.00	\$ 9,975.00	\$ 9,975.00
	\$ 94,317.00	\$ 53,816.00	\$ 50,752.00	\$ 69,945.00	\$ 72,793.72	\$ 80,577.14	\$ 89,482.74	\$ 99,651.79
COMMITMENTS, CONTINGENCIES AND GUARANTEES	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>SHAREHOLDERS' EQUITY</b>								
Common Shares	\$ 97,779.00	\$ 247,839.00	\$ 252,471.00	\$ 253,242.00	\$ 300,588.50	\$ 356,464.01	\$ 418,756.54	\$ 488,226.06
Additional paid-in capital	\$ 451,394.00	\$ 450,623.00	\$ 446,747.00	\$ 448,597.00	\$ 448,597.00	\$ 448,597.00	\$ 448,597.00	\$ 448,597.00
Accumulated other comprehensive loss	\$ (1,089.00)	\$ (25,212.00)	\$ (34,880.00)	\$ (32,779.00)	\$ (32,779.00)	\$ (32,779.00)	\$ (32,779.00)	\$ (32,779.00)
Accumulated deficit	\$ (297,924.00)	\$ (282,865.00)	\$ (262,303.00)	\$ (238,465.00)	\$ (211,151.27)	\$ (177,050.01)	\$ (134,710.75)	\$ (82,386.89)
	\$ 250,160.00	\$ 390,385.00	\$ 402,035.00	\$ 430,595.00	\$ 505,255.22	\$ 595,232.00	\$ 699,863.79	\$ 821,657.17
	\$ 344,477.00	\$ 444,201.00	\$ 452,787.00	\$ 500,540.00	\$ 578,048.94	\$ 675,809.13	\$ 789,346.53	\$ 921,308.96
Common Shares issued and outstanding	63,660,953	75,480,492	75,761,184	75,874,684	75,874,684	75,874,684	75,874,684	75,874,684

## Cash Flow Statement

Year Ended	FY 14	FY 15	FY 16	FY 17	FY 18E	FY 19E	FY 20E	FY 21E
<b>OPERATING ACTIVITIES</b>								
Net income	\$ 9,612.00	\$ 15,059.00	\$ 20,562.00	\$ 23,838.00	\$ 27,313.73	\$ 34,101.26	\$ 42,339.26	\$ 52,323.86
Adjustments to reconcile net income to cash provided by operating activities:								
Depreciation	\$ 3,396.00	\$ 3,295.00	\$ 3,377.00	\$ 3,628.00	\$ 4,058.53	\$ 4,965.83	\$ 6,025.14	\$ 7,258.77
Amortization of intangible assets	\$ 17,999.00	\$ 21,715.00	\$ 26,222.00	\$ 30,001.00	\$ 33,055.61	\$ 35,917.17	\$ 39,373.28	\$ 43,438.20
Stock-based compensation expense	\$ 2,623.00	\$ 1,543.00	\$ 1,577.00	\$ 2,022.00	\$ 1,700.00	\$ 1,700.00	\$ 1,700.00	\$ 1,700.00
Other non-cash based operating activities	\$ -	\$ -	\$ (392.00)	\$ (1,028.00)	\$ -	\$ -	\$ -	\$ -
Deferred tax expense	\$ 2,353.00	\$ 3,978.00	\$ 5,765.00	\$ 3,640.00	\$ -	\$ -	\$ -	\$ -
Deferred tax charge	\$ -	\$ -	\$ 22.00	\$ 368.00	\$ -	\$ -	\$ -	\$ -
Changes in operating assets and liabilities:								
Accounts receivable								
Trade	\$ 3,650.00	\$ 3,999.00	\$ 764.00	\$ 2,727.00	\$ (2,154.72)	\$ (3,051.44)	\$ (3,333.57)	\$ (3,639.47)
Other	\$ 2,164.00	\$ 4,869.00	\$ 203.00	\$ (212.00)	\$ -	\$ -	\$ -	\$ -
Prepaid expenses and other	\$ 91.00	\$ 141.00	\$ (86.00)	\$ (64.00)	\$ (594.14)	\$ (669.02)	\$ (763.48)	\$ (867.21)
Inventory	\$ (535.00)	\$ 859.00	\$ 314.00	\$ 2.00	\$ (164.48)	\$ (25.77)	\$ (27.18)	\$ (28.56)
Accounts payable	\$ 146.00	\$ (3,121.00)	\$ (412.00)	\$ (317.00)	\$ 293.17	\$ 386.56	\$ 407.74	\$ 428.43
Accrued liabilities	\$ 2,051.00	\$ (294.00)	\$ 25.00	\$ 3,674.00	\$ 1,065.64	\$ 2,832.21	\$ 3,232.08	\$ 3,671.18
Income taxes payable	\$ 596.00	\$ (73.00)	\$ (1,690.00)	\$ 1,431.00	\$ (2,170.00)	\$ -	\$ -	\$ -
Deferred revenue	\$ (1,432.00)	\$ (2,492.00)	\$ (2,008.00)	\$ 2,883.00	\$ 3,659.90	\$ 4,564.65	\$ 5,265.78	\$ 6,069.45
Cash provided by operating activities	\$ 42,614.00	\$ 49,478.00	\$ 54,243.00	\$ 72,583.00	\$ 66,063.24	\$ 83,772.88	\$ 97,552.61	\$ 113,994.12
<b>INVESTING ACTIVITIES</b>								
Purchase of marketable securities	\$ -	\$ -	\$ (4,667.00)	\$ (241.00)	\$ -	\$ -	\$ -	\$ -
Sale of marketable securities	\$ -	\$ -	\$ -	\$ 6,140.00	\$ -	\$ -	\$ -	\$ -
Additions to property and equipment	\$ (2,385.00)	\$ (2,679.00)	\$ (4,309.00)	\$ (4,914.00)	\$ (5,705.81)	\$ (6,390.51)	\$ (7,157.37)	\$ (8,016.26)
Acquisitions of subsidiaries	\$ (58,737.00)	\$ (82,152.00)	\$ (120,853.00)	\$ (71,348.00)	\$ -	\$ -	\$ -	\$ -
Cash used in investing activities	\$ (61,122.00)	\$ (84,831.00)	\$ (129,829.00)	\$ (70,363.00)	\$ (5,705.81)	\$ (6,390.51)	\$ (7,157.37)	\$ (8,016.26)
<b>FINANCING ACTIVITIES</b>								
Proceeds from borrowing on the credit facility	\$ 46,262.00	\$ 20,000.00	\$ -	\$ 10,801.00	\$ -	\$ -	\$ -	\$ -
Credit facility repayments	\$ (3,722.00)	\$ (63,305.00)	\$ -	\$ (10,200.00)	\$ -	\$ -	\$ -	\$ -
Payment of debt issuance costs	\$ (692.00)	\$ (386.00)	\$ -	\$ (957.00)	\$ -	\$ -	\$ -	\$ -
Issuance of common shares for cash, net of issuance costs	\$ 3,633.00	\$ 140,724.00	\$ 158.00	\$ 145.00	\$ -	\$ -	\$ -	\$ -
Settlement of stock options	\$ (1,361.00)	\$ (405.00)	\$ (2,590.00)	\$ -	\$ -	\$ -	\$ -	\$ -
Cash (used in) provided by financing activities	\$ 44,120.00	\$ 96,628.00	\$ (2,432.00)	\$ (211.00)	\$ -	\$ -	\$ -	\$ -
Effect of foreign exchange rate changes on cash	\$ (545.00)	\$ (5,927.00)	\$ (2,822.00)	\$ (1,087.00)	\$ -	\$ -	\$ -	\$ -
<b>Increase (decrease) in cash</b>	\$ 25,067.00	\$ 55,348.00	\$ (80,840.00)	\$ 922.00	\$ 60,357.43	\$ 77,382.37	\$ 90,395.24	\$ 105,977.87
<b>Cash, beginning of year</b>	\$ 37,638.00	\$ 62,705.00	\$ 118,053.00	\$ 37,213.00	\$ 38,135.00	\$ 98,492.43	\$ 175,874.80	\$ 266,270.04
<b>Cash, end of year</b>	\$ 62,705.00	\$ 118,053.00	\$ 37,213.00	\$ 38,135.00	\$ 98,492.43	\$ 175,874.80	\$ 266,270.04	\$ 372,247.91

## Key Ratios

Year Ended	FY 14	FY 15	FY 16	FY 17	FY 18E	FY 19E	FY 20E	FY 21E
EBITDA	\$ 36,064.00	\$ 47,586.00	\$ 57,696.00	\$ 64,325.00	\$ 72,028.55	\$ 83,009.40	\$ 95,581.16	\$ 109,966.39
Adjusted EBITDA	\$ 45,580.00	\$ 52,091.00	\$ 61,110.00	\$ 70,153.00	\$ 73,728.55	\$ 84,709.40	\$ 97,281.16	\$ 111,666.39
Adjusted EBITDA Growth Rate	N/A	14.28%	17.31%	14.80%	5.10%	14.89%	14.84%	14.79%
Operating Cashflow	\$ 42,614.00	\$ 49,478.00	\$ 54,243.00	\$ 72,583.00	\$ 66,063.24	\$ 83,772.88	\$ 97,552.61	\$ 113,994.12
Unlevered FCF	\$ 40,834.13	\$ 47,320.04	\$ 50,176.12	\$ 67,060.56	\$ 59,578.65	\$ 72,245.74	\$ 82,861.29	\$ 95,059.29
<b>Unlevered FCF / Operating Cashflow</b>	<b>95.94%</b>	<b>95.64%</b>	<b>92.50%</b>	<b>92.39%</b>	<b>90.18%</b>	<b>86.24%</b>	<b>84.94%</b>	<b>83.39%</b>
Gross Margin	67.58%	67.88%	70.89%	72.49%	73.49%	74.49%	75.49%	76.49%
<b>EBITDA Margin</b>	<b>23.84%</b>	<b>27.85%</b>	<b>31.19%</b>	<b>31.57%</b>	<b>31.56%</b>	<b>32.47%</b>	<b>33.39%</b>	<b>34.29%</b>
<b>Adjusted EBITDA Margin</b>	<b>30.13%</b>	<b>30.49%</b>	<b>33.03%</b>	<b>34.43%</b>	<b>32.30%</b>	<b>33.14%</b>	<b>33.98%</b>	<b>34.82%</b>
Net Margin	6.35%	8.81%	11.12%	11.70%	11.97%	13.34%	14.79%	16.32%
Asset Turnover	43.92%	38.46%	40.86%	40.71%	39.48%	37.82%	36.27%	34.80%
Equity Multiplier	1.38 x	1.14 x	1.13 x	1.16 x	1.14 x	1.14 x	1.13 x	1.12 x
<b>Return on Equity</b>	<b>3.84%</b>	<b>3.86%</b>	<b>5.11%</b>	<b>5.54%</b>	<b>5.41%</b>	<b>5.73%</b>	<b>6.05%</b>	<b>6.37%</b>
EBITDA	\$ 36,064.00	\$ 47,586.00	\$ 57,696.00	\$ 64,325.00	\$ 72,028.55	\$ 83,009.40	\$ 95,581.16	\$ 109,966.39
- Income Tax Provision	\$ 1,768.00	\$ 2,784.00	\$ 1,443.00	\$ 4,022.00	\$ 8,379.46	\$ 10,110.34	\$ 12,043.86	\$ 14,224.66
- Tax Shield	\$ (280.87)	\$ (233.96)	\$ (84.88)	\$ 195.56	\$ 245.93	\$ 658.48	\$ 1,326.43	\$ 2,298.66
<b>Net Operating Profit After Tax</b>	<b>\$ 34,576.87</b>	<b>\$ 45,035.96</b>	<b>\$ 56,337.88</b>	<b>\$ 60,107.44</b>	<b>\$ 63,403.16</b>	<b>\$ 72,240.59</b>	<b>\$ 82,210.87</b>	<b>\$ 93,443.07</b>
Current Assets	\$ 110,229.00	\$ 157,296.00	\$ 74,957.00	\$ 72,561.00	\$ 135,831.77	\$ 216,960.38	\$ 311,479.85	\$ 421,992.97
- Non-Interest-Bearing Current Liabilities	\$ 35,672.00	\$ 40,147.00	\$ 40,042.00	\$ 53,824.00	\$ 56,672.72	\$ 64,456.14	\$ 73,361.74	\$ 83,530.79
+ Property, Plant and Equipment, Net	\$ 8,792.00	\$ 7,829.00	\$ 8,604.00	\$ 10,447.00	\$ 12,094.28	\$ 13,518.96	\$ 14,651.20	\$ 15,408.68
+ Goodwill	\$ 111,179.00	\$ 147,440.00	\$ 217,486.00	\$ 263,113.00	\$ 263,113.00	\$ 263,113.00	\$ 263,113.00	\$ 263,113.00
<b>Invested Capital</b>	<b>\$ 194,528.00</b>	<b>\$ 272,418.00</b>	<b>\$ 261,005.00</b>	<b>\$ 292,297.00</b>	<b>\$ 354,366.34</b>	<b>\$ 429,136.21</b>	<b>\$ 515,882.31</b>	<b>\$ 616,983.85</b>
<b>Return on Invested Capital</b>	<b>17.77%</b>	<b>16.53%</b>	<b>21.58%</b>	<b>20.56%</b>	<b>17.89%</b>	<b>16.83%</b>	<b>15.94%</b>	<b>15.15%</b>

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# MANAGEMENT TEAM

## Edward J. Ryan – Chief Executive Officer

Mr. Ryan is Descartes' Chief Executive Officer, having been appointed to that position in November 2013. Since 2000, Mr. Ryan has occupied various senior management positions within Descartes, with particular focus on the Corporation's network and recurring business. Prior to his appointment as Chief Executive Officer, Mr. Ryan served as the Corporation's Chief Commercial Officer (2011-2013), Executive Vice President, Global Field Operations (2007-2011), General Manager, Global Logistics Network (2004-2007) and Vice President, Sales (2000-2004). Mr. Ryan first joined Descartes in February 2000 in connection with the Corporation's acquisition of E-Transport Incorporated. Mr. Ryan has a Bachelor of Arts from Franklin and Marshall College in Lancaster, Pennsylvania, U.S.A.

## J. Scott Pagan – President and Chief Operating Officer

As President and Chief Operating Officer, Mr. Pagan oversees Descartes' operations. This includes Descartes' research & development activities, Global Logistics Network service delivery, corporate development initiatives, corporate communication strategies, and legal and administrative functions. Mr. Pagan also supports the Board of Directors and its committees in Descartes' governance and strategic direction, and previously served as the company's Chief Corporate Officer and Corporate Secretary. Prior to joining Descartes in May 2000, Mr. Pagan worked in a private law practice in Southern Ontario, where he specialized in corporate and intellectual property law. He was a finalist in the Lexpert 2006 Top Lawyers and General Counsel under 40 and in the 2011 Canadian General Counsel Awards Business Achievement category.

## Allan Brett – Chief Financial Officer

As Chief Financial Officer (CFO), Allan Brett is responsible for Descartes' worldwide financial and administrative functions. Allan is an experienced public company executive, who served as CFO of Aastra Technologies Limited from June 1996 through to its January 2014 sale to Mitel Networks Corporation. In his 18 years at Aastra the company grew to over \$600 million in revenues and 2,000 employees, with more than 60 consecutive quarters of profitability.

## Raimond Diederik – Executive Vice President, Information Services

As Executive Vice President, Information Services, Raimond Diederik is responsible for Research and Development, Customer Support, IT Operations and Data Management solutions for Descartes. Raimond has over 20 years of experience managing logistic information systems, and has played a key role at Descartes since joining the organization in 1993. Prior to Descartes, Raimond worked as an Infrastructure Consultant with the Research & Development group of P&O Nedlloyd's Information Technology Division.

## Chris Jones – Executive Vice President, Marketing and Services

As Executive Vice President, Marketing and Services, Chris Jones is primarily responsible for Descartes marketing activities and professional services for Descartes' solutions. With over 20 years of experience in the supply chain market, Chris has held a variety of senior management positions including: Senior Vice President at The Aberdeen Group's Value Chain Research division, Executive Vice President of Marketing and Corporate Development for SynQuest and Vice President and Research Director for Enterprise Resource Planning Solutions at The Gartner Group.



## Example of Solutions Offered

### 1. Routing, Mobile and Telematics

Descartes Systems Group Inc. unifies critical fleet management processes while supporting the full, closed loop processes attributed to route planning, route execution, driver and vehicle performance, its integrated platform delivers true command of operations by uniting optimized route planning, dispatching and GPS tracking, mobile applications, vehicle telematics, fleet/driver compliance and performance analytics.

#### a) Route Planning

**Descartes Route Planning solutions** enable firms to maximize fleet and mobile resource utilization and efficiency. It allows for strategic delivery planning that enhances and builds new services, sales/distribution territories, and replenishment strategies. Furthermore, it creates optimal reliable routes using fewer trucks, miles, and drivers owing to the **Daily & Multi-daily Route** planner. For highly variable deliveries and pickups, Descartes employs an **Area Planner**, which utilizes historical demand and through an algorithm, generates a forecasted model for demand density which enables it to create territory and route plans for season-driven demand. **Descartes Reservations** facilitates online scheduling of deliveries or service commitments, and automatically schedules them in. The **Sales and Merchandiser Management** solution is leveraged for resource planning, route building and optimization, and tracking across delivery operations and mobile workforce.

#### b) Route Execution

**Descartes Route Execution solutions** bridge the gap between planned and actual route performance. It utilizes on-road, vehicle, and driver feedback data to ensure plans are kept on track. **Descartes Automated Vehicle Location (AVL)** provides the luxury of GPS-based fleet-wide visibility with real-time status updates. It generates information on key indicators such as capacity usage, time to service each stop, alternate available resources and route profitability. It reduces the need to track every aspect of a schedule by providing such relevant and consolidated information. **Descartes Dispatch** facilitates the assignment of new orders and manages exceptions with real time planning tools. Turn-by-Turn Navigation systems improve the efficiency of mobile workers by reducing miles driven and vehicle maintenance costs, minimizing dependency on dispatch and scheduling, and improving customer satisfaction with faster responses.

#### c) Telematics and Compliance

Descartes helps fleet operators implement cost-effective solutions through its Telematics and Compliance components. It automates driver logs and hours of service (HOS) regulatory compliance reporting to increase productivity. **Electronic On-Board Recorder (EBOR)** is an advanced positioning and communication device that continuously monitors the performance of vehicles and drivers. **Descartes FleetCenter™** is a robust user portal that combines a cloud-based platform with secure data storage, mobile communication capabilities, digital maps, and a unique application set. It is capable of providing detailed expense management, remote diagnostics, idle monitoring, driver scoring, HOS compliance, fuel tax data collection, and navigation.

### 2. Transportation Management

Descartes Transportation Management solutions aim to increase efficiency, reduce complexity, decrease costs and enhance customer service by providing standard transportation management solutions such as contract management, load planning and optimization, execution, freight audit, and visibility and performance management. Beyond that, Descartes offers private/dedicated fleet integration, dock/yard management as well as services designed to support supplier and carrier compliance programs.

#### a) Carrier Compliance and Rate Management

**Descartes Rate Builder** manages a global rate network and provides logistics service providers with the ability to centralize independent rate management systems into a single system to leverage rate information. It provides faster and more accurate quoting while establishing a business process for generating global freight rates.

#### b) Transportation Planning and Execution

**Descartes Transportation Management** software accommodates the end-to-end supply chain management process by evaluating cost-effective transportation options. It allows for centrally controlling transportation spending and data.

**Descartes Advanced Pick, Pack and Ship Shipping System** automates and optimizes the rating, routing, consolidation, manifesting, and tracking associated with the transportation process. It is capable of automated freight rating, handling shipping labels and documentation, and automated execution of the shipping process.

#### c) Dock Scheduling and Yard Management

**Descartes Dock Appointment Scheduling** software optimizes the dock appointment process by electronically connecting organizations with thousands of shippers and carriers around the world, while automating the dock appointment process.

**Descartes Yard Management** software is designed to manage the movement of trailers and to provide real-time visibility into trailer content. It further allows for effective planning with respect to trailer contents and yard location.

#### d) Freight Audit and Settlement

**Descartes Highway Carrier Portal** is a software for freight payment agencies to address key areas such as end-to-end shipment management, consolidated document exchange, regulatory compliance, and real-time shipping and payment tracking. **Descartes Ocean Freight Audit** takes bills of lading messages and automatically audits them against the digitized ocean contracts in Descartes Rate Builder. It effectively automates and simplifies the invoice reconciliation process.



e) **Visibility, Tracking and Performance Management**

**Descartes Reporting Services Supply Chain Analytics** grants organizations the flexibility to generate logistics-oriented reporting within a department or across the enterprise. It provides a centralized location for access to departmental reports as well as tools for analyzing those reports. **Descartes Visibility and Event Management** software helps customers improve supply chain management through alerts for missed shipment or quantity deviations, hierarchical reporting, monitoring shipment data, as well generating analytical reports.

f) **Logistics Flow Control**

**Descartes Logistics Flow Control** software is a cloud-based solution manages the end-to-end purchase order management process that improves control of inventory, reduces purchase order cycle time, transportation costs, inventory carrying costs and custom filing fines, and measures supplier and carrier performance.

3. **Customs and Regulatory Compliance**

Descartes helps its customers to gather data from multiple parties and integrate it for filings, move goods across borders without disruption, reduce the risks of penalties or fines, meet a wide range of compliance mandates, and store data for all filings and compliance responses.

a) **Cargo Security Compliance**

**Descartes Security Filing** software provides importers, custom brokers, forwarders, and carriers with advanced manifest filing solutions, reporting to monitor and audit security initiatives, screening tools, electronic document management, and validation and routing engines which pave the way for automated Enterprise Resource Planning initiated messaging.

b) **Declaration and Fiscal Compliance**

**Descartes Customs Declaration Filing** software manages the customs declaration and fiscal compliance processes. It harnesses the potential to support compliance validation on correct rating, trade agreement, and post-entry processing, maintaining detailed and full product masters, and reporting and auditing for compliance.

c) **Customs Warehouse Management**

**Descartes Customs Warehouse Management** software allows users to manage goods stored under the customs warehouses procedure. It stores information on imported goods and accounts, tracks their movement and activity, and enables a timely electronic declaration process. It generally simplifies procedures associated with customs warehouses.

d) **Ocean Regulatory Services**

**Descartes Ocean Compliance** helps ocean carriers manage the rate information for cargo that moves according to the terms of a privately-negotiated service contract or NVOCC Service Agreement rather than the public rates of a tariff.

e) **Global Trade Content**

**Descartes Customs Info** is a database that helps clients minimize trade barriers by equipping them with powerful data resources. Clients can utilize this service to build and maintain complex classification databases for their global operations.

4. **Global Logistics Network Services**

Descartes empowers its customers through its GLN services by providing a standard for multimodal, inter-enterprise electronic data and document exchange. It signifies an industry leading electronic management of a rich set of commercial, logistics and regulatory documents. High-speed, real-time message transfer, interconnectivity, support of "high/low/no tech" connectivity, ad-hoc connectivity to non-registered parties and wireless device connectivity are some of the many noteworthy elements attributed to the GLN.

a) **Document Management Services**

**Descartes CargoAssist™** is an electronic forwarding systems that helps freight forwarders improve freight booking processes, ensure efficient handling of consignments and send electronic waybills. **Descartes CargoBooker™** is an air freight electronic book service for small and medium sized air freight forwarders; it enables customers to access real-time information across air cargo carriers and reduce time spend on administration of the cargo. **Descartes e-Pouch Solution** helps business manage and store data by integrating solutions for bookings, shipment monitoring, quality performance reporting and customs filings. **Descartes eArchiving™** enables customers to store and archive electronic documents in a "safe". **Descartes Viatrade™** automates customs security filing procedures for carriers, resulting in reduce operational costs. It streamlines business processes and interaction between carriers, custom brokers and government agencies. **Descartes webDocs™** gives forwarders access to electronic web forms that enables quick and easy creation of the various documents and electronic messages that are dictated by the industry. **Descartes Cargo iQ™** is an advanced air cargo software solution that enables better decision-making. It helps customers facilitate Cargo iQ™ certification, identify problems occurring in the transportation process, improve transport quality, create detailed reports, and react swiftly to exception alerts

b) **Community Services**

**Descartes eCellerate™** collaborative suite connects businesses to logistics and supply chain trading partners, thus enabling companies to work together to help ensure the most efficient movement of goods

c) **Connectivity Services**

**Descartes Data Integrity Services™** continuously monitors messages and delivery to trading partners to identify and report errors, and also provide periodic summary reports on trading partners, message type and error type.

**5. Broker and Forwarder Enterprise Systems**

Descartes provides on-demand solutions to empower organizations to improve processes such as bookings, security filings, customs entries, shipment and financial management. It allows for better collaboration between regional offices and supply-chain stakeholders, facilitation of compliance with fiscal and security requirements, and improve planning, execution and end-to-end visibility of import/export logistics.

**a) Forwarder Back Office**

**Descartes ForwarderLogic™** is a comprehensive, modular, on-demand freight operations platform for managing the planning and execution of import and export shipments for all modes of domestic and international transportation. It allows for efficient handling of shipments, real-time transit information, and enhanced connectivity with trading partners, and streamlined invoicing and payment processes. **Descartes OneView™** is a single-sign on platform that allows freight forwarders, Non-Vessel Operating Common Carriers, and third-party logistics service providers to effectively coordinate air and ocean import/export shipments. Its modules include: Import Break Bulk, Ocean Export, Air Export, Accounting, and web-Based Cargo Tracking and Visibility. Thus, it standardizes operational procedures while reducing costs, as well as stimulates operational efficiency and accuracy