Dashboard Cloud Cams

George Smith, Bharath Murthy, Danielle Cooper

IST 615

6/20/2022

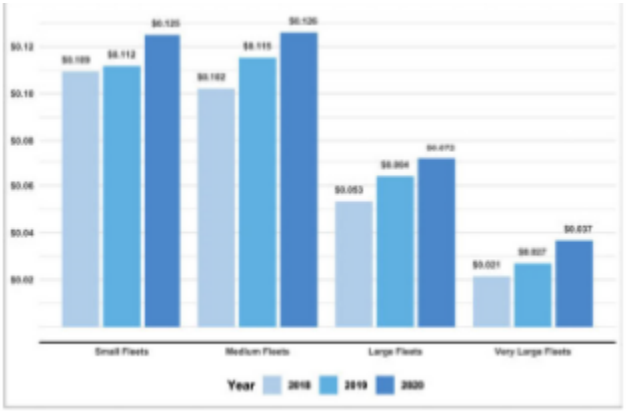
Executive Summary

Dashboard Cloud Cam Security (DCCS) is a newly established corporation, having been in operation for one year. DCCS is located in Syracuse, New York and currently has 3 employees. As the company is small each employee assists with all aspects of the business including finance, product development, sales and marketing . The products that DCCS offers include state of the art cloud based dashboard cams, the software used to access and analyze the footage captured by the dashboard cameras, and an easy to use mobile app. DCCS's mission is to make trucking routes safer and more efficient, while making insurance claims related to trucking incidents streamlined. DCCS currently has a relationship with a leading trucking company who has agreed to test their Cloud Cameras. DCCS currently has a patent on their technology. This patent includes the camera design as well as the software used to access the camera footage. How the Cloud Cameras work is they take real time video footage of a truckers route, a patent relating to the mobile app is currently being processed. This information is analyzed and processed in real time using DCCS's in house software. A driver may be flagged if their route is deemed to be dangerous or inefficient. The result of this is more profitable and safer trucking routes. Additionally this footage is leveraged to train upcoming truckers and also hold current truckers accountable for their driving. Some of the main driving habits the DCCS software looks for includes tailgating, rolling stops, and harsh driving. DCCS is looking to market to insurance companies as this relationship is deemed to be beneficial. Insurance companies can leverage DCCS's footage to make better risk insights, identify crash -for- cash scams, and reduce the investigation time of legitimate insurance claims. In order for DCCS to reach as many clients as possible they have developed a mobile app that allows users to save individual metrics about their routes including real time status, fleet metrics and live video feed.

Problem Statement

As consumers, we all enjoy the benefits of domestic freight transportation. In 2020, in the United States, the domestic trucking industry market was close to $800 billion. In 2019, the trucking industry transported almost 73% or 12 billion tons of freight throughout the United States. While recognizing the tremendous impact the trucking industry has on our economy as well as consumer accessibility, it is also important to consider the expenses, availability, and accessibility of semi trucks and their drivers. With over 2 million semi trucks operating within the United States, and close to 4 million Class A or CDL licensed drivers; accidents, fatalities, law suits, and violations have drastically increased within the past 2-3 years. There are also a tremendous amount of fraudulent and erroneous claims filed against truckers/fleets. This statistic impacts not only the truckers, distribution centers, and civilians, but also, the cost of goods. Due to the increased insurance payouts from such infractions, insurance prices have steadily and drastically increased. This increase in insurance prices has a disproportionate

effect on different sized fleets. The larger the fleet, the lower the per mile cost, making it very difficult for smaller fleets or independent contractors to sustain business. See image below.



This steep hike in insurance cost also trickles down to the consumers. With an industry growth that averages an annual demand of 96,000 additional drivers, a solution is imperative. Portable Dashboard Cloud Cam Security creates a solution for the trucking industry, distributors, and consumers. Not only can real time video be retrieved from the cloud on demand, but additional data such as logged hours, infraction history of drivers, driver statistics and prior job completions will also be available.

Solution

The Target Market for this product will be independent truck drivers, small fleet businesses, large fleet enterprises, and insurance companies. Insurance companies are likely to adopt this technology because statistics show that freight transporters that are monitored are less likely to be involved in an accident or go over the 11 hour driving restriction. This in turn reduces the payouts for insurance companies, which most recently have exceeded an average of $600,000 per claim. Drivers would be likely to adopt this technology in order to lower insurance premiums. DCCS provides the security, data, storage and peace of mind needed to successfully operate your rig or fleet. Using cloud technology to provide SaaS as well as storage for driver/fleet data and statistics, provides an opportunity for economic stability in an $8 billion industry, and can reduce tractor trailer accidents resulting in injury or even death.

Cloud technology protects the data stored, and makes it easier to retrieve. Elastic containers, some of which can be organized using AI, will have the ability to store and retrieve multiple formats of data on demand. Using cloud based technology will also allow DCCS to allocate Seed Funding to product development rather than local servers, data centers and machinery. DCCS's mobile app provides real time updates and communication with the option to store and retrieve data on demand.

Cloud Base System Design

DCCS services rely on two major systems: AWS IoT core and Amazon Kinesis Video Streams. IoT core enables both the edge and cloud computing capabilities of the smart dashcams. IoT core enables full connectivity to the AWS cloud without the need of managing servers. This alongside the edge computing capabilities of our system helps expedite data transmission and gives users better control of what they upload to the cloud. On top of this, real-time functionality such as collision detection, accident alerts, and telematics that are reinforced by GPS data. The IoT core also serves as the foundation for dashboarding through the mobile application.

Amazon Kinesis Video is used to support our video data storage, as well as open up the possibility for further analytics and access to deep learning and ML algorithms. This is a major component of how DDCS is able to work with insurance companies to minimize costly claims. Additionally, Amazon Kinesis Video is capable of encrypting data before it is stored in the cloud, as well as offer livestreams, which can be used to guide newer drivers, or help safety managers optimize their work. A rotating key policy is used to reinforce data encryption security, as well as robust privacy settings that protect the user's location data, and allows custom control of how their data is collected. For more heavy duty analytics, a convolutional neural network (CNN) is employed to bolster the AI that drives the dashcams, which help maximize the accuracy of modeled inputs. This helps determine levels of collision risks and further enhances the recall of real-time traffic routing. This can assist fleet managers train their truckers proactively, and improve their quality of life. The mobile app can be used to navigate wireless cloud transfer, and/or local storage via micro-SD card in the dashcam can be uploaded via desktop. This allows finer control of their data storage, and makes it easy to evaluate how much space is needed, which helps save money in the long-term.

Financial Analysis

Dashboard Cloud Cam Security (DCCS) will require the use of AWS s3 standard storage at a cost of $.023 per gigabyte for the first 50tb or $690. As Dashboard Cloud Cam Security is a relatively small company capping storage at 50tb will be suitable for initial implementation.

DCCS will save on facility costs by moving to the cloud; as there will no longer be a need to house their own servers. DCCS is expecting a reduction in facility fees by 20,000 year over year. The full time labor costs for the 3 employees are expected to be around 500,000 this cost is expected to increase by approximately 50k per year. For media services DCCS will leverage Amazon Interactive Video Services. This service is priced at $.0375 for the first 10,000 hours. DCC will start with 8,000 hours worth increasing by 1,000 hours per year. DCCS will leverage AWS PrivateLink to enable private connection that is priced at .0035 per GB of data processed. In order to be consistent with the amount of cloud storage we have we will consider 50 tb of storage. We will leverage the free tier Amazon EC2 as 750 hours of time per month should be suitable for our monthly work schedule to begin. The Dash Cam Security software will be developed and maintained in house, however there will be software charges associated with the microsoft suite of products. Microsoft 365 business standard costs 12.50 per user per month. This will come to 450 dollars per year for 3 users. DCCS will leverage Amazon for all maintenance activities related to the newly purchased cloud products. The maintenance cost will be 10% of monthly cloud expenditure which comes to $117 in the first year.

The initial implementation cost of the cloud solution will be approximately $200,000. Revenues are expected to be $600,000, $700,000, and $750,000 in the first 3 years. With these financial values Net Present Value (NPV) is expected to be approximately $194,447. Return on investment (ROI) is expected to be about 97.22%. Internal Rate of Return is expected to be approximately 39.92%. This leads to a payback period of approximately 1.6 years

The table below details the NPV, ROI, IRR, and payback period estimates

Year	0	1	2	3	Total
Revenues		600,000	700,000	750,000	2,050,000
Investment	200,000				200,000
Expense: Cloud services		1,107	1,401	1,695	4,203
Expense: Software license		450	450	450	1,350
Expense: Labor		500,000	550,000	600,000	1,650,000

Cash flow	(200,000)	98,443	148,149	147,855	194,447

Year	0	1	2	3	Total
Cash flow	(200,000)	98,443	148,149	147,855	194,447
Present value of cash flow	(200,000)	98,443	148,149	147,855	194,447
Discount rate (you can set this)	1.00%				
	NPV	194,447.00			
	ROI	97.22%			
	IRR	39.92%			
Payback period	1.6 years				

Request for Funding

Dashboard Cloud Cam Security (DCCS) can benefit from a cloud implementation for many reasons. Although the initial move to cloud may be considered costly in the short term, the long term savings from cloud implementation are worthwhile (see table below for on-prem vs cloud projections). Operating in a cloud ecosystem will allow DCCS to scale up or down as needed. Additionally there is no need for expensive installations as AWS will handle this for DCCS. This allows employees to focus on business operations rather than scaling IT. Having data in the cloud ensures that it is backed up and protected in a secure and safe location. This minimizes downtime due to natural disasters or power outages. The cloud offers increased collaboration over traditional computing methods. Employees are able to easily access the same files from various locations. Cloud computing offers employees flexibility in their work practices. An employee can easily access the same file at home, in the office, or while in transit. Finally employees have access to automatic updates ensuring that employees are using the latest available software.

DCCS will require approximately $200,000 in initial funding to migrate existing systems to the cloud. This includes stored video cam footage, the implementation of DCCS cam software into

the cloud computing environment and migration of all current workflows into the cloud environment. As well as the setup of AWS S3, Amazon Interactive Video Service, AWS PrivateLink, and Amazon EC2. Although this might seem costly in the short run the 3 years savings of switching to the cloud are expected to be approximately $40,000.

The below represents a comparison of On-prem vs Cloud cost options

On-prem

	Year 1	**Year 2**	**Year 3**	**Total**
Storage	1,000	1,200	1,300	3,500.00
Maintenance (AWS)	200	200	200	600.00
Facilities	70,000	80,000	90,000	240,000.00
Full-time Equivalent Labor (FTE)	500,000	550,000	600,000	1,650,000.00
Media Services (Amazon Interactive Video Service)	500	600	700	1,800.00
Network (AWS PrivateLInk)	200	300	400	900.00
Server Hardware	1,000	2,000	3,000	6,000.00
Server Maintenence	500	600	700	1,800.00
Software licenses	450	450	450	1,350.00
TCO	**573,850.00**	**635,350.00**	**696,750.00**	**1,905,950.00**

Cloud provider

Disk Storage (AWS s3)	690	920	1,150	2,760.00

Maintenance (AWS Support Plan)	117	143	170	429.75
Facilities	60,000	70,000	80,000	210,000.00
Full-time Equivalent Labor (FTE)	500,000	550,000	600,000	1,650,000.00
Media Services (Amazon Interactive Video Service)	300	338	375	1,012.50
Network (AWS PrivateLInk)	175	175	175	525.00
Virtual machines (Amazon EC2)	0	0	0	-
Software licenses	450	450	450	1,350.00
TCO	**561,731.50**	**622,025.75**	**682,320.00**	**1,866,077.25**

Savings	**12,118.50**	**13,324.25**	**14,430.00**	**39,872.75**

Works CIted

AWS Pricing Calculator. (n.d.). Retrieved June 14, 2022, from https://calculator.aws/#/

Lockridge, D. (2022, February 18). *Atri Report takes on rising trucking insurance costs*. Fleet Management - Trucking Info. Retrieved June 10, 2022, from https://www.truckinginfo.com/10161860/atri-report-takes-on-rising-trucking-insurance-costs

What Is Amazon Kinesis Video Streams? https://docs.aws.amazon.com/kinesisvideostreams/latest/dg/what-is-kinesis-video.html.

“What Is an AI Dash Cam? - Definition.” *Nauto*, https://www.nauto.com/glossary/what-is-an-ai-dash-cam.