The Silver Lining: A Teaching Case Using Google Docs to Illustrate Cloud Computing Concepts

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Abstract

As Cloud Computing becomes an increasingly important technology strategy and solution for businesses, it is important for today's students to be aware of the various services that the Cloud offers. While many first-year college students have heard of the term Cloud Computing and used Google Docs, a popular web-based office suite of applications for collaboration, their knowledge of how the Cloud is used in a business environment is limited. This paper describes an introductory lesson that builds on student familiarity with Google Docs to illustrate the concepts of Infrastructure, Software, Data, and Platform as a Service. The paper concludes with student reflections on their learning from this lesson based on anecdotal and survey data.

Keywords: Cloud Computing, Google Docs, Web 2.0, learning, classroom case study

1. INTRODUCTION

Cloud Computing, the delivery of software and computing services over the Internet, has changed the way in which people interact with the Web. The increase in popularity of mobile devices, smartphones, and tablets has created an expectation to always have access to data and applications across multiple devices.

"Cloud Computing grew out of our never-ending hunger for ever-faster and ever-cheaper computation." (Pallis, 2010, p. 71). Applications deployed in the Cloud offer scalability, a "pay as you go" business model where customers pay only for the computing services and storage they actually use, and simple mechanisms for providing software updates. These features make Cloud Computing an attractive paradigm for developing and deploying both small and large scale Web applications. (Agrawal, Das, & El Abbadi, 2010)

The use of the term "cloud" probably originates with network diagrams in college textbooks where a cloud represented the complex connections between computers on a network, and later, the Internet, "in order to conceal the complexity that lies behind them." (Sultan, 2010, p. 110)

In 2008, the Pew Internet and American Life Project released a study on how Americans use Cloud Computing applications and services. It was reported that while 69% "use webmail services, store data online, or use software programs such as word processing applications whose functionality is located on the web", "most internet users are unlikely to be aware of the term 'Cloud Computing.'" (Horrigan, 2008)

Two years later, the Pew Internet and American Life Project (Anderson & Rainie, 2010) reported that "by 2020, most people won't do their work

with software running on a general-purpose PC. Instead, they will work in Internet-based applications such as Google Docs, and in applications run from smartphones." (Anderson & Rainie, 2010, p. 8)

The IS 2010 model curriculum (Topi, et al., 2010) notes that "service-oriented architecture, Web services, software as a service, and Cloud Computing are all important elements in the new way of organizing the fundamental architecture for computer-based systems and solutions that is gradually becoming the dominant paradigm of organizational computing." (p. 6) Given the projected rise in usage and popularity of Cloud applications in the next decade for consumers and the enterprise, Cloud Computing is an appropriate topic to present in the introductory information technology classroom.

While the literature is rich with examples citing the use of web-based collaboration tools, and specifically Google Docs in educational settings as well as Web development courses that teach Cloud Computing concepts to advanced students, little has been published on effective teaching methods to integrate Cloud Computing concepts in the introductory information technology classroom. This paper develops a teaching case for presenting Cloud Computing concepts and terminology to introductory IT students. The lesson described in this paper builds on the experience that digital students have using collaborative Cloud applications, specifically Google Docs. (Frydenberg & Andone, 2010) (Gehringer, 2010) (Sultan, 2010)

Three research questions guided this study:

- What do introductory college students know about Cloud Computing?
- How can students who have little or no programming background build on their experience with collaborative Cloud applications to learn about complex Cloud Computing concepts and terminology?
- Will such a lesson using consumer Cloud tools help students understand how to apply Cloud Computing concepts in a business context?

2. CLOUD COMPUTING IN THE COLLEGE CLASSROOM

As web-based collaboration tools have become more widespread in recent years, college courses across the disciplines have incorporated learning activities that integrate their use. Blogs, wikis, and podcasts were among the first wave of Web 2.0 collaboration tools that have found their way into college classrooms (Davi, Frydenberg, & Gulati, 2007); (Chan, Lee, & McLoughlin, 2006), and now collaborative authoring tools such as Google Docs, which have been found especially useful in group projects. (Frydenberg & Andone, 2010), (Broin & Raftery, 2011)

Such collaborative software as a service applications have become popular in many college classrooms because they provide free or low-cost software solutions that require little or no set-up or maintenance. Users access the services or applications via a Web browser.

Cloud Computing is generally characterized by several computing services (Software as a Service, Platform as a Service, Infrastructure as a Service, Data as a Service), a discussion of which are often left to advanced computing courses. Cloud Computing as a topic is omitted from the IS 2010.1 Foundations of Information Systems course. It first appears in the core IS 2010.4 IT Infrastructure course (Topi, et al., 2010), where students learn to write and deploy applications to the Cloud.

Hollingsworth and Powell (2010) introduce Cloud Computing topics in a Web programming course where students write and configure applications deployed to Google's Cloud (App Engine). Malan (2010) created a network of virtual machines hosted on Amazon's Elastic Cloud platform for students to explore cloud concepts and build applications in an introductory computer science course. Rehman and Sakr (2010) chose Microsoft's Azure platform to design an undergraduate-level course in Cloud Computing where students learned about public and private clouds, virtualization, MapReduce and Hadoop parallel processing technologies, and other cloud technology concepts. Each of these courses requires programming knowledge in order to complete the projects.

3. WHAT FIRST-YEAR COLLEGE STUDENTS KNOW ABOUT CLOUD COMPUTING

IT 101 (Introduction to Information Technology and Computing Systems) is a first-year required course for all students at Bentley University, a business university in Massachusetts. The course introduces students to topics such as using the

World Wide Web, hardware and software, operating systems, storage, HTML and Web pages, wireless networking, multimedia, and problem solving skills using Excel.

Bentley University offers several sections of IT 101 each semester. Surveys were given to 101 students (57 male, 43 female, one preferred not to say) from sections taught by four different instructors one week before and one week after the lesson to ascertain their learning about Cloud Computing. As shown in Figure 1, students understand the Cloud as supporting online storage and applications for collaboration.

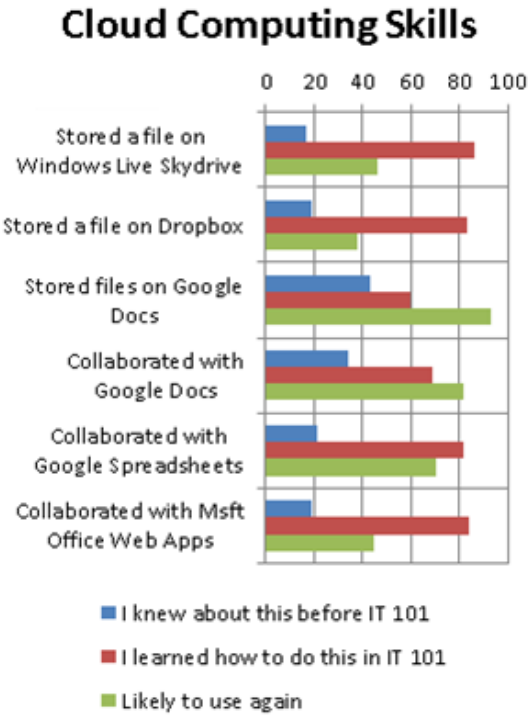


Figure 1. Student Experiences with Cloud Computing Applications.

Students also identified Facebook, YouTube, Huddle, Blogger, Prezi, and SumoPaint as popular Cloud applications which they have used.

Prior to the start of the in-class lecture during which Cloud Computing concepts would be presented, one instructor asked students to share their definitions of Cloud Computing on Twitter. Appending the class hashtag to their tweets made it easy to gather all of their tweets in a search; a sample of the results is shown in Figure 2.

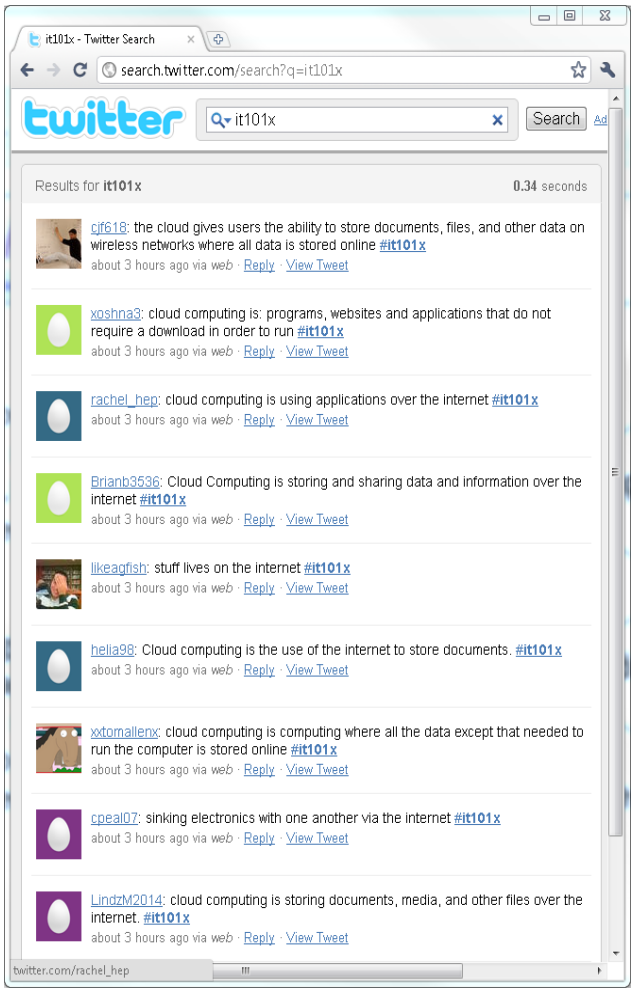


Figure 2. Students tweet about Cloud Computing.

Students' tweets about Cloud Computing are consistent with the experiences they described in Figure 1. From their tweets it is clear that many students associate Cloud Computing with online storage of documents and data ("stuff lives on the internet"), and software applications "that do not require a download in order to run."

This sample of tweets is representative of those from the rest of the class; most do not mention more technical Cloud Computing capabilities related to virtualization or scaling, or specific providers of Cloud platforms. This suggests that most students are only familiar with consumer and collaborative Cloud Computing applications.

3. A CLASSROOM DEMONSTRATION FOR TEACHING CLOUD COMPUTING CONCEPTS USING GOOGLE DOCS

This section describes a classroom lesson in a Fundamentals of IT course using Google Docs for introducing the terms Infrastructure, Software, Data, and Platform as a Service as functional aspects of Cloud Computing.

Prior to this lesson, students were introduced to Google Docs, Cloud Storage applications, and Microsoft Office Live Web apps as part of other assignments. This ensured students had a familiarity with the collaborative features that cloud applications provided, and were familiar with Google Docs in order to make it a viable platform for using to teach about Cloud Computing concepts.

A pre-survey of students enrolled in several IT101 sections shows that Google Docs is an environment with which most students are familiar (see Figure 1); this seems to be consistent with a statement from the Pew Internet and American Life's study on the Future of Cloud Computing, which indicates that as of September, 2008, "69% of Americans had either stored data online or used web-based software applications at least once." (Anderson & Rainie, 2010, p. 8).

The instructor demonstrates how to use Google Docs to create a spreadsheet that accesses live stock data, and write a web function to determine whether a stock increased or decreased on a given day. Each step in the example illustrates one of the Cloud Computing aspects mentioned above. Students can follow along on their own computers.

The accompanying discussion shares teaching notes about Cloud Computing and suggestions to build on what students already know from their experiences with consumer Cloud applications in order to describe uses of the Cloud in the enterprise. The exercise described here was developed by the author and subsequently presented by four different IT 101 instructors to over 100 students who followed along on their laptops during the 75-minute class session.

Cloud Computing

The instructor introduces the four Cloud Computing services to be explained during this presentation. Appendix I lists several additional web resources that instructors might share with students to explore these concepts.

Infrastructure as a Service (IaaS)

Infrastructure as a Service refers to the delivery of a networked computing infrastructure over the Internet. For consumers, this is most commonly found in Cloud storage. For consumers, the process of storing files "in the cloud" makes them available on laptops, smart phones, and other Internet-connected devices. The service provider often manages the backup process and previous versions of files. Computing infrastructure refers to the ability to provide computing capabilities such as storage and processing online.

Figure 3 illustrates cloud storage, an IaaS feature implemented in Google docs. In Figure 3 (a), users may create new documents that are stored in the cloud or upload documents from their computers to the Cloud for storage within Google Docs. In Figure 3 (b), the ability to purchase additional storage is exemplary of the "pay as you go" model that characterizes many Cloud Computing applications. Users pay only for the services that they need.

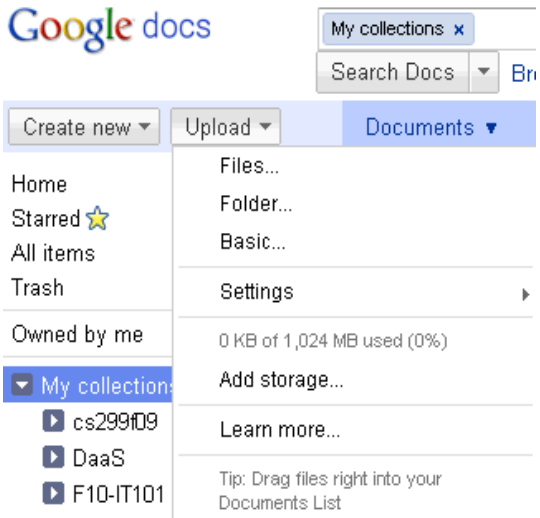


Figure 3(a). Creating or uploading a new document to be stored in the Cloud.

Figure 3 (b). Pay-as-you-go Cloud Storage is an example of IaaS.

These examples of personal uses of IaaS provide a good segue into introducing students to enterprise uses of IaaS. Many Infrastructure as a Service providers allow companies to rent storage space for publishing web content as well as for having access to files from Cloud servers. Without a Cloud Computing framework, users would have to purchase, setup, and manage their data and application servers themselves.

Companies also use IaaS to configure virtual servers using a web-based interface, so that they can add memory, processing, or bandwidth capabilities to control the running environment of a web application, in order to host websites or applications that dynamically scale as more users visit them.

The online retail store whose website predictably receives a large number of seasonal visitors during peak holiday shopping periods and the news organization, whose website receives additional traffic when there is an unexpected major news story, are two examples of the need for the dynamic scalability that IaaS provides. In each of these cases, the customer only pays for the resources actually used.

IaaS lets companies run their business while delegating other computing issues such as web hosting, storage and server processing capabilities to third party companies. They rent, rather than own their servers. Amazon's Elastic Compute Cloud (EC2) is a well-known industry example of IaaS.

Table 4 in Appendix I describes several enterprise IaaS providers.

Software as a Service (SaaS)

As evidenced by the pre-lesson Twitter exercise and a student survey, most students are familiar with the concept of Software as a Service even if they have not heard of the term itself. They interact with Facebook, Google Docs, and web-based email clients regularly, all of which are SaaS applications.

To begin the demonstration, the instructor launches Google Spreadsheets, as shown in Figure 4. The instructor explains why it is an example of software as a service. Key ideas of SaaS applications for introductory IT students to take away are that SaaS applications run within a Web browser without installing additional software, and as a SaaS provider makes updates to the application, they are immediately available the next time the application is launched.

This is different from Microsoft Excel, for example, where users may wait several years for new features, as witnessed by the releases of Office 2003, 2007, and 2010). This incremental build is characteristic of SaaS applications, which Tim O'Reilly described as being in "perpetual beta." (O'Reilly, 2005)

To begin the demonstration, the instructor enters a stock symbol such as GOOG in cell A1, as shown in Figure 4.

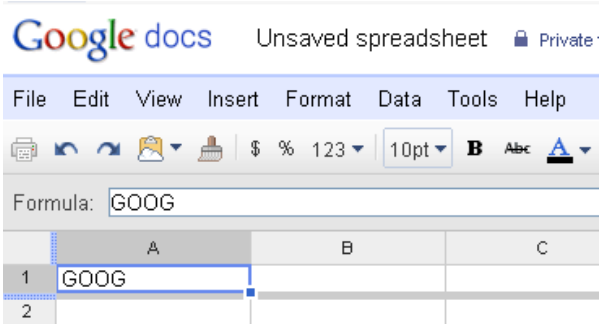
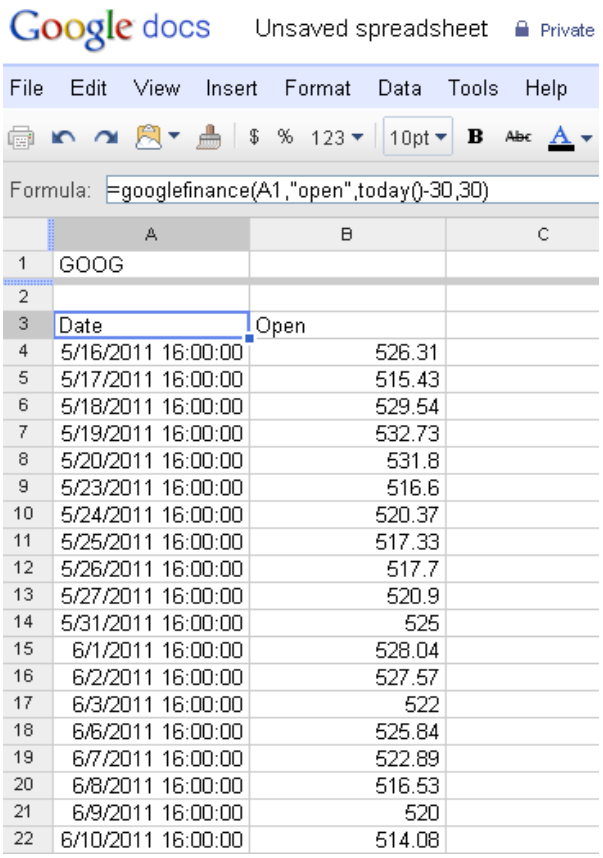


Figure 4. Google Spreadsheets is an example of Software as a Service.

Table 2 in Appendix I lists several popular consumer and enterprise SaaS solutions. An interesting exercise for introductory students is to compare a SaaS consumer cloud application with a similar installed desktop application, and identify those features (such as document sharing) that are enabled by Cloud architecture.

Data as a Service (DaaS)
Data as a Service refers to the delivery of data over the Internet in various formats from multiple sources. (Wang, Von Laszewski, Kunze, & Tao, 2010, p. 140) The next step in this demonstration introduces Data as a Service through the use of the GoogleFinance function (Harter, 2010) to obtain live stock data from the Web.

Figure 5 shows the results of calling the GoogleFinance function to obtain the opening price of Google's stock over the past 30 days.



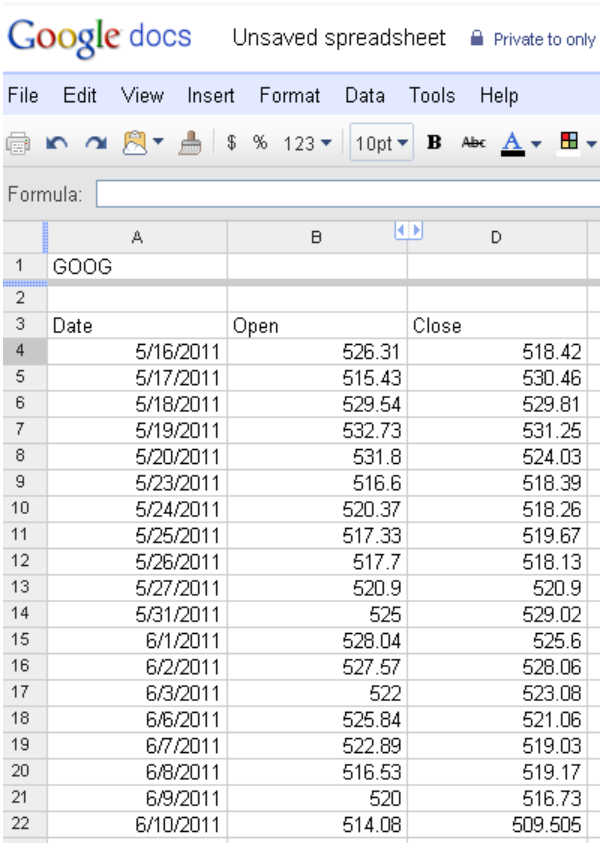
	A	B	C
1	GOOG		
2			
3	Date	Open	
4	5/16/2011 16:00:00	526.31	
5	5/17/2011 16:00:00	515.43	
6	5/18/2011 16:00:00	529.54	
7	5/19/2011 16:00:00	532.73	
8	5/20/2011 16:00:00	531.8	
9	5/23/2011 16:00:00	516.6	
10	5/24/2011 16:00:00	520.37	
11	5/25/2011 16:00:00	517.33	
12	5/26/2011 16:00:00	517.7	
13	5/27/2011 16:00:00	520.9	
14	5/31/2011 16:00:00	525	
15	6/1/2011 16:00:00	528.04	
16	6/2/2011 16:00:00	527.57	
17	6/3/2011 16:00:00	522	
18	6/6/2011 16:00:00	525.84	
19	6/7/2011 16:00:00	522.89	
20	6/8/2011 16:00:00	516.53	
21	6/9/2011 16:00:00	520	
22	6/10/2011 16:00:00	514.08	

Figure 5. GoogleFinance function is an example of Data as a Service.

The formula entered in cell A3 that that provides this data is *=GoogleFinance(A1, "open", TODAY()-30, 30)* . It instructs Google Spreadsheets to obtain the opening price of the stock whose symbol is listed in cell A1, starting from 30 days ago (*TODAY()-30*), for 30 days.

Because students have familiarity with Excel prior to this exercise, they can make the transition from a spreadsheet function that calculates values within a spreadsheet to one that obtains live data from external sources and imports those values to the spreadsheet.

To continue with the demonstration, the formula *=GoogleFinance(A1, "close", TODAY()-30, 30)* is entered in cell C3 to obtain the corresponding closing stock prices. Figure 6 shows the results. For the sake of clarity, the dates in column A have a simpler format, and the dates in column C have been hidden.



	A	B	D
1	GOOG		
2			
3	Date	Open	Close
4	5/16/2011	526.31	518.42
5	5/17/2011	515.43	530.46
6	5/18/2011	529.54	529.81
7	5/19/2011	532.73	531.25
8	5/20/2011	531.8	524.03
9	5/23/2011	516.6	518.39
10	5/24/2011	520.37	518.26
11	5/25/2011	517.33	519.67
12	5/26/2011	517.7	518.13
13	5/27/2011	520.9	520.9
14	5/31/2011	525	529.02
15	6/1/2011	528.04	525.6
16	6/2/2011	527.57	528.06
17	6/3/2011	522	523.08
18	6/6/2011	525.84	521.06
19	6/7/2011	522.89	519.03
20	6/8/2011	516.53	519.17
21	6/9/2011	520	516.73
22	6/10/2011	514.08	509.505

Figure 6. GoogleFinance calls for open and closing stock data.

This is also an opportunity to introduce the concept of Application Programming Interfaces (APIs) and explain how GoogleFinance is an API to access the requested data from Google. GoogleFinance is one of several functions implemented within Google Spreadsheets that access live data from the Web and include the results within cells of the spreadsheet. Table 1 in Appendix II describes some of the functions in Google Spreadsheets access data from the World Wide Web.

This example illustrates that external data may be used in creating Web applications. Data as a Service and online data management is a growing industry (Agrawal, Das, & El Abbadi, 2010); Table 4 in Appendix I lists several such providers that make real-world data available for download to analyze in spreadsheets, or as a service for integration in custom software applications.

All of the Data as a Service providers listed offer visualization tools to create the views and embed them on a Web page. There are a plethora of open-source datasets for students to analyze within Excel or Google spreadsheets.

Platform as a Service (PaaS)

Platform as a Service refers to the delivery of a computing development platform and an environment for running applications over the Internet. This is probably the most abstract cloud concept for students without programming background to understand. It is also the least accessible concept because most consumer cloud applications do not rely on PaaS.

This step uses the Google Apps script editor to introduce concepts of a software development environment within a web-based interface. Students may have seen the Macro editor within Excel, or have created software applications using Visual Studio. Both of these are development platforms, but require installed software to run.

The Google apps script editor provides a platform for adding new or custom capabilities within Google spreadsheets. The code editor and development environment is entirely based in the browser. The script editor is invoked from the Tools menu in Google Spreadsheets, and enables the creation of new functions by entering JavaScript code.

Figure 7 shows the code for a simple JavaScript function called StockStatus that returns "Up", "Down", or "No Change" depending on the change in a stock's opening and closing values on a given day. Saving the script makes the function available to call within Google spreadsheets.

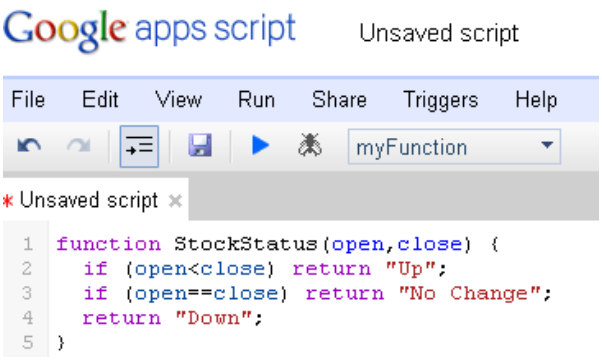
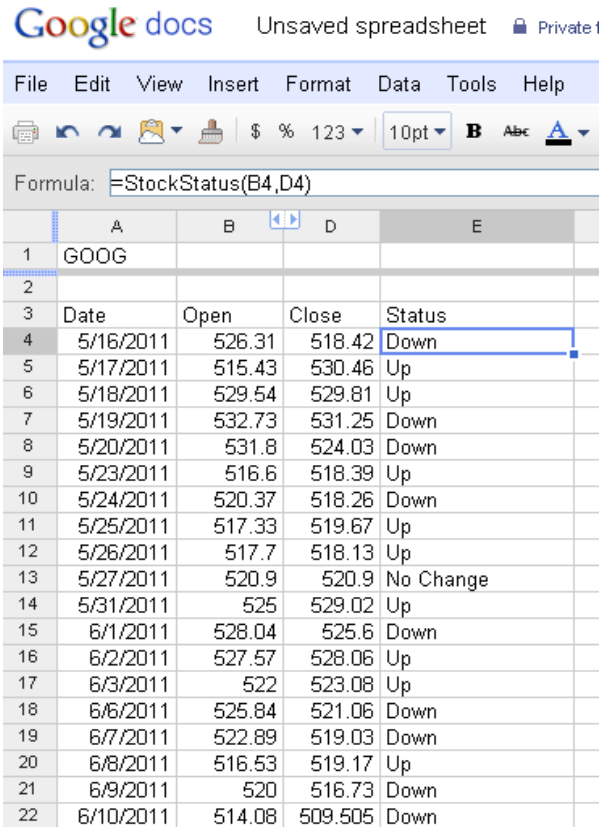


Figure 7. Google apps script editor provides a development environment within Google Spreadsheets.

To invoke the new function within Google spreadsheets, one enters the appropriate formula using cell values as arguments. Figure 8 shows the results of entering the formula *=StockStatus(B4,D4)* in cell E4 and copying the formula to the cells in column E.



	A	B	D	E
1	GOOG			
2				
3	Date	Open	Close	Status
4	5/16/2011	526.31	518.42	Down
5	5/17/2011	515.43	530.46	Up
6	5/18/2011	529.54	529.81	Up
7	5/19/2011	532.73	531.25	Down
8	5/20/2011	531.8	524.03	Down
9	5/23/2011	516.6	518.39	Up
10	5/24/2011	520.37	518.26	Down
11	5/25/2011	517.33	519.67	Up
12	5/26/2011	517.7	518.13	Up
13	5/27/2011	520.9	520.9	No Change
14	5/31/2011	525	529.02	Up
15	6/1/2011	528.04	525.6	Down
16	6/2/2011	527.57	528.06	Up
17	6/3/2011	522	523.08	Up
18	6/6/2011	525.84	521.06	Down
19	6/7/2011	522.89	519.03	Down
20	6/8/2011	516.53	519.17	Up
21	6/9/2011	520	516.73	Down
22	6/10/2011	514.08	509.505	Down

Figure 8. Adding a function builds on the Google Spreadsheets platform.

While it is not expected that introductory computing students would be to write this code from scratch on their own, they should be able to read and follow the logic. The function uses JavaScript's if statement, which operates similarly to the common spreadsheet *=IF()* function with which many students are already familiar.

This demonstration introduces the notion of building applications on top of an existing platform. While the function itself is pretty simple and could have been implemented in a formula using nested *=IF()* functions, one could imagine a more complicated calculation, such as social security or retirement deductions in a payroll spreadsheet whose details are best hidden from the spreadsheet author. Here the details of the implementation of the StockStatus function are not available to the spreadsheet author, who can still use it within the spreadsheet.

Platform as a Service applications are most often referred to in the enterprise, hidden from casual users. Pedagogically, this example of building a function on top of the Google Spreadsheets platform that extends its native capabilities opens the conversation to the use of enterprise Platform as Service applications and the notion of software development within the Cloud.

Platform as Service providers such as Microsoft Azure and Google's App Engine enable users to build scalable enterprise applications in the Cloud using the development tools they provide for handling distributed computing services.

Demonstration Summary

This section introduced the concepts of Infrastructure, Software, Data, and Platform as a Service to introductory IT students in a demonstration that builds on their familiar experience with Google Spreadsheets. It also provided additional talking points for relating applications of these concepts from a consumer context to an enterprise context.

4. WHAT STUDENTS LEARNED

To measure student learning about Cloud Computing concepts, students were surveyed one week prior to, and one week after the class in which the lesson above was presented. Figure 9 displays student familiarity with the terms and concepts of Cloud Computing, and Infrastructure, Software, Data, and Platform as a Service, before and after this presentation.

(While the same example was presented during both the Fall 2010 and Spring 2011 semesters, the term Data as a Service was not introduced until the Spring 2011 semester. In order to keep the survey instrument the same for both semesters, no data is available about student familiarity with this term.)

Several students found this demonstration to be a tangible introduction to Cloud Computing concepts and terminology. Said one student, "It introduced me to Software, Platform, Data, and Infrastructure as a Service to me but I realize that still do not know very much about them." Another commented, "I think the most helpful was using the Google spreadsheet to see Data as a Service and also using examples of Platform and Infrastructure because those terms seemed vague when I first heard of them." A third student was very confident in his/her learning:"Before the presentation, I knew nothing of any of these services. After the presentation, I would definitely feel comfortable explaining any of the three, especially Software as a Service. I feel that because software as a service is most common to individuals, it is a much easier concept to learn and explain. … Most people would need more time to grasp the concept of Infrastructure as a Service because most people aren't concerned with things like platform virtualization environments that is the topic of IaaS."

It is worthwhile to note that five of the 82 students who provided comments in the survey after this presentation said that Cloud Computing still did not make sense to them. One said "I'm still not really sure what these [concepts] are all about." And another candidly stated, "I understand what software is but I have no clue what it is as a service."

Students realized the promise that Cloud Computing holds in the enterprise as well as in the way they personally interact with the Web. Said one student, "[Learning about] Cloud Computing helped me to understand the benefits of the Cloud and the endless amount of storage capacity it provides. It is strange to think that Google contains all of this vast information in a Cloud." Another stated, "I thought the Cloud Computing section of this class was very helpful because I knew very little [about it] prior to the class. I also feel that the future is moving more

towards Cloud Computing therefore I will certainly use the skills I've learned."

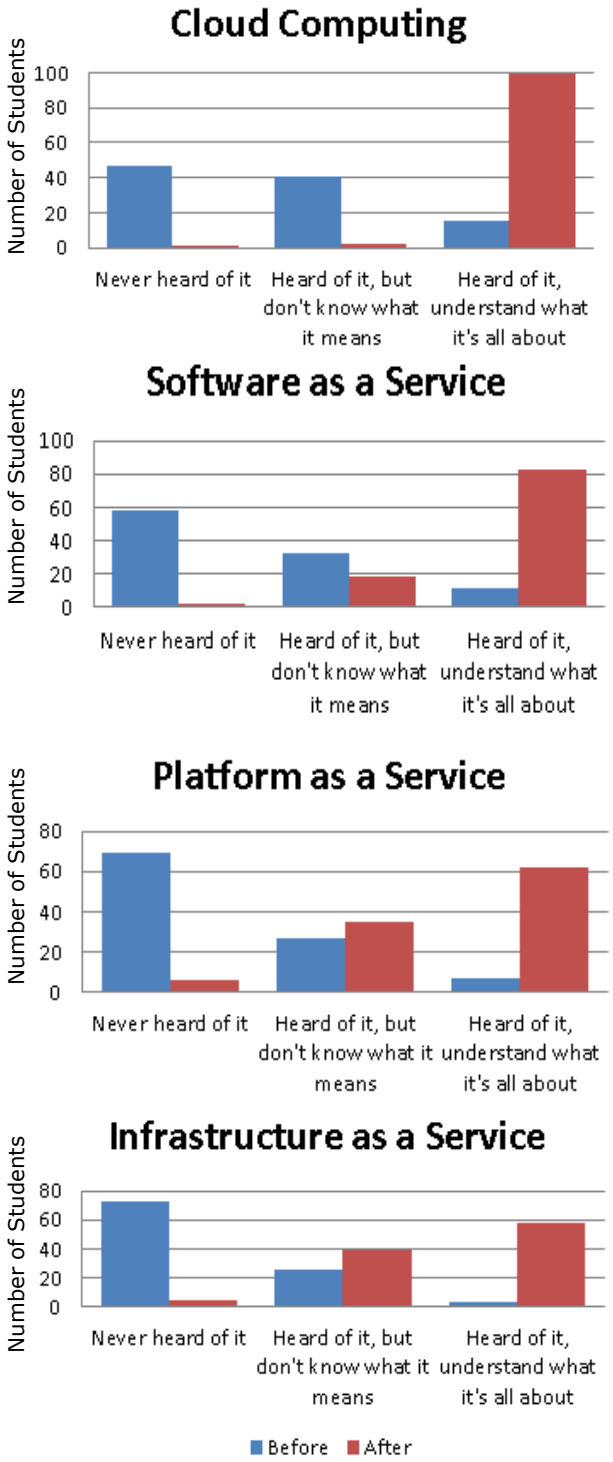


Figure 9. Student familiarity with Cloud Computing and service concepts before and after this presentation.

Figure 9 shows that most students never heard of, or couldn't describe Cloud Computing or any of its related Service concepts prior to the class presentation, and found the presentation to be an effective way to learn about these concepts.

5. CONCLUSION

Cloud Computing applications have found their way into many college classrooms in recent years, and their collaborative features have been embraced as effective learning tools. Teaching Cloud Computing concepts and terminology is often designated for students in advanced courses with software development experience.

This paper presents a teaching demonstration using Google Spreadsheets to illustrate Infrastructure, Software, Data, and Platform as Service which students found to be an effective introduction to Cloud Computing concepts.

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Appendix I – Consumer and Enterprise Examples of Cloud Computing Services

After introducing Cloud Computing concepts and terminology via the Google Docs example, the following resources provide real-world examples for students to investigate.

Table 1. Infrastructure as a Service Examples

Infrastructure as a Service		
Name	**URL**	**Description**
Windows Live Skydrive	http://skydrive.live.com	• Provides 25 GB of free online storage • Integrates with Microsoft Office platform
Dropbox	http://dropbox.com	• Provides 2 GB of free online storage; • Requires installation of a client application to automatically synchronize files with the Cloud and multiple devices
ZumoDrive	http://zumodrive.com	• Provides 2 GB of free online storage; • Popular for playing multimedia from the Cloud on mobile devices with limited local storage
Carbonite	http://carbonite.com	• Automates backup of files on a user's personal computer to the Cloud. • Used by small businesses as a cost-effective backup solution.
Amazon Elastic Compute Cloud	http://aws.amazon.com/ec2/	• Provides resources to increase or decrease memory and processing power as needed in order to run Web applications over Amazon's computing environment.

Table 2. Software as a Service Examples.

Software a as a Service		
Name	**URL**	**Description**
Sumopaint	http://sumopaint.com	• Online photo editing application
JayCut	http://jaycut.com	• Online video editing application
Microsoft Office Live Web Apps	http://oficelive.com	• Web-enabled subset of Office functionality
Google Docs	http://docs.google.com	• Google's collaborative productivity suite
Salesforce.com	http://www.salesforce.com/	• Provider of business management and CRM (customer relationship management) software tools for the enterprise

Table 3. Platform as a Service Examples.

Platform as a Service		
Name	**URL**	**Description**
Windows Azure	http://azure.microsoft.com	• A Cloud operating system for developing and managing Web applications hosted on Microsoft

		servers. • Integrated with Microsoft's software development tools.
Google App Engine	http://code.google.com/appengine/	• Enables the development of automatically scaled Web applications running on the same systems used for Google applications. • Integrated with Google services.
Force.com	http://www.salesforce.com/platform/	• Provides tools for developing and deploying Web-based business applications that run on the Salesforce.com platform.

Table 4. Data as a Service Examples.

Data as a Service		
Name	**URL**	**Description**
Factual	http://factual.com	• Offers an open data platform and community where users may share datasets with others
DataMarket	http://datamarket.com	• A data portal that provides access to statistics and structured data from public and private organizations.
Azure DataMarket	http://datamarket.azure.com	• Provides a platform for Microsoft partners to publish or consume data. • Integrated with Microsoft Office and database applications.

Appendix II – Selected Google Spreadsheet Functions

GoogleFinance is one of several functions that interact with live data on the Web in Google Spreadsheets. This table describes additional functions for students to explore.

Table 1. Selected Google Spreadsheets functions that operate on live data from the Web.

Function	**Example**	**Description**
=GoogleLookup(*item*, *value*)	=GoogleLookup("Amazon River", "length")	Searches Google to find the length of the Amazon River.
=GoogleFinance(*symbol*, *attribute*)	=GoogleLookup("GOOG", "price")	Searches Google Finance to find the current price of Google stock. Optional arguments allow specifying a date range.
=GoogleTranslate(*words, fromLanguage, toLanguage*)	=GoogleTranslate("Where is the train station? ", "EN", "FR")	Translates the phrase from English to French. Two-letter language codes required.
=ImportFeed (*url)*	=ImportFeed("http://news.google.com/?output=rss")	Imports content from the Google News Web feed. Optional arguments (not shown) enable specifying exactly which and how many

		items to import.