



English

General

Online collaboration utilizes collaborative software to permit a gathering of individuals to cooperate with the goal of accomplishing a common objective.

Collaboration has a big impact in the process that we learn. Particularly collaborative learning has proven highly influential in the areas of medical education and many other educational areas showing that when there is collaboration there is a higher chance for success

The fundamental requirement for online collaboration is a cloud service that will allow the team to use any tools at its disposal to achieve the best result possible. Cloud services, in whatever shape or form they come, provide either free or proprietary means for organizing, communicating, coordinating, sharing, arranging and planning in order to manage and complete project tasks.

Benefits of working on the cloud

Cloud computing adaptation is on the rise every year since business are realising the benefits that it offers. According to (Bozicevic, 2018) these benefits can be summarised as:

- Efficiency / cost reduction: Using cloud infrastructures means avoiding investing on buying and maintaining equipment, or space for that equipment or even IT support. Downtime and recovery costs are also eliminated
- Data Security: cloud services provide advanced security features guaranteeing secure storing and handling of company data.
- Scalability: cloud based solutions can cater for every business size, type and needs. Growing or shrinking is easily achieved with no risk of operation disruption or issues about maintenance. Scalability is probably the greatest advantage of cloud services.
- Mobility: no one is ever left out; with access (to corporate data) being made available to mobile devices (smartphones or otherwise). Resources can easily be stored, retrieved, recovered. Additionally, updates are automatic.
- Disaster recovery: with cloud, you don't have to worry if your equipment is malfunctioning or damaged and how will this affect access to data and operation. Uploading data on the cloud ensures availability and quick data recovery just in case something does go wrong.
- Control: cloud providers, offer means for complete visibility and control of resources and data. Additionally, collaborative work will be easier and more efficient since a single copies of files are available and edited by anyone with proper access rights.
- Competitive edge: moving to the cloud sooner rather than later gives you the competitive advantage of reaping all the benefits.

Risks of working on the cloud

In an ever-changing and volatile environment like the business world switching on to a cloud service does come with certain risks. With a lack of standardisation on the cloud (Adamov, 2009) and the threat of being a constant target, with reliability issues (Kaur, 2015) and risks (Turner, 2013), there exist potential problems. More recent articles by (Coles, 2020)(Architects, 2020) (Calyptrix, 2016) identify the following risks:

- Intellectual property loss or theft: Sensitive data can be compromised or stolen. Data might be related to the business, research and development or, and this is the worst case scenario, customer-related data
- Compliance violations and regulatory actions: service providers and companies have to be compliant with various standards. Failure to comply could have catastrophic effects on a business or its customers.
- Security risks, unauthorised access to customer and business data, infections, attacks: data security should be a prime concern to a cloud provider.
- Risks related to lack or loss of control over users' actions, over performance, over quality: This relates to the fact that not everything is controllable (easily) when everything is on the cloud

- Disruption to business and customers in any of the above eventualities: which might entail loss of customer trust or even losing the client entirely

Cloud service providers

As part of the be-com project, major players in the online free cloud-based services have been investigated. Primary focus was given to provision of potential services covering aspects relating to synchronization, file sharing, productivity, security, support and miscellaneous. Also certain requirements have been extracted from the Cyprus research team relating to educational aspects of online collaboration. In this research, four options were considered

	Google Drive: a file storage and synchronization service developed by Google. It allows users to store files on their servers, synchronize files across devices, and share files
	Microsoft One Drive: a file hosting service and synchronization service operated by Microsoft as part of its web version of Office.
	Jumpshare: a file sharing service which allows users to upload files. It uses a freemium business model: free accounts are offered with limited storage, while a paid subscription is available
	Dropbox: a file hosting service that offers cloud storage, file synchronization, personal cloud, and client software

The table below provides a summary of the findings and at the same time compares the characteristics of every service.

Requirement				
Synchronisation				
Sync Folder	Yes	Yes	Yes	Yes
Block-level sync		Yes	Yes	Yes
Bandwidth management		Yes	Yes	Yes
Selective sync	Yes	Yes	Yes	Yes
Sync any folder	Yes		Yes	No
File sharing				
File link sharing	Yes	Yes	Yes	Yes
Link passwords			Yes	Yes
link expiry dates	Yes	Yes	Yes	Yes
Folder sharing	Yes	Yes	Yes	Yes
Folder permissions	Yes	Yes	Yes	Yes
Link download limit			Yes	
Upload links			Yes	Yes
Productivity				
File previews	Yes	Yes	Yes	Yes
Edit files	Yes	Yes	Yes	Yes
In-app collaboration	Yes	Yes	Yes	Yes
Office online		Yes	Yes	Yes
Google docs	Yes			Yes
Delete file retention	Yes	Yes	Yes	Yes
Versioning	Yes	Yes	Yes	Yes
Security				
At-rest encryption	Yes	Yes	Yes	Yes
In-transit encryption	Yes	Yes	Yes	Yes
Encryption protocol	Yes	Yes	Yes	Yes

Requirement				
Zero knowledge encryption				
Two-factor authentication	Yes	Yes	Yes	Yes
Support				
24/7 support	Yes		Yes	Yes
Live chat support	Yes			Yes
Telephone support	Yes			
Email support	Yes	Yes	Yes	Yes
User forum	Yes	Yes		Yes
Knowledge base	Yes	Yes	Yes	Yes
Miscellaneous				
Free plan	Yes	Yes	Yes	Yes
Education related				
Break-out groups				
Asynchronous communication	Yes	Yes		Yes
Synchronous communication	Yes	Yes		
Sharing documents	Yes	Yes		Yes
Real-time shared editing	Yes	Yes		
Online data collection	Yes	Yes		
Remote automated or manual assessment of work				
Attendees participation	Yes			
Online classes	Yes		Yes	

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<p>Based on the above it was decided that the Google Drive (g-drive) would be the most appropriate choice of cloud service provider offering the most benefits without any cost. The following present a brief description of services / applications provided by Google¹. It should be noted that all ² of the below services or applications are (if applicable) interoperable with each other.</p> <ul style="list-style-type: none"> - Google drive: a file storage and synchronization service developed by Google. It allows users to store files on their servers, synchronize files across devices, and share files - Google Docs: a word processor included as part of a free suite of productivity applications offered by Google within its Google Drive service - Google Sheets: a spreadsheet program included as part of a free suite of productivity applications offered by Google within its Google Drive service - Google Slides: a presentation program included as part of a free suite of productivity applications offered by Google within its Google Drive service - Google Forms: a survey administration app included in the Google Drive productivity applications and Google Classroom along with Google Docs, Google Sheets, and Google Slides. Forms features all of the collaboration and sharing features found in Docs, Sheets, and Slides - Gmail: a free email service developed by Google. Users can access Gmail on the web and using third-party programs that synchronize email content through POP or IMAP protocols - Google Groups: a service from Google that provides discussion groups for people sharing common interests. The Groups service also provides a gateway to Usenet newsgroups via a shared user interface. - Google Classroom: a free web service developed by Google for schools that aims to simplify creating,

¹ The listing provided here is not exhaustive, google offers a plethora of services but in here we list only the most relevant to online collaboration.

² The information presented here are quotes from the Wikipedia website.

distributing, and grading assignments. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students

- Google Chat: a communication software developed by Google and integrated in g-mail allowing a chat-like interface to have synchronous text-based communication with collaborators.
- Google Meet: a video-communication service developed by Google and integrated in g-mail allowing video conferencing collaborations. It is one of two apps that constitute the replacement for Google Hangouts, the other being Google Chat
- Google Contacts: Google's contact management tool that is available in its free email service Gmail, as a standalone service, and as a part of Google's business-oriented suite of web apps G Suite
- Google Calendar: a time-management and scheduling calendar service developed by Google. Calendar allows users to create and edit events
- Google Photos: a photo sharing and storage service developed by Google. It gives users free, unlimited storage for photos up to 16 megapixels and videos up to 1080p resolution