
Final Project

Ger's Garage

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1 Project Introduction:

The first chapter sets the background and motivation for the project. The problem to be solved is stated, with the project aims and a list of specific objectives.

The chapter could include:

- A brief synopsis of the project context (supplied by CCT)*
- General areas of computing that project context covers / requires knowledge of*
- Brief summary of your initial proposed plan for addressing the project context*
- Short section arguing ‘why’ this is a good project – outline Individual’s skills, interests, strengths – they Individual can describe how the project brings together many of the modules they’ve listed*
- Novel aspects – a real world business or organisation or taking advantage of new technology*

1.1 Part 1: Overview

Ger is a mechanic who runs a small garage. He carries out maintenance checks for all kinds of small to medium vehicles (i.e. motorbikes, cars, small vans and small buses). He has a small number of staff who work with him.

In most cases, a maintenance check will require parts or other supplies (e.g. brake fluid; engine oil). He keeps a stock of common supplies at his garage and sells them to customers if/when needed. He needs an online service to allow customers to book their vehicles in for a check-up or service. He has asked you to build a WEB-BASED [OR MOBILE] application to fulfil his requirements.

Project overview:

He carries out maintenance checks for all kinds of small to medium vehicles (i.e. motorbikes, cars, small vans and small buses). He has a small number of staff who work with him.

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He needs an online service to allow customers to book their vehicles in for a check-up or service. He has asked you to build a WEB-BASED [OR MOBILE] application to fulfil his requirements.

Ger’s garage minimum requirements:

- A new website for Ger’s Garage is created that advertises his garage and his services.
[OPTION – YOU COULD CREATE THIS AS A MOBILE APPLICATION INSTEAD]
 1. websites
 2. mobile applications

Booking services:

Customers can register on the website and book their vehicle in for a service OR a repair.
There must be AT LEAST 4 types of booking:

1. Annual Service
2. Major Service
3. Repair / Fault
4. Major Repair

Login Service:

Registered customers should be able to login on future occasions and the system should remember their details. This would include details of the vehicle they LAST booked in to the garage

Booking checklist:

Customers need to be able to select a DATE for their service. The website should limit the number of bookings allowed per day (you can decide the limit, but this should be realistic for a small garage). If there is no available space for a day, then the customer should not be able to book a service on that day.

Ger’s garage is closed on Sundays for service bookings. DO not allow customers to select a Sunday.

Information about the vehicles:

Customers will need to be able to provide some basic information about themselves and their vehicles:

- Customer name & contact details (mob phone essential)
- Vehicle type & make
- Vehicle licence details
- Vehicle engine type
 - diesel
 - petrol
 - hybrid
 - electric
- Booking Required
 - Annual Service
 - Major Service
 - Repair / Fault
 - Major Repair
- Customer Comments (to allow customer add any notes they want to add, such as a description of the problem)

Ger administration:

Ger needs to have an admin access to the site to view bookings for any particular day OR week, so that he can plan his work & staff rostering. You can assume Ger has at least 4 mechanics available on any one particular day (you can change this, but be realistic – this is a small garage!)

He needs to be able to allocate a mechanic to each vehicle. You can assume that all of his staff are able to carry out any type of service / repair and that each mechanic could carry out AT MOST 4 services/repairs in one day. If the booking is a Major Repair then this would count double.

Printing services:

He needs to be able to print the schedule for any particular date.

He needs to be able to allocate costs to each booking. You can assume a basic fixed cost (e.g. an Annual Service might cost €200 minimum).

Items/Parts:

Ger needs to be able to add to this the cost of any item/parts that were needed to fix/service the vehicle. For example, if a tyre needed to be replaced then the cost of the tyre would be added and the cost of carrying out a “wheel balancing” would be added.

You can decide the cost of each item/part and what types of items/parts you include, but you should be realistic. You do not have to provide an exhaustive list of parts, but the more you provide the more realistic your final product will be. AT A MINIMUM you should provide 40 different parts/items for the garage.

Note that the customer has to provide details of the type and make of car (e.g. Car - Ford Feista). The site MUST allow for motorbikes, cars, small vans and small buses. You can decide how many different makes to provide as default, but you MUST provide at least 30 in total. Make sure to allow the user choose “other” if their vehicle is not in the list.

Booking statuses:

Ger needs to be able to set each booking to one of 5 possible statuses:

1. Booked – this is the default status when a booking is made
2. In Service – when the vehicle arrives at the garage
3. Fixed / Completed – when the vehicle is ready for collection
4. Collected – When the customer has taken the vehicle away and paid their bill
5. Unrepairable / Scrapped – when the fault cannot be fixed; in this case the car has either been taken away by the customer or has been sent for scrap.

Invoice:

Ger needs to be able to print an “invoice” or bill for each customer when the service/repair is complete. This should provide an itemised bill for the customer. For example:

CUSTOMER:

Joe Bloke
Mob No: 085 02140201
Vehicle: Peugeot 406
Licence: 12 G 123456

Annual Service €189

Mini Valet €39
Car mat €17
TOTAL DUE €245

Payment due on collection.

You can assume that the actual payment is handled by Ger at his checkout / on another system. You do not need to process payments or issue a receipt. To achieve a distinction grade you should aim to include additional functionality that has not been specified here but which would make sense within the project brief.

REPORT GUIDANCE:

For the design section of your report, you should aim to include the following

ESSENTIAL:

- Wireframe designs for the website. Include key pages – you may not need to include every single page.
- Functional Requirements – set out the various requirements in a structured manner and specify a level of priority (e.g. Must have, etc.)
- Data Requirements – set out the data you will need to store using a 'data dictionary' or similar structured layout. Make sure you specify data types, restrictions and any other important details
- Database tables – should be normalized to 3NF minimum

DIAGRAMS

- Include design diagrams to detail your design. Examples would include: a class diagram, and E-R Diagram, Use-cases.

JUSTIFICATION

Why did you choose this wireframe design? How did you determine your data requirements? How did you construct your class diagram and/or use-cases?

1.2 Part 2: Purpose

Why need Gerg a website?

Small medium or large size of the business has to have a website or mobile app because this is the key to making sales and contact with the customers. Consumer behavior changes over time to adapt to modern technology, and consumer behavior has changed to adapt to the digital age.

At the 21 century, the key is to get real-time and communication with the customer. The 1930s, advertising in the Yellow Pages. It was a standard operating procedure for most businesses. Then came the world wide web (WWW) and a new disruption to the commercial status of the digital transformation. As more and more consumers realized they could find what they needed online faster and more effectively than a phone book, behavior moved away from using the printed directory. Nowadays at 2019, and the number of purchasers that go online to find a local business has jumped to 97 percent. If you want them to choose your company, you need to be found online— meaning you need a website.

"Websites work. No matter what your business or profession, a website can generate business, promote goodwill among customers and prospects, and deliver strong marketing messages - whether your business is small, large or in-between, well-established or brand-new.

People use the Web in greater and greater numbers, more and more every day. Even if you are a completely local small business, service, contractor or consultant, odds are people have used search engines to look for your web site - and if you don't have a web site... well, you get the picture.

" <http://www.networksolutions.com/education/business-needs-website/>

The is a couple of the reason why small business needs a Website

- The customers expect it.
The customer has to trust a business
- It provides social proof.
The potential customers are already looking for you online, including customer recommendations on your site is a great way to impress potential clients.
- Influence the clients
You can control the communication channel
- You can control the communication channel
- The competitors all have company websites.
- You will be visible on the Google search results
- Display your products or outline your services in detail

Web Developer:

Web developers are at the forefront of the Internet age. The websites we browse, the gifts we order and the news we read online are all made possible by the web developers who design, build and implement Internet websites. Web developers are responsible for designing and develop a website and website application. The developer can use different languages (HTML, PHP, JavaScript, JQuery, etc), and can develop with different technology, and manager site functionality, implement application features and manage security.



<https://medium.com/level-up-web/developer-roadmaps-all-in-one-place-75c0402db0e0>

The 9 Web Technologies Every Web Developer Must Know in 2019

1. Browsers
2. HTML & CSS
3. Web Development Frameworks
4. Programming Languages
5. Protocols
6. API

7. Data formats
8. Client (or Client-side)
9. Server (or Server-side)

More information <https://tms-outsource.com/blog/posts/web-technologies/>

My origin project plan.



I have chosen this project because I wanted to build an app (website) and I wanted to use the Google cloud platform. I think this is the future more and more project will move to the cloud. It is a game changer because It is more playable and advances.

1. Less Costs

The services are free from capital expenditure. There are no huge costs of hardware in cloud computing. You just have to pay as you operate it and enjoy the model based on your subscription plan.

2. 24 X 7 Availability

Most of the cloud providers are truly reliable in offering their services, with most of them maintaining an uptime of 99.9%. The workers can get onto the applications needed basically from anywhere. Some of the applications even function off-line.

3. Flexibility in Capacity

It offers flexible facility which could be turned off, up or down as per the circumstances of the user. For instance, a promotion of sales is very popular, capacity can be immediately and quickly added to it for the avoidance of losing sales and crashing servers. When those sales are done, the capacity can also be shrunk for the reduction of costs.

4. All over Functioning

Cloud computing offers yet another advantage of working from anywhere across the globe, as long as you have an internet connection. Even while using the critical cloud services that offer mobile apps, there is no limitation of the device used.

5. Automated Updates on Software

In cloud computing, the server suppliers regularly update your software including the updates on security, so that you do not need to agonize on wasting your crucial time on maintaining the system.

You find extra time to focus on the important things like 'How to grow your businesses.

6. Security

Cloud computing offers great security when any sensitive data has been lost. As the data is stored in the system, it can be easily accessed even if something happens to your computer. You can even remotely wipe out data from the lost machines for avoiding it getting in the wrong hands.

7. Carbon Footprint

Cloud computing is helping out organizations to reduce their carbon footprint. Organizations utilize only the amount of resources they need, which helps them to avoid any over-provisioning. Hence, no waste of resources and thus energy.

8. Enhanced Collaboration

Cloud applications enhance collaboration by authorizing diverse groups of people virtually meet and exchange information with the help of shared storage. Such capability helps in improving the customer service and product development and also reducing the marketing time.

9. Control on the Documents

Before cloud came into being, workers needed to send files in and out as the email attachments for being worked on by a single user at one time ultimately ending up with a mess of contrary titles, formats, and file content. Moving to cloud computing has facilitated central file storage.

10. Easily Manageable

Cloud computing offers simplified and enhanced IT maintenance and management capacities by agreements backed by SLA, central resource administration and managed infrastructure. You get to enjoy a basic user interface without any requirement for installation. Plus you are assured guaranteed and timely management, maintenance, and delivery of the IT services.

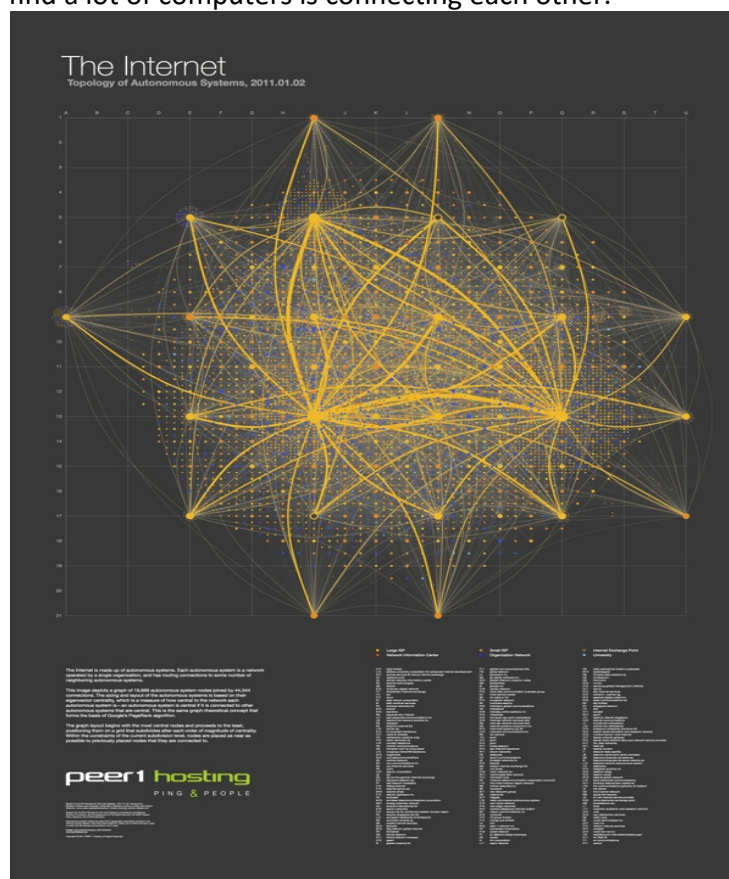
2 Literature Review:

The aim of this chapter is to present all academic research carried out throughout the project cycle. It is important that learners produce research that defends their justifications for choosing one from of technology or software over another, and other sources of information that have helped inform the individuals thinking, planning and delivery of the project.

2.1 Part 1: Cloud Computing Services

What is the cloud computing?

Before we go deeper to cloud computing We have to define the cloud. This is the technology not older than 10 years and nowadays is happening the change. Why the people using the cloud that a logo, Because It is easy to draw it. But If we looking at the big picture we will see cloud computing is similar that the real cloud. In the cloud, We can find a lot of h2o and cloud computing we will find a lot of computers is connecting each other.



The Map of the Internet — Cool Infographics

<https://coolinfographics.com/blog/2011/4/7/the-map-of-the-internet.html>

"It's a layout of all the networks that are interconnected to form the internet. Some are run by small and large ISPs, university networks, and customer networks - such as Facebook and Google. It's visual representation of all those networks interconnecting with one another, forming the internet as we know it. Based on the size of the nodes and the thickness of the lines, it speaks to the size of those particular providers and the connections."

Randy Krum Designer | Author | Instructor

<https://coolinfographics.com/blog/2011/4/7/the-map-of-the-internet.html>

Those small computers are working together that a big resource. Those computers are sharing the resource with each other.

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is regularly used to describe datacenters available to many clients over the Internet. Big clouds, dominant today, often have roles spread over many locations from central servers. If the connection to the user is relatively close, it may be designated an edge server.

Fundamentally, cloud computing is the delivery of computing services including servers, storage, databases, networking, software, analytics, and intelligence over the Internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale. You typically pay only for cloud services you use, helping you lower your operating costs, run your infrastructure more efficiently, and scale as your business needs change.

Cloud computing services have several standard properties:

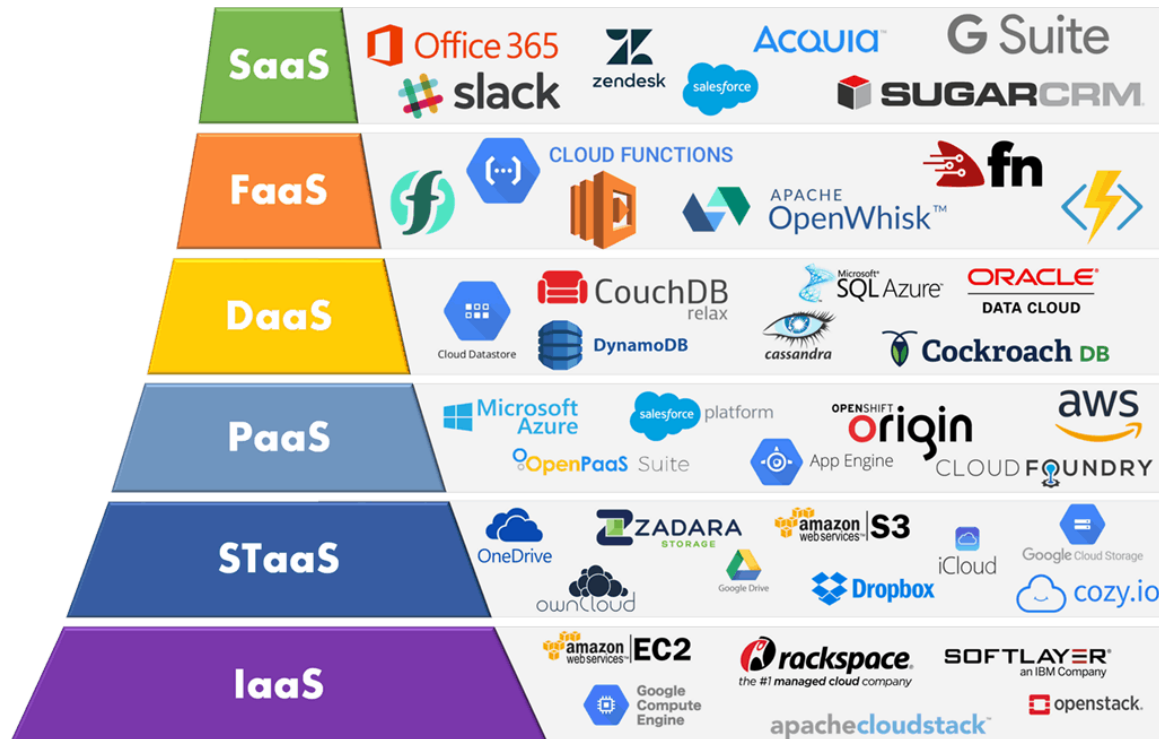
- Virtualization- cloud computing utilizes server and storage virtualization extensively to allocate/reallocate resources rapidly
- Multi-tenancy-resources are pooled and shared among multiple users to gain economies of scale
- Network-access- resources are accessed via web-browser or thin client using a variety of networked devices (computer, tablet, smartphone)
- On demand- resources are self-provisioned from an online catalogue of pre-defined configurations
- Elastic-resources can scale up or down, automatically
- Metering/chargeback-resource usage is tracked and billed based on service arrangement

Cloud computing services delivered internally or by third-party service:

- Software as a Service (SaaS) – software runs on computers owned and managed by the SaaS provider, versus installed and managed on user computers. The software is accessed over the public Internet and generally offered on a monthly or yearly subscription.
- Infrastructure as a Service (IaaS)– compute, storage, networking, and other elements (security, tools) are provided by the IaaS provider via public Internet, VPN, or dedicated network connection. Users own and manage operating systems, applications, and information running on the infrastructure and pay by usage.

- Platform as a Service (PaaS)– All software and hardware required to build and operate cloud-based applications are provided by the PaaS provider via public Internet, VPN, or dedicated network connection. Users pay by use of the platform and control how applications are utilized throughout their lifecycle.

Cloud services delivery models



<https://imelgrat.me/cloud/cloud-services-models-help-business/>

Models of cloud computing:

Not all clouds are the same, different users, different type of cloud computing system right for them. Different models, types, and services offer the right solution. There are three different ways to deploy cloud services: on a public cloud, private cloud, or hybrid cloud.



<https://www.allcovered.com/the-learning-center/cloud-revolution-or-evolution-582>

- **Public cloud**
Public clouds are owned and operated by a third-party cloud service providers, Public cloud provides computing resources, like servers and storage, over the Internet. The cloud provider owned and managed all hardware, software and other infrastructure.
- **Private cloud**
A private cloud belongs to cloud computing resources used exclusively by a single business or organization. It can be located on the company’s data center, or companies can pay third-party service providers to host private cloud.
- **Hybrid cloud**
Hybrid clouds join public and private clouds. The technology permits applications and data to be shared between them. The data and applications can transfer between private and public clouds, a hybrid cloud gives to the business adaptability, more deployment options, and helps optimize your current infrastructure, security, and compliance.

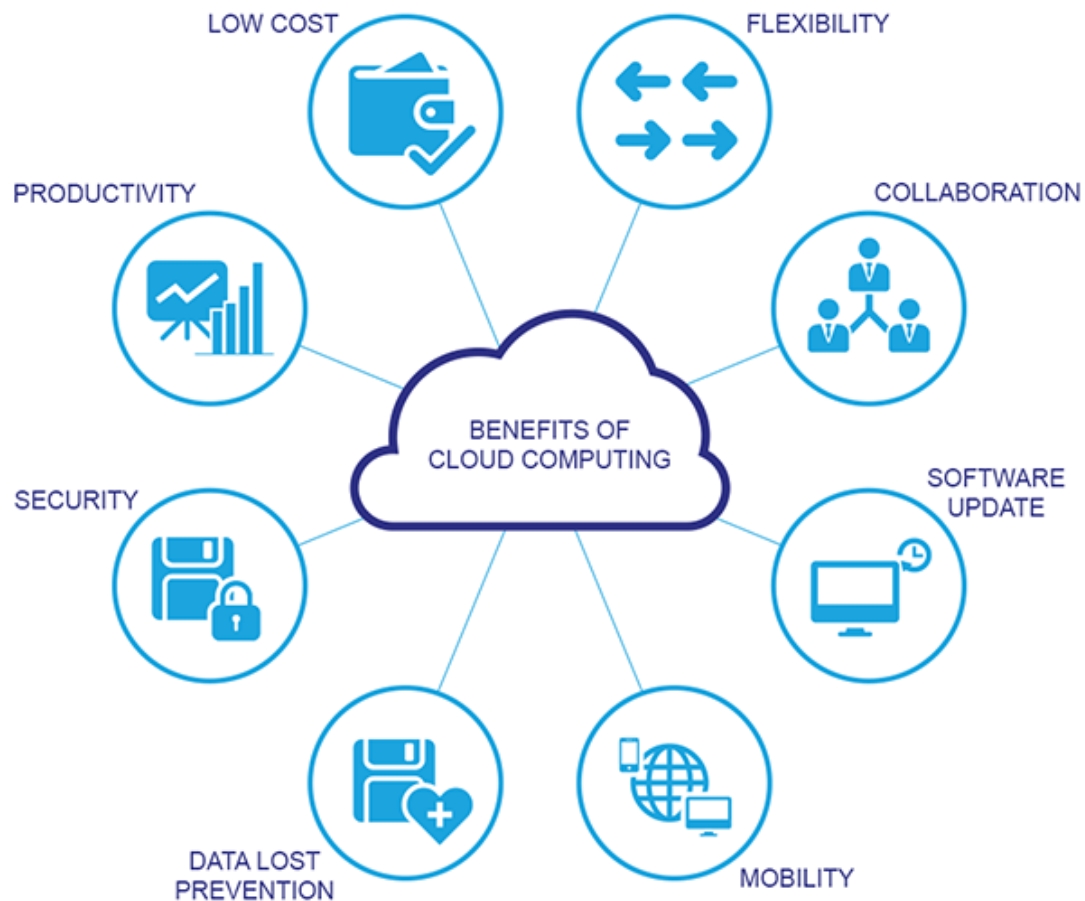
Cloud computing services offer numerous benefits:

- Faster implementation and time to value
- Anywhere access to applications and content
- Rapid scalability to meet demand
- Higher utilization of infrastructure investments
- Lower infrastructure, energy, and facility costs
- Greater IT staff productivity and across organization
- Enhanced security and protection of information assets

Cloud computing in the business view:

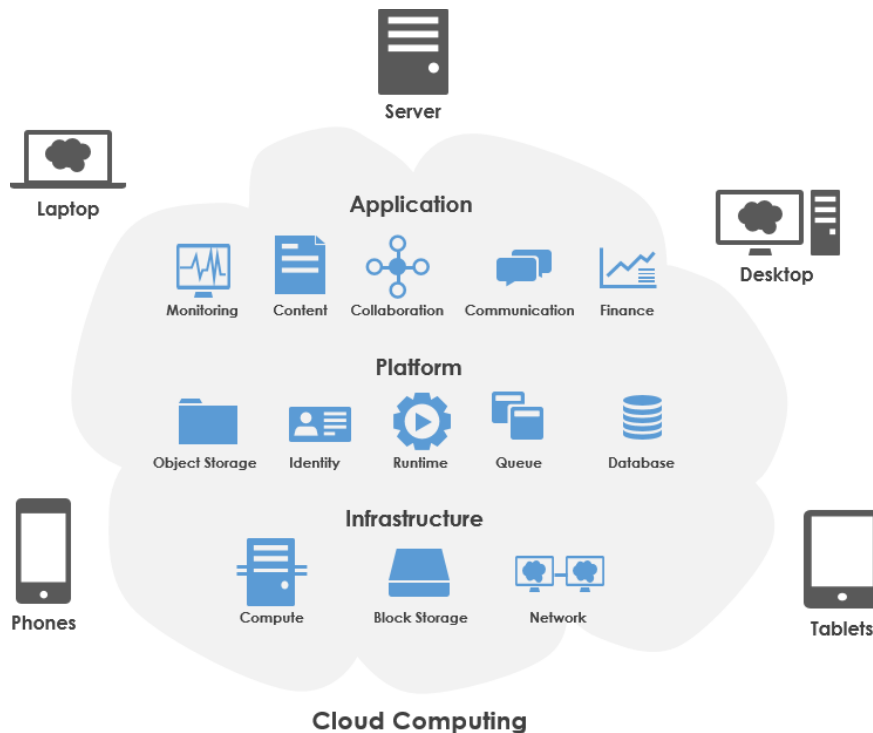
- **Cost**
If you use Cloud computing You do not need to buying hardware and software and setting up and running on-site datacenters—the racks of servers, the round-the-clock electricity for power and cooling.
- **Productivity**
Datacenters typically require a lot of “racking and stacking”—hardware setup, software patching, and other time-consuming IT management chores. Cloud computing eliminates the need for many of these jobs, so IT teams can spend time on achieving more important business goals.
- **Security**
The cloud providers offer methods, technologies, and controls and security on your products. It is helping protect your data, apps, and infrastructure.
- **Performance**
The most significant cloud computing services run on a worldwide network of secure datacenters, which are usually improved to the latest generation of fast and efficient computing hardware. This offers several benefits over an individual corporate datacenter, including reduced network latency for applications and greater economies of scale.

- Global scale
The cloud computing service can be scale, So the users can choose the right size of IT resources. Can make computer power stronger, storage size, change location.
- Speed
The system more flexibility, few minutes and the user can create service.
- Reliability
Cloud computing makes data backup, recovery, faster and save because data can be copied at multiple locations.



<http://www.visiontechme.com/cloud-computing.php>

You can use an online service to send an email, edit documents, watch movies or TV, listen to music, play games, or store pictures and other files, it's likely that cloud computing is making it all possible.



<https://www.visual-paradigm.com/guide/cloud-services-architecture/what-is-aws-architecture/>

Create new apps and services

Quickly build, deploy, and scale applications—web, mobile, and API—on any platform. Access the resources you need to help meet performance, security, and compliance requirements.

Test and build applications

Reduce application development cost and time by using cloud infrastructures that can easily be scaled up or down.

Store, back up, and recover data

Protect your data more cost-efficiently—and at massive scale—by transferring your data over the Internet to an offsite cloud storage system that's accessible from any location and any device.

Analyze data

Unify your data across teams, divisions, and locations in the cloud. Then use cloud services, such as machine learning and artificial intelligence, to uncover insights for more informed decisions.

Stream audio and video

Connect with your audience anywhere, anytime, on any device with high-definition video and audio with global distribution.

Embed intelligence

Use intelligent models to help engage customers and provide valuable insights from the data

captured.

Deliver software on demand

Also known as software as a service (SaaS), on-demand software lets you offer the latest software versions and updates around to customers—anytime they need, anywhere they are.

2.2 Part 2: Google Cloud Platform

1. Cloud Service Providers

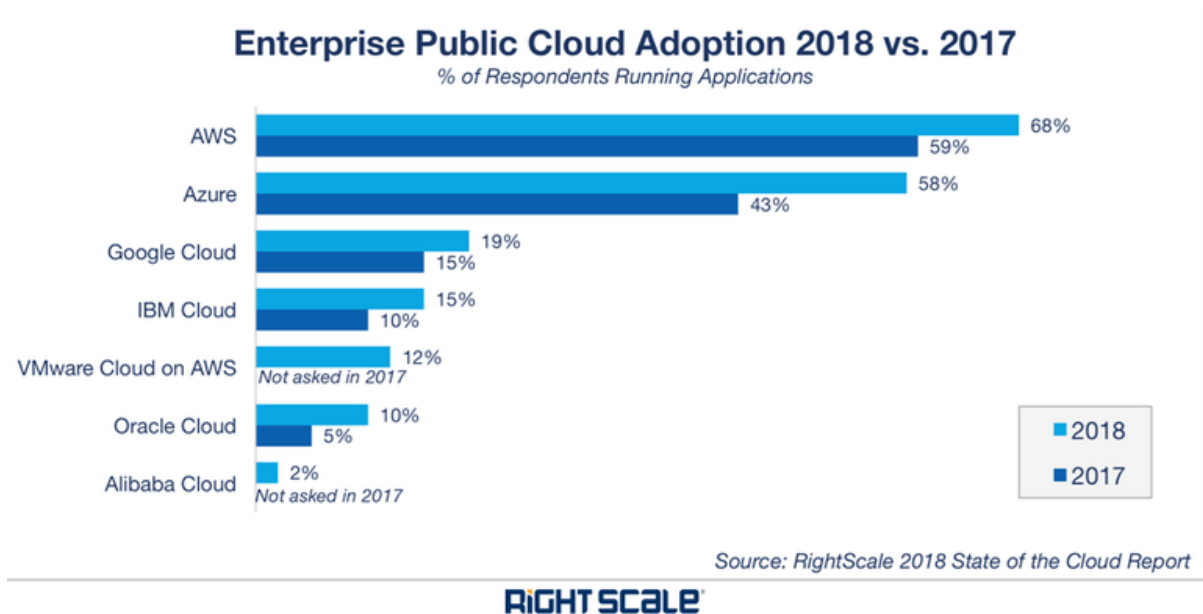
Cloud Computing Services are Information Technology (IT) as a service over the Internet. Cloud computing is a term which is used for storing and accessing data over the internet. It doesn't store any data on the hard disk of your PC. Cloud computing helps you to access your data from a remote server.

Cloud computing services range from full applications and development platforms to servers, storage, and virtual desktops. There's are various types of cloud computing services are available in the market.



<https://www.edureka.co/blog/what-is-azure/>

Market share 2018



<https://www.zdnet.com/article/top-cloud-providers-2018-how-aws-microsoft-google-ibm-oracle-alibaba-stack-up/>

2. What is the GCP and Why should We choose it.

GCP short name of the Google Cloud Platform.

Google Cloud Platform provides infrastructure as a service, platform as a service, and serverless computing environments. Google, is a cloud computing service provider that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search and YouTube, Gsuit.

This is developing dynamically and improving and the 3rd bigger provider.

Google offers free 300 dollars free credit, to the user. The clients can use this credit to test the system before a charge.

Google has been in the cloud computing race for much less time than the incumbent leader AWS. Amazon Web Services rakes in about \$6 billion per quarter — still way ahead of Google Cloud, but from market trends, Google Cloud seems to be the fastest growing cloud platform today.

Google Cloud is differentiated and place GCP ahead of the other service providers in the industry.

- Billing per second
Google Cloud charges customers for usage of its compute engine instances in one-second increments having a one-minute minimum.
- Big Data
GCP has next-gen frameworks for data warehousing, advanced machine learning, and visual analytics give it an edge in data processing and analytics.
- User-friendly interface
It's CloudShell, great tutorials, clear communication, and well-integrated services.
- Kubernetes leadership
It is the creator of Kubernetes, the container management platform.



Google Cloud Platform

<https://medium.com/google-cloud/deploying-websockets-cluster-to-gcp-with-lets-encrypt-certificates-5ebb7fc1e245>

Few companies that are using Google Cloud Platform (Compute Engine or App Engine) include Spotify, HSBC, Home Depot, Snapchat, HTC, Best Buy, Philips, Coca Cola, Domino's, Feedly, ShareThis, Sony Music, Ubisoft, and Apple.

3. Google Cloud Platform Products

More than 60 Google Cloud Platform services



https://www.slideshare.net/Hadoop_Summit/running-apache-hadoop-on-the-google-cloud-platform

Google Cloud Platform products span the following categories:

- API management: API Analytics, API Monetization, Cloud Endpoints, Developer Portal, Cloud Healthcare API
- Artificial intelligence & machine learning: AI Hub (beta), Cloud AutoML (beta), Cloud TPU, Cloud Machine Learning Engine, Diagnostics Enterprise Edition, Cloud Natural Language, Cloud Speech-to-Text, Cloud Text-to-Speech, Cloud Translation, Cloud Vision, Cloud Video Intelligence, Cloud Inference API (alpha), and more
- Compute: Compute Engine, Shielded VMs, Container security, App Engine, Cloud Functions, GPU, and more
- Data analytics: BigQuery, Cloud Dataflow, Cloud Dataproc, Cloud Datalab, Cloud Dataprep, Cloud Composer, and more
- Databases: Cloud SQL, Cloud Bigtable, Cloud Spanner, Cloud Datastore, Cloud Memorystore
- Developer tools: Cloud SDK, Container Registry, Cloud Build, Cloud Source Repositories, Cloud Tasks, and more, as well as Cloud Tools for IntelliJ, PowerShell, Visual Studio, and Eclipse
- Internet of Things (IoT): Cloud IoT Core, Edge TPU (beta)
- Hybrid and multi-cloud: Google Kubernetes Engine, GKE On-Prem, Istio on GKE (beta), Anthos Config Management, Serverless, Stackdriver, and more
- Management Tools: Stackdriver, Monitoring, Trace, Logging, Debugger, Cloud Console, and more
- Media: Anvato, Zync Render
- Migration: Cloud Data Transfer, Transfer Appliance, BigQuery Data Transfer Service, Velostrata, VM Migration, and more
- Networking: Virtual Private Cloud (VPC), Cloud Load Balancing, Cloud Armor, Cloud CDN, Cloud NAT, Cloud Interconnect, Cloud VPN, Cloud DNS, Network Service Tiers, Network Telemetry
- Security: Access Transparency, Cloud Identity, Cloud Data Loss Prevention, Cloud Key Management Service, Cloud Security Scanner, and more
- Storage: Cloud Storage, Persistent Disk, Cloud Filestore, and more

A cloud database is a database that typically runs on a cloud computing platform, and access to the database is provided as-a-service. Database services take care of scalability and high availability of the database. Database services make the underlying software-stack transparent to the user.





2.3 Part 3: GCP SQL Database

Google Cloud database services are fully managed, scalable database services to support all your applications. GCP is rounding out its stable of managed database services as it on boards more large enterprises.

Managed database services are increasingly popular as enterprises aim to abstract the

underlying infrastructure and connect with databases via application programming interfaces.

Where do I store my stuff?


Object	In-memory	Non-relational		Relational		Warehouse
 Cloud Storage	 Cloud Memorystore (beta)	 Cloud Datastore	 Cloud Bigtable	 Cloud SQL	 Cloud Spanner	 BigQuery
Binary or object data	Web/mobile applications, gaming	Hierarchical, mobile, web	Heavy read + write, events	MySQL, PostgreSQL	RDBMS+scale, HA, global	Enterprise Data Warehouse
Images, media serving, backups	Cache, game state, user sessions	User profiles, Game State	AdTech, financial, IoT	CMS, eCommerce	Transactions, Ad/Fin/MarTech	Analytics, Dashboards



<http://www.knowstuff.org/2018/04/google-cloud-platform-adds-more-managed-database-services/>

Cloud SQL


Google Cloud Database Services comes as part of Google's cloud platform services, and is the last of the big name cloud providers we'll mention here. There are a lot of options for users to choose from, not relational vs non-relational ones. The Cloud SQL option provides managed support for PostgreSQL & MySQL, while the BigTable option provides a petabyte-scale, fully managed NoSQL database service for large analytical and operational workloads.



Cloud SQL

Cloud SQL is a fully managed database service that makes it easy to set up, maintain, manage, and administer your relational MySQL and PostgreSQL databases in the cloud.


[View cloud sql →](#)



Cloud Bigtable

NoSQL database service for use cases where low latency reads and high throughput writes, scalability, and reliability are critical.


[View cloud bigtable →](#)



Cloud Spanner

Cloud Spanner is a mission-critical, scalable relational database service, built to support transactions, strong consistency, and high availability across regions and continents.


[View cloud spanner →](#)



Cloud Memorystore

Cloud Memorystore is a fully managed in-memory data store service for Redis built on scalable, more secure, and highly available infrastructure.


[View cloud memorystore →](#)



Cloud Firestore

Cloud Firestore is a fast, fully managed, serverless, cloud-native NoSQL document database that simplifies storing, syncing, and querying data for your mobile, web, and IoT apps at global scale. Cloud Firestore is the next generation of Cloud Datastore.

[View cloud firestore →](#)



Firebase Realtime Database

The Firebase Realtime Database is a cloud-hosted NoSQL database that lets you store and sync data between your users in real time.

[View firebase realtime database →](#)

<https://cloud.google.com/sql/>

Google control your database, so you can concentrate on your applications. Cloud SQL is ideal for WordPress sites, e-commerce applications, CRM tools, and any other application that is compatible with MySQL, PostgreSQL, or SQL Server.

Cloud SQL is simple to use. It does not need any software installation. It automates all your backups, replication, patches, and updates.

Cloud SQL delivers high performance and scalability with up to 10 TB of storage capacity.

Simply configure replication and backups to protect your data. The database is highly available, and automatically encrypted.

Step by step setting up cloud SQL:

3 System Analysis and Design:

The overall aim of this chapter is to answer the questions – exactly what is the application supposed to do? It can include the following, where relevant:

- Functional Requirements

o Detailed description of the functionality of the proposed system. This should be comprehensive and exact, break up the application into subsystems.

o Diagrams – use Case diagrams, Wire frames, with text descriptions

- Data Requirements

o An overview of the entities and data in the system, and what data needs to be stored

o Diagrams – an Entity-Relationship Diagram

- User Interface Design

o This should contain an argument as to how this suggested interface supports each of the use cases specified in the analysis

o Diagrams – Screen designs, either pen-and-paper or computer drawn of how the user interface will appear

- Functional Design

o Functional design should model both the structure of each software component in the systems, and also how they interact with each other.

o Diagrams – detailed class diagram and an Interaction Diagram to show the interaction between objects in the system

- Data Design

o Whether to be implemented as a database or some other central data repository, a detailed design of the data storage components should be presented

o Diagrams – Normalised database tables

3.1 Part 1: Functional Requirements

1. Using virtualization software, **install** 2 virtual machines.

Use *Server 2012 R2 (GUI)* or *Server 2008R2 (GUI)* (Both Server OS not Client OS)

One VM will act as the Server and the other VM will act as the Client. [Client will also be Web Server]

3.2 Part 2: User Interface Design

11. This should contain an argument as to how this suggested interface supports each of the use cases specified in the analysis

o Diagrams – Screen designs, either pen-and-paper or computer drawn of how the user interface will appear

3.3 Part 3: Functional & Data Design

17. Functional design should model both the structure of each software component in the systems, and also how they interact with each other.

- o Diagrams – detailed class diagram and an Interaction Diagram to show the interaction between objects in the system

Whether to be implemented as a database or some other central data repository, a detailed design of the data storage components should be presented

- o Diagrams – Normalised database tables

4 Implementation of the system:

This chapter should detail how the learner implemented a working system based on their design. This should include the technologies used (languages, APIs, frameworks etc.) and how the system was implemented, based on the user and functional requirements identified during the analysis and design phase. This chapter should address any potential problems that could arise in the system and suggested or implemented solutions.

Possible areas for discussion in this chapter are:

o Architecture considerations - e.g. are there specific functional requirements that will influence the software architecture implementation.

o Technologies used - operating systems, databases, computer languages, frameworks, API's etc.

o Implementation of the system - main body of work for the chapter. This will discuss precisely how the system was developed, based on the analysis and design considerations.

o Problems encountered - any issues that may have arisen during the implementation phase, e.g. the project's cross-platform compatibility between different operating systems.

4.1 Part 1: Software Architecture Implementation

Setting up Google Cloud Platform

My website will be on the cloud so I have chosen GCP (Google Cloud Platform)

Google Cloud Platform, offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search and YouTube.

Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning. Google Cloud Platform provides infrastructure as a service, platform as a service, and serverless computing environments.

Why we should transform a business with Google Cloud.

Modernize workloads on Google's global, secure, and reliable infrastructure.

Develop and run applications using open source and other software without operations staff.

Get insights from data with a full suite of analytics and ML tools.

- **Reduce risk with world-class security**

Your most challenging security scenarios are protected by the same secure-by-design infrastructure, global network, and built-in safeguards that Google uses.

- **Flexible hybrid and multi-cloud options**

Our managed, cloud-native solution means you can write an application once, then run it on-premises, on GCP, or on other clouds with no change in infrastructure

- **Power innovations with AI and ML**

Our easy-to-use artificial intelligence and machine learning capabilities are embedded in our core solutions, making them accessible and easily deployed.

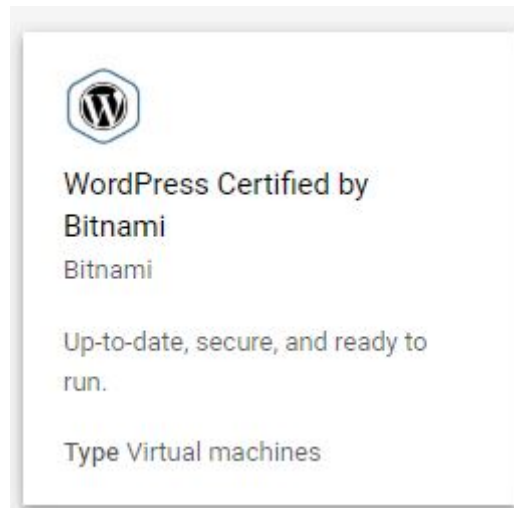
Step by step Setting up a WordPress site on Google Cloud.

Step 1:

I have created a project

Step 2:

Marketplace I have created a virtual machine



Step 3:

I have to give my WordPress site a name and set up a (0.6GB) micro instance in the Europe West Zone .

Small instance is cheaper.

← New WordPress Certified by Bitnami deployment

Deployment name
wordpress-1

Zone
us-central1-f

Machine type
small (1 shared ... 1.7 GB memory Customize

Boot Disk
Boot disk type
Standard Persistent Disk

Boot disk size in GB
10

Networking
Network
default

Subnetwork
default (10.128.0.0/20)

External IP
Ephemeral

Firewall
Add tags and firewall rules to allow specific network traffic from the Internet
☒ Allow HTTP traffic
Source IP ranges for HTTP traffic
0.0.0.0/0, 192.169.0.2/24
☒ Allow HTTPS traffic
Source IP ranges for HTTPS traffic
0.0.0.0/0, 192.169.0.2/24

Deploy



WordPress Certified by Bitnami overview

Solution provided by Bitnami

\$13.61 per month estimated

Effective hourly rate \$0.019 (730 hours per month)

Details

Software

Operating System	Debian (9)
Software	Apache (2.4.39)
	ImageMagick (6.9.8)
	lego (2.6.0)
	MySQL (8.0.16)
	OpenSSL (1.0.2s)
	PHP (7.3.6)
	phpMyAdmin (4.9.0.1)
	SQLite (3.28.0)
	Varnish (6.0.3)
	WordPress (5.2.2)
	WP-CLI (2.2.0)

Documentation

[Access using SSH](#)

Configure SSH keys to access the application as the user "bitnami".

[Using SFTP](#)

Use this guide to upload files using SFTP.

[MySQL access credentials](#)

Use username "root" and the temporary password to access MySQL.

[Change your MySQL root password](#)

Change your temporary MySQL root password by following these instructions

[Accessing phpMyAdmin](#)

Access phpMyAdmin via an SSH tunnel using this guide.

[Adding plugins with privileges](#)

Some plugins need privileged access to install. Edit privileges with this guide.

[Installation directory structure](#)

Learn how application files, libraries and configuration files are organized.

[Terms of Service](#)

Step 4:

Once the site is complete I can log-in using the username and password given. Note This is the new site has an external IP address

wordpress

WordPress Certified by Bitnami
Solution provided by Bitnami

Site address <http://35.204.159.181/>

Admin URL <http://35.204.159.181/wp-admin/>

Admin user user

Admin password (Temporary) HQ4seoNzHWmi

Instance wordpress-2-vm

Instance zone europe-west4-c

Instance machine type f1-micro

More about the software

Get started with WordPress Certified by Bitnami

Log into the admin panel SSH

WordPress logo

Username or Email Address
user

Password
.....

☐ Remember Me

Log In

Create easy website.

4.2 Part 2: System Analysis and Design Reflections

11. This will discuss precisely how the system was developed, based on the analysis and design considerations.

4.3 Part 3: Problems confronted

17. Problems encountered - any issues that may have arisen during the implementation phase, e.g. the project's cross-platform compatibility between different operating systems.

5 Testing and Evaluation:

Details of the learner's test plans, test results, user evaluations and discussion of these results in detail and in summary.

Possible entries in this chapter might include:

- Functional correctness
 - o Set of tasks system should be able to perform – part of requirements specification of system and include a focus on efficiency
 - o Set of inputs and correct outputs
 - o Set of 'test scripts'
 - Objective of test / statement of which part of systems is being tested
 - Input data/situation
 - Correct output data / state / behaviour
 - Need to show actual results of test – screen shots
 - Evaluation - if actual matches correct then working
 - Usability
 - o List of usability requirements
 - set of tasks user should be able to perform
 - Have a set of tasks for each type of user
 - System Response times
 - Time for user to complete a task
 - Aesthetic
 - Acceptable navigation of site and layout
 - o Set of 'test scripts'
 - Instructions for user
 - Observation / measure time / evaluate success of task
 - Analyse results to come up with usability result
 - o Can also measure qualitative usability aspects with questionnaires / structured interviews etc.
 - Commercialisation / marketing
 - o Requirements – registration on web search engines, direct marketing – discuss real commercialisation aspects of project
 - o Evaluation – have set of key words / phrases for targeted websites
-

5.1 Part 1: Functional Requirements

1. Set of tasks system should be able to perform – part of requirements specification of system and include a focus on efficiency
 - o Set of inputs and correct outputs
 - o Set of 'test scripts'
 - Objective of test / statement of which part of systems is being tested
 - Input data/situation
 - Correct output data / state / behaviour
 - Need to show actual results of test – screen shots
 - Evaluation - if actual matches correct then working
 - Usability

5.2 Part 2: Instructions for user

11. CompuTech has two departments. Using Active Directory Users and Computers

(ADUC), create 2 departments (Organizational Units) called Accounting-Dublin and Sales-Dublin. Inside the **Accounting-Dublin** OU and in the **Sales-Dublin** OU create user accounts, and network groups as specified below:

12. Inside the **Accounting-Dublin** OU create a Global Security group called **Accounting** and then create the 5 **Accounting** users accounts shown below, using the names supplied.

5.3 Part 3: Commercialisation / Marketing

17. Requirements – registration on web search engines, direct marketing –discuss real commercialisation aspects of project Evaluation – have set of key words / phrases for targeted websites

6 Conclusions:

The Individual needs to review the entire project against their problem context, aims and objectives, and evaluate project success and results. This may also include a section for suggestions for further work.

Appendix A: Code Listings

This should be a link to a cloud resource (such as GitHub) where the project code is maintained. Students should have only included selected code fragments or algorithm summaries in the main chapters, otherwise the project report can become a monotonous technical manual rather than a story of what they did and why they did it.

6.1 Part 1: Evaluate the success and results of the project

1. Using virtualization software, **install** 2 virtual machines.
Use *Server 2012 R2 (GUI)*.) or *Server 2008R2 (GUI)* (Both Server OS not Client OS)

One VM will act as the Server and the other VM will act as the Client. [Client will also be Web Server]

6.2 Part 2: Suggestions for further work

11. **CompuTech** has two departments. Using **Active Directory Users and Computers**

(ADUC), **create 2 departments** (Organizational Units) called **Accounting-Dublin** and **Sales-Dublin**. Inside the **Accounting-Dublin** OU and in the **Sales-Dublin** OU create user accounts, and network groups as specified below:

12. Inside the **Accounting-Dublin** OU create a Global Security group called **Accounting** and then create the 5 **Accounting** users accounts shown below, using the names supplied.

7 Code Listings:

This should be a link to a cloud resource (such as GitHub) where the project code is maintained. Students should have only included selected code fragments or algorithm summaries in the main chapters, otherwise the project report can become a monotonous technical manual rather than a story of what they did and why they did it.

7.1 Part 1: #####

7.2 Part 2: #####

11. CompuTech has two departments. Using Active Directory Users and Computers

7.3 Part 3: #####

8 Appendix B: (other technical or data appendices as required):

If you have additional technical data to showcase it should be included in this appendix, you can also use this appendix to present the raw data of empirical research carried out (questionnaires, interviews etc.)

8.1 Part 1: : Project Planning

1. U

8.2 Part 2: Reflective Learning Journal

11. C

9 *List of References:*

All citations used within the report should include their full reference using the Harvard referencing style. A reference list should be included in this section of the report.

17. U