

# PROJECT: NETWORK VISUALIZATION

CLIENT: AMAZON WEB SERVICES

TEAM: QUADCORE PRODUCTIONS

*Author(s):*

Mpho BALOYI

Hlengekile JITA

Mayimela MOSES

Mbhele THEMBA

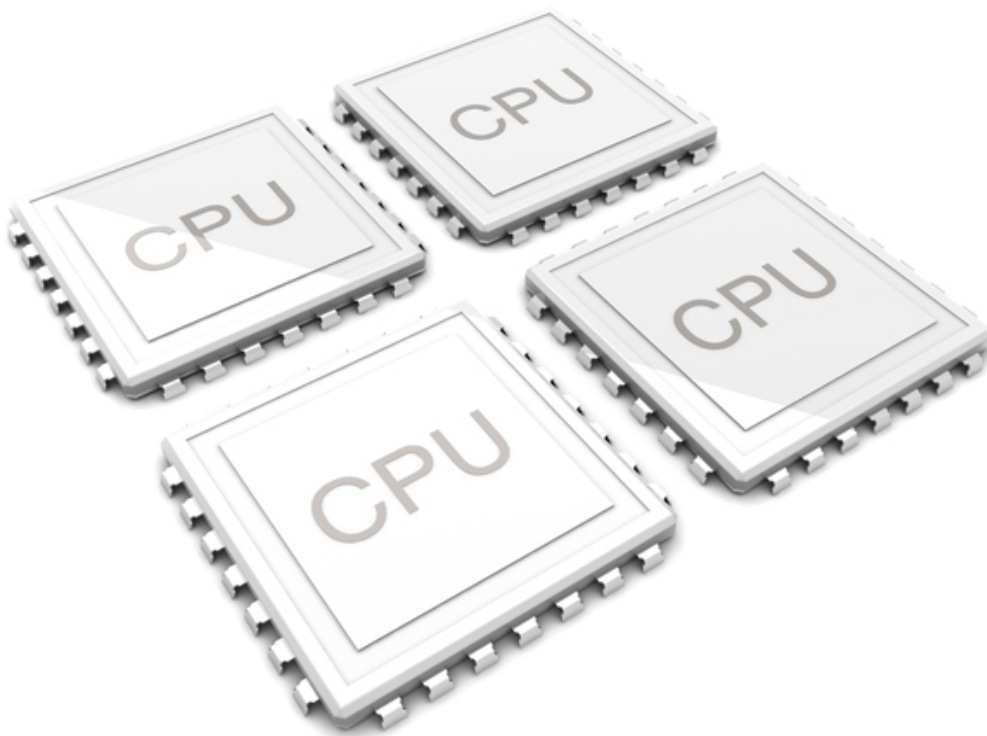
*Student number(s):*

14133670

14077893

14019702

14007950



University of Pretoria, Department of Computer Science  
02 May 2016

# Contents

<b>1</b>	<b>The Team</b>	<b>2</b>
1.1	Mpho Baloyi . . . . .	2
1.1.1	Interests . . . . .	2
1.1.2	Technical Skills . . . . .	2
1.1.3	Non-Technical Strengths . . . . .	2
1.1.4	Relevant Past Experiences . . . . .	3
1.1.5	Reasons for wanting to do the project . . . . .	3
1.2	Hlengekile Jita . . . . .	3
1.2.1	Interests . . . . .	3
1.2.2	Technical Skills . . . . .	3
1.2.3	Non-Technical Strengths . . . . .	4
1.2.4	Relevant Past Experiences . . . . .	5
1.2.5	Reasons for wanting to do the project . . . . .	5
1.3	Moses Mayimela . . . . .	5
1.3.1	Interests . . . . .	5
1.3.2	Technical Skills . . . . .	5
1.3.3	Non-Technical Strengths . . . . .	5
1.3.4	Relevant Past Experiences . . . . .	5
1.3.5	Reasons for wanting to do the project . . . . .	5
1.4	Themba Mbhele . . . . .	5
1.4.1	Interests . . . . .	5
1.4.2	Technical Skills . . . . .	5
1.4.3	Non-Technical Strengths . . . . .	5
1.4.4	Relevant Past Experiences . . . . .	5
1.4.5	Reasons for wanting to do the project . . . . .	5
<b>2</b>	<b>Project Execution</b>	<b>5</b>
2.1	Project Development Methodology . . . . .	5
2.1.1	Data Collection . . . . .	5
2.1.2	Data Classification . . . . .	5
2.1.3	Data visualization . . . . .	7
2.2	Communication With Client . . . . .	7
2.2.1	email . . . . .	7
2.2.2	Phone calls . . . . .	8
2.2.3	Regular Meetings . . . . .	8
2.2.4	GIT . . . . .	8
2.3	Technical Challenges . . . . .	8
2.4	Technologies . . . . .	8

# **1 The Team**

## **1.1 Mpho Baloyi**

### **1.1.1 Interests**

- Keeping abreast with new technologies
- Learning and using new technologies to solve problems
- Reading up and doing research on new and old concepts in computer science
- Solving riddles and puzzles
- Helping people through ICT

### **1.1.2 Technical Skills**

- Solid programming skills in java,c++ and python
- Fair amount of knowledge in assembly programming
- Web development with HTML,JAVASCRIPT,JQUERY,CSS,PHP,AJAX,ANGULARJS
- Interaction Design
- Database design with MySQL
- Understanding of process development
- Unit testing,mocking and dependency Injection

### **1.1.3 Non-Technical Strengths**

- Excellent Communication skills
- Patient
- Creative approach to problem solving
- Pay attention to detail
- Excellent planning skills
- Ability to grasp concepts quickly

- Willingness to learn new things
- Ability to interpret and follow technical plans
- Ability to collaborate and work efficiently with other people
- Ability to work under pressure

#### **1.1.4 Relevant Past Experiences**

Work in the mini-project of the university of Pretoria taught me important skills in software engineering such as unit testing, dependency injection, mocking and working with different technologies. I believe that these skills will be valuable to the development of this project as they apply in every area of software development.

#### **1.1.5 Reasons for wanting to do the project**

My love and interest for computer networks, computer graphics, interaction design and data Structures are what attracted me to this project as it is a combination of the above mentioned areas and more. The project provides me with the opportunity to learn new things such as working with the AWS EC2 api and will refine my programming and research skills. As a person who loves challenges I believe this is the perfect project for me due to its complexity. I want to do this project because I believe I have all the qualities that are required.

### **1.2 Hlengckile Jita**

#### **1.2.1 Interests**

#### **1.2.2 Technical Skills**

- Microsoft Office – Word, Excel, Access, PowerPoint
- Programming – Java, C++, Python, Android
- Database Design - MySQL
- Web Development – XHTML, HTML5, CSS, JavaScript, PHP

### **1.2.3 Non-Technical Strengths**

- Good leader
- Excellent communication skills both verbal and written
- Works well under pressure
- Great at teamwork
- Sociable character that gets along with people
- Organized individual with meticulous planning skills
- Determined

#### 1.2.4 Relevant Past Experiences

#### 1.2.5 Reasons for wanting to do the project

### 1.3 Moses Mayimela

#### 1.3.1 Interests

#### 1.3.2 Technical Skills

#### 1.3.3 Non-Technical Strengths

#### 1.3.4 Relevant Past Experiences

#### 1.3.5 Reasons for wanting to do the project

### 1.4 Themba Mbhele

#### 1.4.1 Interests

#### 1.4.2 Technical Skills

#### 1.4.3 Non-Technical Strengths

#### 1.4.4 Relevant Past Experiences

#### 1.4.5 Reasons for wanting to do the project

## 2 Project Execution

### 2.1 Project Development Methodology

#### 2.1.1 Data Collection

The first step is to retrieve the network data. The information may be retrieved from a file or web source.

#### 2.1.2 Data Classification

The data will now be validated for correctness. If the data is valid, the different members of the network (parent node, sub-parent node and leaf nodes) will be identified and classified accordingly. To arrange the data, data structures such as trees will be used.

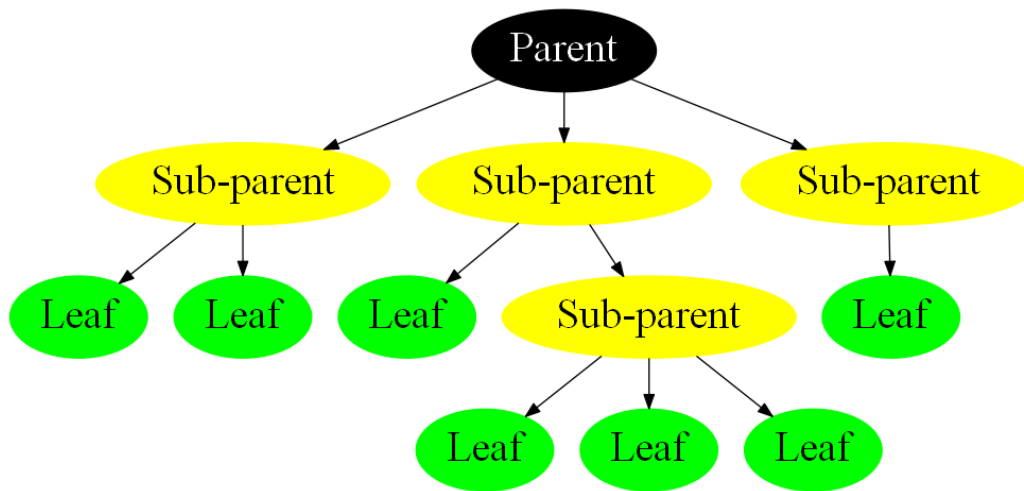
The members of the network that have been identified are:

- **Parent node:** This is the member from which all the other members will be referenced (This is the Main parent or root node).

- **Sub-Parent node:** This is a member that is referenced from another member and has other members that are referenced through it (It is a child with children).
- **Leaf node:** This member is at the lowest level of the tree data structure, it is referenced through a parent and has no members that are referenced through it ( It has no children).

### 2.1.3 Data visualization

After all the data has been retrieved successfully and the members classified to the respective types, the data will then be loaded to the screen for visual representation (visualize). At this stage, the data can be viewed while allowing interactions for the user. The interactions will include zooming in and out of the visualizer, panning around the graph, click events for more information on a specific member of the network.



Data organization as data structure and basic representation

The image above is a basic representation of how data structures will be used to organize the data and also a starting point as to how the data will be visualized.

## 2.2 Communication With Client

To keep the clients informed we are going to use the following means of communication

### 2.2.1 email

- To inform the client of our progress
- To address any issues or concerns that they client may have
- To acquire information from the client
- To require any resources that the client has to offer for their project,...



### **2.2.2 Phone calls**

This will only be used to address very urgent matters if they arise during the course of the project development however this will only be done with permission from the client and during business hours.

### **2.2.3 Regular Meetings**

These will take place depending on the clients availability and willness. We may discuss the progress of the project,to address any concerns,etc.

### **2.2.4 GIT**

Access to our git repository will be provided to the client,so the client can be able to monitor our progress and have access to the project material. We are also open to any means of communicatiuon that the client may prefer or suggest.

## **2.3 Technical Challenges**

- Learning the EC2 API

As this is a very specific technology and one that we have not encountered before but we have a strong believe that through more research,more information from the client and our previous experiences with using an API we can overcome this challenge.

- Retrieving Data from Amazon

This challenge is only due to the lack of information at this stage we plan to overcome this challenge by using either xml or JSON.

## **2.4 Technologies**

The following technologies will be used for the front-end:

- HTML5
- WebGL

The following technologies will be used for the back-end:

- Java