*Ahmet Akgun, Brandin Mcpherson,*

*Hugo Hughes, Taylen Anderson,*

*Tetsu Watanabe and Timothy Prast*

**Assessment 2**

**My profile**

**Produced by**

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# TEAM PROFILE

## Our Team Name

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## Personal Information

**A person taking a selfie with a cat

Description automatically generated*Ahmet Akgun*****Student No: S3865010**

Originally from Istanbul Turkey, Ahmet’s passion for IT started in 1992, when his uncle assembled their first personal computer. Their first computer had MSDOS 4.0 installed and provided the young Ahmet with various experiences such as customising a data storage device and entering lines of code in the command bar. It was this first interaction with a computer that fostered his interest in IT.

After graduating from RMIT university, he intends to continue his study at the postgraduate level in hopes to become an instructor at an education institution one day. Ahmet’s hobbies include learning about astronomy and astrophysics, playing chess and editing music using a program called CoolEdit. He currently lives in Melbourne Australia.

***Brandon McPherson*****Student No: S3921902**

Brandon is a person with a wide range of interests. In his spare time, he enjoys playing video games, watching soccer games, spending time with friends and family, and travelling. He is also an enthusiastic reader, his favourite book for this year is titled *Sapiens: A Brief History of Humankind* by *Yuval Noah Harari*. In his childhood, he used to play a game called *Sonic the hedgehog.* The experience resulted in developing his passion for video games and technology.

At the time of this writing, he has already been working in the IT industry as an information system support analyst for 7 years. Despite his solid background in networking and information systems, he found computer programming interesting and is considering a career change as a full stack software developer in the future. He lives in Brisbane with his cat named Indy.

**A picture containing person, wall, clothing, indoor

Description automatically generated*Hugo Hughes***  
**Student No: S3923309**

Hugo has a culturally diversified family background with his parents and grandparents who originated from various countries all over the world. He is a keen learner of different languages and loves to travel the world to experience different cultures. In his childhood, information technology was not something he was familiar with nor interested in. However, it all changed when he landed a job at an IT service desk.

With this challenging role, he gradually developed his passion in IT. The role also allowed him an opportunity to brush up on the basic skills that are required to secure his ideal job in the future. His ideal role is to work for the Royal Australian Navy as a Cyber Security Technician. The position interests him because it requires him to be multifaceted and be familiar with various disciplines.

**A person wearing glasses

Description automatically generated with medium confidence*Taylen Robert Anderson*****Student No: S3925287**

Born in Idaho USA, Taylen grew up in Mornington Peninsula, the southeast of Melbourne. Taylen started nurturing his interest in IT when his father was building websites, it was here that he began playing around with Macromedia flash. Due to Taylen's proficiency with building websites, his IT teacher offered him to build a website for the teacher's dad, the website was built using ActionScript 2.0 which is now deprecated. Since then, he taught himself various computer skills and successfully implemented a server which is running his smart home system for his family.

Being a qualified mechanic, he has a strong understanding of electronics. Also, as an astute self-learner, He acquired a basic understanding in programming languages such as C and C++. In the future, he sees himself becoming a firmware engineer which allows him to be involved with both hardware and software development. He currently lives in West Gippsland with his wife and child.

***Tetsu Watanabe***  
**Student No: S3923443**

Born and raised in Japan, Tetsu came to Australia over 20 years ago. He worked at several accounting practices in Brisbane before starting his consulting firm targeting Japanese businesses. The company has grown after 8 years of operation, expanding his client offices in Brisbane, Japan, and Vietnam.

He has witnessed the substantial evolution of IT in the accounting industry. He believes that combining IT and Accounting skills will take him and his company to the next level. His hobby is surfing, which is the reason he moved to Tweed Heads 3 years ago with his family.

***Tim Prast*  
Student No: S3923309**

Tim has a successful business background operating his own bar in Subiaco for the past 5 years. His business is technically advanced and uses the latest technologies to achieve efficient operation. His interest in IT came naturally by having a childhood surrounded by technology and can easily relate himself to IT. Throughout his life, he has enjoyed experiencing the technological advancement.

Gaming has also significantly contributed to developing his interest in the field of IT, his passion for gaming led him to build his own gaming PC. With his strong commercial experience, he hopes to transition his studies over to Computer Science and pursue a career as a business analyst specialising in IT.

## Team Profile

The test outcomes for our members are tabled and summarised below.

The followings are snapshots of who we are as a team.

* We are more introverted than extraverted.
* We are more intuitive than observant.
* We are more logical than emotional thinkers.
* We are equally decisive and flexible.
* We are more self-assured and even-tempered than self-conscious and sensitive.
* We tend to learn by doing & seeing rather than listening.

Information obtained from test results is helpful to facilitate the group’s collaboration. For example, our test results demonstrate our introverted nature. It took two online meetings before we determine our roles and the leadership to make visible progress with the assessment. This may be an example of the introverted nature of the team working against us. If we shared this information before the meeting, we may have acted differently.

A good aspect of our team might be that we think logically, this means that we know the consequences if we do not collaborate and execute our plan properly. Therefore, after the first two meetings, we quickly realised that it was in our best interest for the team to work together and complete the tasks.

“The strength of the team is each individual member. The strength of each member is the team.”

― **Phil Jackson**

The test results also helped us to decide how to deal with each member. Everyone has their own strength and weaknesses. Knowing them would positively influeach other. We understand that acknowledging the individual differences is a good starting point to collaborate and proceed with our team project.

Source: www.goodreads.com, n.d.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Team Member | Test 1 - Myers-Briggs Type Indicator (MBTI) test | | test 2 - Online learning style test | test 3 - Further online test | |
| *Ahmet*  *Akgun* | **Mediator**  Introverted 58%  Intuitive 70% | Feeling 52%  Prospecting 51%  Assertive 83% | **ONLINE LEARNING STYLE TEST** | **CREATIVITY TEST** | |
| Visual 67%  Kinaesthetic 59%  Auditory 33% | 69.99 (Typical score is 62.96) | |
| *Brandon*  *McPherson* | **Architect**  Introverted 84%  Intuitive 73% | Thinking 52%  Judging 69%  Assertive 54% | **LEADERSHIP STYLE TEST** | **BIG FIVE PERSONALITY TEST** | |
| Contrarian leaders – mostly independent and question normality. | Extroversion 13  Emotional stability39  Agreeableness 21 | Conscientiousness 67  Intellect/Imagination 65 |
| *Hugo*  *Hughes* | **Debater**  Extraverted 85%  Intuitive 93% | Thinking 59%  Prospecting 67%  Assertive 51% | **MULTIPLE INTELLIGENCE TEST** | **EMOTIONAL INTELLIGENCE TEST** | |
| His top three intelligence and learning styles are kinaesthetic, Musical, and linguistic. | EQ scoring of 19 out of 20 | |
| *Taylen*  *Anderson* | **Virtuoso**  Introverted 59%  Observant 52% | Thinking 68%  Prospecting 74%  Turbulent 72% | **ONLINE LEARNING STYLE TEST** | **BIG FIVE PERSONALITY TEST** | |
| Kinaesthetic 64  Visual 64  Auditory 41 | Extroversion 70  Emotional stability 7  Agreeableness 17 | Conscientiousness 2  Intellect/Imagination 34 |
| *Tetsu*  *Watanabe* | **Logistician**  Introverted 73%  Observant 51% | Thinking 59%  Judging 67%  Turbulent 56% | **ONLINE LEARNING STYLE TEST** | **BIG FIVE PERSONALITY TEST** | |
| Visual 59  Auditory 46  Kinaesthetic 46 | Extraversion 35%  Openness 56%  Agreeableness 54% | Conscientiousness 62.5%  Neuroticism 42% |
| *Tim*  *Prast* | **Assertive Advocate**  Introverted 59%  Intuitive 70% | Feeling 59%  Judging 63%  Assertive 54% | **PERSONAL LEARNING PROFILE** | **SITUATIONAL JUDGEMENT TEST** | |
| His focus areas are Personal Value, Using Technology while his strengths are Accessing Support and Persistence | Answered 11 out of 16 questions correctly. | |

# IDEAL JOBS

Overview

W

e have found both similarities and differences for our ideal jobs. The summary of the findings is tabled and outlined below.

Figure 1 –Photo of people doing handshakes

Source: Fauxels, 5AD

Three of our team members consider roles in the public sector for their ideal jobs. Of those who chose a private sector, two (Brandon and Tetsu) picked the full stack developer role whilst the remaining member (Taylen) is determined to become a firmware engineer.

We found that each job required both technical and soft skills. However, the emphasis on soft skills tends to be stronger for those in the public sector. We believe that there are two reasons for this. The first is because roles within the private sector are highly specialised, so the job advertisements aim to attract only those who have specific technical expertise. The second is because the public sector is likely to have a more hierarchical organisational structure and is vital for employees to understand and follow a chain of command which requires them to have good people skill.

Similarities

Among our ideal jobs, the most common technical requirement is programming skills. All three roles in the private sector require fluency in at least one or two programming languages. The knowledge in SQL databases and version control systems such as GIT is also highly regarded in the private sector.

Among the many soft skills, communication is by far the most preferable skill in the public sector. The ability to manage people is another important skill that is sought after in this sector. The skill includes the management of stakeholders, tasks, and projects.

Roles in the private sector tend to emphasise an ability to adapt and learn new technologies rather than people skills. This may indicate the employers’ intention to hire a highly specialised technician.

Differences

We found that each role has its unique aspect. For example, Taylen’s role as a firmware engineer requires him to understand basic electronics and mechatronics which are not a requirement for the other roles mentioned. Brandon and Tetsu chose the same job title as full stack developer. However, there is a prominent difference in required skill sets. Brandon’s role has a stronger emphasis on programming skills. On the other hand, Tetsu’s role leans toward a thorough understanding of the web application development process rather than focus on programming.

Also, every job has an element of unique specialisation. For example, in the case of Ahmet, it is the teaching. For Hugo, it is the cyber security. For Tim, it is the data management/analysis.

Conclusion

We found that there are some skills and knowledge that commonly attract our potential employers. These are technical expertise in programming, SQL database, and version control system as well as soft skills such as communication and management skills.

We also found that there were differences in each job. These differences arise as the result of different specialisation that we choose to pursue.

It is concluded that although it is important to develop commonly preferred skills specified by employers, having a specific specialisation would significantly influence our future job prospects and career path.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Team Member | Job Title | occupation | Requirement | | Similarity | Difference |
| **Technical** | **Soft** |
| *Ahmet*  *Akgun* | Instructor of Information Technology | Education tutor | * Online course development * Learning Management Software | * Master’s degree * Communication * Teaching | * Communication | * Emphasis on formal education and teaching skill |
| *Brandon*  *McPherson* | Full Stack Developer | Software developer | * Cloud technologies * SQL Database * Various programming * Version control | * Ability to adopt new technologies * Adaptability with different technologies | * SQL Database * Programming * Version control * Ability to adopt new technologies | * Very specialised in programming |
| *Hugo*  *Hughes* | Cyber Security Technical Officer | Cyber security specialist | * Computer Science/Cyber Security qualification/experience | * Management * Analytical * Communication * Stakeholder management | * Management * Communication | * Emphasis on soft skills * Focus on Cyber security |
| *Taylen*  *Anderson* | Firmware Engineer | Computer engineer | * C, C++, and a higher -level language * Tertiary education * Electronics * Version control | * Ability to adopt new technologies * Attention to detail | * Programming * Version control * Attention to details * Ability to adopt new technologies | * Emphasis on engineering (Software, Mechatronic and Electronics) * IoT |
| *Tetsu*  *Watanabe* | Full-Stack Software Developer | Software  developer | * Cloud technologies * SQL Database * PHP * Version control | * Ability to work solo and in a team | * Programming * Version control * SQL Database | * Involvement in the full web application development cycle |
| *Tim*  *Prast* | Business Analyst | Analyst | * Business analysis experience * SQL Databases * Understanding of various IT areas * Data modelling & Data management | * Communication * stakeholder management * Ability to see the big picture * Attention to details | * Management * Communication * Attention to detail * SQL Database | * Balanced between technical and soft skills * Emphasis on data management |

# TOOLS

## GitHub

GitHub Pages URL

<https://github.com/taylenAnderson/stockIT.git>

GitHub Public Repository URL

<https://taylenanderson.github.io/stockIT/>

Comments on the team’s Git repository

T

he full audit trial on the team’s commits is found in the following link.

<https://github.com/taylenAnderson/stockIT/commits/main?before=e5059bad1b25cd96e1caf00ab1eadb8adc2d4ae1+105&branch=main>

According to the audit trail, Taylen, our assigned manager for the website development, made the first commit. No other member pushed any commit until 7th October 2021. Prior to that, we used Microsoft Teams to share our documents. GitHub was first introduced to the team when one member made [Youtube](https://youtu.be/51yngM1Pfik" \t "_blank) video to facilitate other members to set up the group repository in their local drives. Initially, some members were hesitant to use GitHub due to the lack of experience and knowledge. We had a stereotype of GitHub as mainly being used for a programming collaboration and did not think of it as a tool to share other files such as word documents. We soon realised that it is a powerful tool that makes our file sharing and tracking much more effortless. Closer to the end of assignment completion, we had one occasion where there was a misunderstanding within the team to identify an incorrect file as the final version. This incidence occurs due to inconsistency in document naming, file structure, and miscommunication with the project management. We took the incident as a valuable lesson that helped us comprehend how Git works and should be used for the next group assignment. We believe that the audit trail and other information attainable from the repository demonstrate our collaborative effort and improvement in utilising the tool more frequently and effectively. We have included snapshots of some usage data obtainable from our repository (as of 15th of October 2021) in [Appendix A](#Appendix_A) for your information.

## Microsoft Teams

Microsoft Teams Invite Link

<https://teams.microsoft.com/l/team/19%3a9MyjIii3NQaWmcpGtjxWffQmZgmL-1rA13fQ8CUmn6g1%40thread.tacv2/conversations?groupId=24f3f6bd-b9be-4a72-8a4f-c982e853354a&tenantId=d1323671-cdbe-4417-b4d4-bdb24b51316b>

Please note that we have used the chats section for most of the group's conversation and collaboration. If you require access to our chats history, please contact our team leader, Tetsu Watanabe, via email: [**s3923443@student.rmit.edu.au**](mailto:s3923443@student.rmit.edu.au).

**Microsoft Teams collaboration**

Please note that we have held the total of 7 official team meetings during the preparation of this report, not including an unofficial meeting being planned 17th of October 2021.

For Microsoft Teams meeting agenda & actions, please refer to the PDF report titled Group # 12 - MS.PDF that is submitted in conjunction with this report.

We have communicated daily using chats section of Microsoft Teams to supplement our official meetings held twice a week. These frequent communications within the group assisted each member to be accountable with their tasks and be informed with the progress of the assignment.

## Other Tools Used

EXCEL SPREADSHEETS

We have used Microsoft Excel spreadsheets to manage tasks assigned to each member. The snapshot of Excel spreadsheets adopted by the team are attached in [Appendix B](#_Appendix_B). These spreadsheets were vital tools for the group to share and monitor the project progress.

# INDUSTRY DATA

Industry Snapshot

A

ustralia is rapidly becoming an increasingly digitalised society. Recent health and socio-economic upheavals, caused by the COVID-19 pandemic, has accelerated our nation’s push to develop strong digital sovereignty and capability. This shift can be captured through industry statistics, where the Australian Computer Society (ACS) reports in the ‘*ACS’ Demand & Impacts on Tech & Digital Skills White Paper 2021,’ ‘*that the ICT & Technology Workforce grew by 33,400 to 805,525 which represents an annual increase of 4.3 per cent, (contrary to) other professional industries which only saw growth of 1.3 per cent and the overall unemployment rate which increased by 1.7 per cent (Australian Computer Society, 2021, P7). Further to this, the *Skills Priority List* identifies numerous ICT-related professions that are in national shortages and predicts continued moderate to strong demand for these skillsets in the future (National Skills Commission, 2021, P6).

Figure 2 –Close-up Photo of Survey Spreadsheet

Source: Lukas

Industry statistics are consistent with Government initiatives and plans that look to establish Australia and the Australian Government as a leading digitally run society. Released in 2018 by the Digital Transformation Agency, the *Digital Transformation Strategy* recognises that ‘Australia’s ongoing success depends on our ability to harness these technological advances’(National Skills Commission, 2021, P6) and that ‘the pace of change continues to blur the boundaries of the physical and digital worlds(National Skills Commission, 2021, P6).’ Programs such as CSIRO’s (Commonwealth Scientific and Industrial Research Organisation) Data 61, the Australian Defence Force Cyber Gap program and the Digital Cadetship program all seek to bridge digital skill and capability gaps in Australia’s workforce.

What does this mean for our team?

The Department of Industry in their report *Australia’s Tech Future* highlights the innate value of embracing digital technologies from a business perspective. “Small and Medium businesses with higher levels of digital engagement are significantly more likely to be growing revenue, creating jobs, exporting and innovating new products or services” (Department of Industry, 2018, P17). There is a strong need for educators, developers and analysts, enabling businesses and Government to grow and deliver services that are effective, efficient and accessible.

A screenshot of a computer

Description automatically generated with low confidenceBelow compares our team’s ideal jobs against Industry Data developed by Burning Glass in 2018, the Australian Computer Society in 2021 and the National Skills Commission *Skills Priority List* released in 2021.



Sources: Labour Insight Jobs (Burning Glass Technologies 2018), National Skills Priority List (National Skills Commission 2021) Demands & Impacts on Tech & Digital Skills White Paper (Australian Computer Society 2021)

Observations on Data Findings

The Business Analyst role does not rank in the Burning Glass Data (2018) but is Ranked First in ASC Data (2021). Causal factors for exclusion in the Burning Glass data can include:

* + - Change in Industry Demands
    - Development of Industry in recognising the need for Business Analysts
    - Expansion of traditional IT Roles, to now include business enablers such as Business Analysts to facilitate outcomes

There has been significant growth in the IT Industry over the past couple of years and consequently roles have been created and redefined to meet the needs of Industry. There has been a noticeable trend of Small and Medium Businesses adopting digital practices to assist in developing their enterprises and delivering their services. Business Analysts can be utilised to offer bespoke solutions to businesses and can be used to bridge a knowledge gap between non-digital using business owners and the digital world.

Most roles identified by the team have strong business demand or future strong business demand according to the National Skills Priority List. Demand for these skills can be attributed to the following:

* + - Industry Growth
    - Dependency on Digital Services (increased digitalisation outside of ICT realm)
      * Supply of workers outweighs current demand
    - National Need

The IT Industry has been one of the fastest growing Industry. This has been accelerated by increased access to technology, global events such as COVID-19 and the growing integration of digital capabilities into traditionally non-digitalised space. The boom in the use of IT services has occurred at a rate far greater than the industry’s ability to recruit and train employees to necessary standard. This has created a huge workforce capability gap, requiring Government and Industry to develop strong incentives to attract people to study and work in IT.

The Security Analyst & Cyber roles were absent from Burning Glass Data (2018) yet ranked Seventh in the ASC Data (2021) and has been acknowledged as a skillset that is currently in National Shortage with a Strong Future Demand. Causal Factors for exclusion in the Burning Glass Data can include:

* + - Cyber Security and awareness have been the peripheral, not the main focus on organisations and Industry until recently
      * The Australian Government announced 2020 Cyber Security Strategy, replacing the 2016, noting the security environment is degrading at a rate greater than anticipated in 2016, with a reliance and integration of digital services increasing at a rate unprecedented in 2016.
      * The Government’s 2016 Cyber Security Strategy invested $230 million into Cyber Security functions; the Government’s 2020 Cyber Security Strategy invested an additional $1.35 billion into Cyber Security functions. (Department of Home Affairs, 2020,P2)
        + The significant increase in investment is indicative of the massive shift in the attitude towards cyber security.
    - The function of cyber security could have been an assumed responsibility in some of roles in the Burning Glass Data.
      * Development of hardware and software is heavily intertwined with elements of cyber security.
      * Elements of cyber security is in inherent in maintenance of a system

Further to this, we have extracted some of the core skills in each role we have chosen to create an aggregated group skillset and compared that to the Burning Glass data. It was harder to find an alternative data source that was consistent with the metrics used in the Burning Glass data to provide greater depth in the analysis of which skills are relevant in the ICT roles. This is partly due to the evolution and refinement of language used to describe and used by Industry.

Graphical user interface, text, application, chat or text message

Description automatically generated

A screenshot of a computer

Description automatically generated

**Source: Labour Insight Jobs (Burning Glass Technologies 2018)**

Planning, communication skills and problem solving are the most sought-after skills according to the Burning Glass data. This comes as no surprise as these skills are quintessential to every IT professional regardless of their role. Without the ability to communicate what a problem is, what needs to be done, who needs to be engaged to resolve it and who it may affect, it is hard to be effective within the IT Industry. Further to this, an IT professional often deals with numerous systems and processes, which often are not designed to operate to work with other systems. Having the necessary skills to be able to recognise and methodically solve problems are crucial in an industry that many people are rely on to perform their respective job. IT professionals are often faced with a suite of complex and intricate problems. Without a proper plan they are likely to encounter issues effectively implementing solutions. This could incur great financial and reputational costs if projects and solutions are not delivered promptly, especially in areas where the industry is heavily reliant on continual and stable access to IT.

Below outlines the top skillsets that fell outside of our group’s aggregated skillset:

Table

Description automatically generated

There are a few causal factors that can provide key insights as to why these skills fell outside of our aggregated skillset:

Breadth of the professions selected by individuals

In our group of six, five different professions were chosen across the IT industry. The professions selected comprised of a range of required technical abilities and strengths. As result our aggregated skillset was quite balanced across the entirety of the industry, rather than being focused on one specific area.

Communication, whilst an incredibly important skill and relevant in the industry, is not the key reason someone would be hiring an IT professional in most circumstances

The key differentiator in IT professions stem from the required level of technical proficiency needed to be effective in a role. It is less so defined by the communicative ability of the IT professional. Generally speaking, if you required a communications specialist, you will not be hiring an IT professional, unless you require a telecommunications specialist to fix your VoIP (Voice over IP). Jokes aside, the key skills required by the IT industry tend to have a focus on hard skill sets such as programming ability.

Whilst there definitely is a need for strong communicators in the IT Industry, there is also an equally strong, if not stronger need for technical specialists. For example, communication is a needed skill in the full stack developer role as you work with both front & back-end systems, meaning that you would most likely be dealing with a range of stakeholders. However, if you do not possess the technical skills necessary to perform a function, no amount of communication skills can bridge that capability gap

Organisation Skills & Writing are interchangeable with other skills

Whilst organisational skills fell out of our skillset, planning did not. Similarly, writing fell out of skillset, but communication skills featured more in the data that informed our aggregated skillset. These skills are heavily interchangeable and conceptually linked. To be an effective communicator, you need a balance of written and oral skills; to be an effective planner, you required a degree of organisational skills. The absence of these skills is not a point of concern, but it is useful to understand what might be of interest to employers that is not in our preliminary focus.

Breadth of technical skills in the industry

Our aggregated skillset lists three out of range of key technical skills in the industry. Consequently, it was a given that some major IT skills were going to fall out of our aggregated skillset such as SQL and JavaScript. Once again this is not a point of concern, but it is useful to have an awareness of what might be of interest to employers.

Has our opinion of our ideal jobs changed?

In short, no. If anything, the data has solidified everyone’s decision on their dream job. There are three causal reasons for this.

1. The IT Industry is growing at a much faster rate than the IT workforce is.

Throughout this report on industry data, it has become abundantly clear that there is a current shortage of skilled IT workers. As the industry grows, the demand for certain technical skillsets will only increase further. As Ahmet said when asked if his dream job had changed, “organisations are becoming more computerised and businesses are becoming more digitalised” therefore “more education and training must be conducted to meet these requirements.” For Hugo, the fact that the security analyst type roles did not feature in the Burning Glass data, but featured heavily in more current statistics he said, “the environment has clearly evolved a lot over the past few years” what this mean is “as everything becomes more digital, cyber-attacks are going to become more common, as a result, security analysts will become more relevant.”

1. Whilst statistics can help us make informed decisions, passion is what really drives us.

When Taylen was asked about whether his ideal job had changed he led with “I am very passionate about how hardware and software communicate and interface with each other.” His primary motivation is his curiosity and interest in the field. For Tetsu there are similar motivations, “my goal is to launch my own web application, so I feel that it is important to have skills across all areas of web application development.” Whilst both acknowledged that the industry data was heavily supportive of their dream jobs, with both being in high demand, they both mention it is their passions and goals that drive them to pursue their career paths.

1. Industry growth and demand means that there is long term career flexibility.

Given the breadth of the industry and the rate that it is growing, there is a clear advantage in gaining a set of core technical skills that can be deployed in different job environments. When Tim was asked whether or not his dream job had changed, he said that “it requires a skill set that will allow me to grow and change with the IT industry as whole.” He is mindful of “the swift changes that can occur within the IT industry” and seeks a skillset that can evolve with industry development. Similarly, Brandon observed a trend in industry noting that “with cloud becoming more and more prominent” in some roles “the pay margin is decreasing.” This supported his career path which requires “proficiency in many different languages and integrating them,” offering him career security and flexibility.

As a group and as individuals, the skills we seek and the professions we strive for put us in good stead for future proofing our careers. The demand for skilled ICT workers is now high and this is forecasted only to increase as not only our nation, but as the world becomes increasingly digitalised. Roles that typically have extremely limited ICT presence are becoming increasingly rarer as tools, processes and interfaces are being developed and automated to increase efficiency, outreach and impact for businesses and individuals. Gaining core IT skills allows the team to work in a range of Industries outside IT enabling strong flexibility and adaptability when it comes to building our careers.

# IT WORK

For our IT Work, we Interviewed Mr. Martin Harrington who is a Systems administrator for MS Queensland and has 15 years of experience within the IT field. The Interview was conducted via Microsoft Teams and goes for roughly 30 minutes. We discussed on what his role entails as a systems administrator and some the daily tasks, challenges and rewards that come with the role. We asked what IT is like working with business professionals to gain some insight of what an IT team represented to a business. As University students, we thought to ask what his learnings at university in IT was like at the time and what were the current trends being taught which was rather interesting. What I really like about the interview was his prediction on technology in the future and this is where the interview began to feel natural and informal. As a team, we took a lot of useful information from the Interview and were very thankful that we had a great interviewee.

The video is watchable via the following YouTube link [YouTube video](https://youtu.be/134lUKZ_nhg) for the transcript, please refer to [Appendix C](#_Appendix_C) of this report.

# IT TECHNOLOGIES

## Machine Learning

Introduction

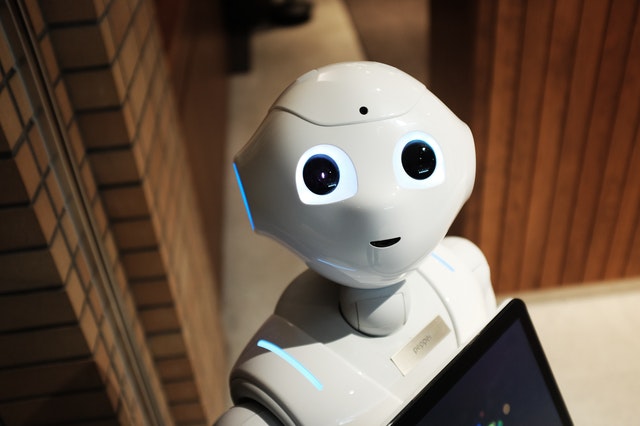
Machine Learning is the way by which a machine can interpret, understand and make meaning from a large volume of data. It is often purported that they do this in a way that mimics human behaviour and methodology. “Machine learning is an umbrella term that refers to a broad range of algorithms that perform intelligent predictions based on a data set. These data sets are often large, perhaps consisting of millions of unique data points. Recent progress in machine learning has attained what appears to be a human level of semantic understanding and information extraction, and sometimes the ability to detect abstract patterns with greater accuracy than human experts” (J, et al., 2019). Machine learning and artificial intelligence are symbiotic, in the sense that one cannot exist without at least some aspect of the other. Therefore, to gain a true understanding of Machine Learning, it is important for us to understand what Artificial IntelAs defined by Prof Dalvinder Singh Grewal, PhD; “artificial intelligence is the mechanical simulation system of collecting knowledge and information and processing intelligence of universe: (collating and interpreting) and disseminating it to the eligible in the form of actionable intelligence.” (IOSR-JCE, 2021) It is the way by which a machine collects, collates, and acts on information it receives from artificial sensors. What makes it different from natural intelligence is that the processing is done entirely through artificial means and sensors. Artificial intelligence allows information to be collected by a machine’s software and hardware, usually a type of sensor, to be used by the machine to learn. This differs from machine learning, where its intent is to maximise the self-cognition of a machine with little to no human intervention. Unlike other types of artificial intelligence, machine learning does not require intensive programming and it allows a machine to learn by itself. This allows a machine to learn by itself.

Figure 3– High-Angle Photo of Robot

Source: Knight, 2019

Machine Learning

The concept of machine learning falls into three differing categories, (IBM, 2021) supervised, unsupervised and semi-supervised. In supervised learning, a machine is given a dataset and instructed to interpret it using a defined logical sequence. In unsupervised learning, the dataset is interpreted by the machine using a sequence of its own creation. It does not rely on human intervention to discover hidden patterns or data groupings. Semi-supervised learning uses a combination of both. It provides the machine with a smaller dataset and a defined logical sequence, which allows the machine to learn and adapt to create its own rationale to apply to future datasets. This can be useful when a machine creator only has access to limited number of datasets; by exposing the machine to many smaller sets it can be taught more with less overall exposure. An automated system capable of self-learning can predict the result of a situation, an event or task based on the relevant information available. Using this logic, a machine can in essence pre-empt future outcomes, based on historical datasets.

The understanding and development of machine learning has diversified greatly over the past couple of years. Recent discoveries have branched into new areas of study such as: automated machine learning, neural Networks and transfer learning, showcasing some of the most advanced machine learning technologies and applications.

Automated machine learning simplifies data selection, processing, and extraction. This method reduces the time and resources needed to achieve desired results. More notably, it enables people who do not possess the knowledge or skills in machine learning to apply this technology to their field of work.

Neural networks are designed to emulate structures similar to that of the brains of animals and humans. Organic brains have neurons (nerve cells) to process information that is received from the five major senses (sight, sound, taste etc.); whereas artificial neural networks are composed of nodes that compute information from non-biological sensors. Machine learning is based on a machines ability to learn from the data provided to it, but neural networks learn by classifying data after first processing it through their nodes, similar to the way in which a human brain operates.

Transfer learning is a method of machine learning that enables the data from a particular task to be carried to another related task. This method provides the opportunity for a machine to gain more knowledge and experience, thus making it more effective in future tasks. The machine will essentially learn from the repeated iterations of a given task.

How does a Machine learn?

Data and algorithms are the two main components of machine learning technology. The sophistication of an algorithm will determine the path a machine will follow whilst training itself. The quality of the data the machine has access to will drastically affect the content created by a self-learning system. Consequently, implementing more mathematical and geometrical applications like statistics, probability and charting will increase the intelligence of learning machines. Developments in the discipline of data science will allow machines to be fed information that is of a higher quality and greater quantity. Therefore, training and employing more data analysts will help develop machines that are capable of sorting information faster and with a greater degree of accuracy.

A machine can be programmed to learn based on the data it is fed. If you need a machine to learn to recognise a street scene and to navigate using modern roadways, then it must be fed the required information. In this instance, the field of study of Computer Vision is applied. Computer vision can be broken down into three separate categories: semantic segmentation, image classification and object detection.

Semantic segmentation can be understood as giving a machine the information to   
“understand the structures and components of an image on a pixel level. Methods for semantic segmentation try to make predictions about the structures and objects in image.” (Marius, 2021)  
An example of which can be seen below.



Figure 4 (Example cases of pixel wise segmentation performed by SegNet on real road scenarios, 2016) (Arroyo, 2016)

Unlike the example of semantic segmentation shown above, image classification focuses on the image holistically, rather than on its individual parts. It classifies the subject using the key component of an image. Tied directly to image classification is object detection. Object detection technology works to identify the “instances of objects of a certain class within an image.” (Marius, 2021). In this sense, image classification might be used to feed data of a certain data type to an object detection machine learning algorithm to help it develop.

See also this document’s section on Autonomous Vehicles for more information relating to the machine learning behind a vehicles’ autonomous future.

[Natural language processing (NLP)](#Natural_Language_Processing) is a field of machine learning that we explore in another section of this document, but is worth mentioning while we are exploring the idea of machine learning as a whole.

While natural language processing is a large field of study, “all of them (the different fields of study within NLP) try to deduct some meaning from our language and perform calculations based on our language and its components. Algorithms based on NLP can be found in various applications and industries. Just to name a few applications which you might encounter every day such as translators, social media monitoring, chatbots, spam filters, grammar check in Microsoft word or messengers and virtual assistants.” (Marius, 2021)

Deep learning is a sub-type of machine learning technology and over the recent years it has received substantial interest from industry leaders and innovators. It mainly benefits from image and audio processing, artificial neural networks and both supervised and unsupervised learning styles. Traditional learning machines would require an expert to set their definitions, whereas machines with deep structured learning can differentiate objects from another by analysing their appearance and voice. Consequently, they tend to follow similar learning patterns to humans' when processing raw data.

Machine Learning in Our Daily Lives

Although at an early stage, deep learning technology is already used in digital vocabularies, translators, self-driving vehicles and video streaming platforms. Finance, electronic commerce, logistics and healthcare industries are widely benefitting from deep learning systems. When browsing shopping websites and viewing products, similar items displayed by the web browser use deep learning technology to find this information. Another example of this are the anti-fraud security systems of financial organisations that detect suspicious activities by analysing live transactions and comparing them with information with past transactions.

Machine learning will enhance an organisation’s data processing capabilities, thus increasing the productivity and profitability of a businesses. Marketing departments will have access to more specific information on the targeted demographics that would be interested in their products, providing them will more relevant statistics on markets and market behaviour. Production departments will have greater amounts of technical data available to them concerning the materials and techniques used to manufacture goods. Automated assembly lines will be assisted not only by human operators but learning machines that will enable power usage, material distribution and workflow optimisation. Logistics companies will have navigation systems augmented with learning machines, creating delivery routes with live traffic information, reducing delivery times and fuel consumption of their shipments. These examples showcase the value of machine learning in enabling us to efficiently and effectively utilise large datasets to achieve outcomes in a range of different industries.

The number of employment opportunities for people who are expects in the field of machine learning are sure to increase, as the technologies driving innovation develop and as it is use more by society.

On the other side, the need for people who provide these services manually will likely decrease as automated systems reach maturity. Organisations adopting deep learning or machine learning technology more broadly will constantly be challenged with developmental obstacles. Such challenges would include the cost of maintenance and experimentation in real-life scenarios and finding fit-for-purpose datasets. Over time new methods and techniques will rise that will enhance machine learning in every aspect, making it more affordable and feasible for individuals and organisations to use.

Our Relationship with Machine Learning

Today, virtual assistants and chatterbots already present on certain websites are powered by machine learning and natural language processing. When we enter questions into chat-boxes they can understand what the inquiry is about by detecting and processing keywords – this is after being fed and learning from large datasets of natural language libraries and human to human text-based interactions.   
This service saves both businesses and their customers a significant amount of time, by reducing the need for human-to-human interactions or waiting in virtual (or phone line) queues.

At this early stage, machine learning and natural language processing are not able to fully comprehend or grasp linguistic meanings in certain situations, but as develop they will become much more efficient assistants. Goods purchased from online-stores will reach homes quicker than ever before through machine learned route optimisation. Customers will also be provided more accurate delivery timelines and will be able track an items route in real-time.

When protective programs that defend our IT devices from malicious software are augmented with deep learning machines, they will provide an even greater line of defence. They will be empowered to do this by reacting in real-time more efficiently, drawing on thousands of different dataset scenarios. Machine taught anti-virus programs will be able to better identify and defend from threats as ill-intended hackers attempt to infiltrate a person’s IT system. By being one step ahead of attackers these programs will operate in both a proactive and protective manner.

Artificial intelligence, machine and deep learning are inter-related technologies. As one advances, the others benefit from the developments in that field. Advancements in these areas will make our digital and personal lives faster, safer and more affordable, as well as creating new fields for innovation in other areas of Information Technology.

## Natural Language Processing And Chatterbots

Introduction

T

he concept of natural language processing (NLP) and Chatterbots represent the perfect combination of an idea and its execution. Without natural language processing, Chatterbots would not be able to exist, as to be functional they require a base level understanding of the inputs they are receiving. Before diving into the combination of these concepts, a Chatterbot, we must first look natural language processing.

Figure 3– AI Chatbot smart digital customer service

application concept

Source: Blue Planet Studio, 2020

Natural Language Processing (NLP)

“Natural Language processing is a branch of computer science and artificial intelligence which is concerned with interaction between computers and human languages. Natural language processing is the study of mathematical and computational modelling of various aspects of language and the development of a wide range of systems. These includes the spoken language systems that integrate speech and natural language.” (Reshamwala, Pawar and Mishra, 2013). Thereby, the field of natural language processing is the understanding of the interaction between a human’s language input; a computer’s understanding of that input; then subsequently the computer’s language-based outputs; based on its understanding of the original inputs.   
By definition, a natural language is a language used by a human (e.g English, Chinese, specific dialects) to communicate information, knowledge, emotions, and verbal responses to situations. These are things we as humans learn to process and understand from an early age and develop further over time. These however are extremely difficult in the abstract for a logic-based computer system or machine to interpret and understand, since a computer or machine lacks the interpretive nature (by default and by human design) to pick up the nuance, meaning and structure of a natural human language.

The field of natural language processing has come a long way in a relatively short time. A crude example of this can be seen as far back as the early 1900’s. In 1922 a company called Elmwood Button Co created a children’s toy called “Radio Rex”(Dr Judith Markowitz, 2021). Rex, a small wooden dog-shaped toy, was controlled using a small electromagnet that was sensitive to certain acoustic frequencies. The sensitive frequency that Rex ‘responded’ to was designed to be attuned to the user saying “Rex”, at which point a small spring would push Rex out of home as if it was responding to the users call for it. Whilst Rex did not respond to a natural language per say, rather a frequency (that just happened to coincide with a Natural language), Elmwood Button Co created what some would deem to be the first instance of a consumer good that used natural language processing. After all, what is human speech if not groupings of repeatable frequencies? Rex did respond (in the most part) to those frequencies.

Most smartphone users today would be familiar with virtual assistants such as Bixby or Siri, both of which use natural language processing to understand and implement voice commands given by a user. The creation of these virtual assistants is indicative of the massive developments in the technology from its first iteration in Radio Rex nearly 100 years before. Both Siri and Bixby can to complex statements, not simply single words and commands from the user. The virtual assistants we use today all help to collect and collate data on natural language; every time a user interacts with one, they are giving permission to those applications (and by extension the companies that own that software) to use and collect their speech in to further develop the applications. Doing this builds a database of human speech inputs, increasing the knowledge base for the applications to learn from, furthering their understanding of the natural language inputs given to them, creating a cyclical learning environment. As proliferation of the virtual assistant increases so does its knowledge base and by extension its ability to interpret and accurately understand natural language inputs.

Humans possess the innate ability to understand the intentions and meanings behind the language we use. This is important to understand when exploring natural language processing in context of machines and computers. When communicating with them we must teach the device what our language or input means before it can action what has been requested. Therefore, natural language processing as a field can be distilled down to the concept of teaching a computer, machine or device to understand human language (whether it be text or speech) the same way we do.

Chatterbots

Now that we understand natural language processing we can really explore Chatterbots – a natural extension and real-world application of natural language processing – to its fullest. “Chatterbot” as a term was first coined by Michael Mauldin, whom created the very first chatbot ‘Verbot’(En.wikipedia.org. 2021), and was used to describe a “software application used to conduct an on-line chat conversation via text or text-to-speech, in lieu of providing direct contact with a live human agent.” (Chatbot - Wikipedia, 2021).

The Turing Test is a “test of a machine’s ability to exhibit intelligent behaviour equivalent to, or indistinguishable from, that of a human” (Turing test - Wikipedia, 2021). The standard Turing test involves two people and one machine. Person 1 interacts with person 2 and the machine; then using the responses from both person 2 and the machine, determines which is the machine and which is the person. If person 1 is unable to come to a reliable conclusion about which is which after the interactions, then the machine passes the test. In a more realistic context, it can be difficult for a user to tell if the chatbot they are interacting with on a website is a real person or simply a chatbot. The line is becoming increasingly more blurred as the technology behind Chatbots and the natural language processing they employ develops.

As a concept, a Chatterbot is something that most internet users would be familiar with on some level. Most people have visited a website before and seen the small window pop up on the screen “A service agent is here to help you”, sometimes they can be obnoxious and sometimes they can be helpful. If you have ever interacted with one before you will be familiar with the often strange syntax or manner of speaking that they utilise. Sometimes a Chatterbot may skip over certain things that have been said, instead latching on to key words or phrases and regurgitating information related to them. This is because a Chatterbot can operate in a few different ways.

One of the ways in which a Chatterbot will interact with a user is by listening for or registering key-word inputs. These key-word inputs will trigger the Chatterbot into responding in a pre-determined way, either by displaying a list of related information (to the language input) or by responding with a pre-programmed response. An example we have previously looked at is that of the Siri Virtual assistant. By nature, Siri is always waiting for an input, continuously listening for a key language phrase before running its full programming. When the key-word is spoken (“Hey Siri”), Siri will respond to the input and begin actively listening for further natural language input.

In another example, a Chatbot may be used by an online retailer or a company with a digital presence to increase its customer service availability. In this way, an online service provider can filter through legitimate customer queries and funnel them to live agents or filter more simple customer questions to help forums or website help sections. This also allows a business to filter out actual sales queries and drive them towards a real customer service agent, allowing a business to focus its finite staffing resources on sales and customer acquisition rather than general help questions.

There can often by confusion from a customer’s perspective about whether they are dealing with an actual person or a Chatterbot. While many companies do go to the lengths of explaining that their digital help assistants may be a Chatterbot, some do not, which is something that a consumer may find problematic if they try to use complex sentence structure, syntax or colloquial terms while interacting with the Chatterbot. This will cause the Chatterbot to misunderstand or read the wrong input, causing it to rely on incorrect information or miss the point of a statement or question entirely.

An example of this reports Authors interactions with a Chatterbot can be found at the end of this report.

The Now

Nowadays, Chatterbots are everywhere. According to data from 99Firms(25+ Chatbot Statistics for 2021 - 99firms, 2021), the “chatbot industry is forecast to grow from $190.8 million dollars in 2016 to over $1.25 billion dollars in 2025”. With “47% of businesses having plans to add Chatbots to their platforms in 2021”, with at least a separate “40% of companies planning to introduce virtual assistants”.

The Chatbot industry is also overtaking the mobile app market, with “50% of companies planning to make more investment in integrating a Chatbot or virtual assistant in their website or programs than on developing a mobile app”. Furthermore, over “35 million people in the US alone interact with a chatbot at least once per month” (virtual assistants included).

From a business’s perspective, “data shows that chatbots receive a higher customer satisfaction rating than their human counterparts. With 87.58% of people reporting a positive satisfaction and interaction rating when using a Chatbot”. They also help a business get a lead and then close a sale, with “26% of sales reportedly starting with a Chatbot interaction”.

From a customer complaint resolution perspective, “80% of brands surveyed by Technology Review reported a reduction in call volume processing” as the Chatbot is able to filter out and funnel customer calls and enquiries to the correct customer service operators. “90% of brands reported measurable improvement in complaint resolution”(25+ Chatbot Statistics for 2021 - 99firms, 2021).

At this point there is simply too much invested by customer facing companies for the technology to no longer be present. The pure costs saved by businesses, far outweigh the negative impressions a person may initially have about interacting with a Chatbot or virtual assistant. The fact that over 87% of people have a satisfactory interaction with a Chatbot is even more indicative of their staying power. When a product can reduce a business’ costs, keep customers happy and help generate sales, it means it will quickly become a staple of industry. At the cost of human-to-human interaction, the Chatbot is here to stay.

The Future

As the databases for natural language processing grow and as Chatbots become ever more prevalent, intelligent and advanced we will see their potential uses explode. Think of all the interactions you may have with a person in a customer service facing role through-out your day, could their job be taken by a Chatbot or virtual assistant? Customer call centres are the first jobs at risk in this environment. A customer call centre employees’ job is to handle customer enquiries, if these customer enquiries can instead be handled by a Chatbot (that has a reportedly higher level of customer satisfaction), it would make financial sense for the business employing the call centre to transition to fully automated digital system that has no down time - a Chatbot.

However, most consumers still prefer to interact with a Human service agent when possible so whilst the initial fear of the call centre role disappearing may seem well founded, Chatbot integration into customer service may in fact allow a call centre agent to spend more time interacting and helping a customer than previously possible. This is because the Chatbot can collect information before a customer service agent becomes involved (name, age, account verification details) and even funnel the customer to the customer service agent best suited to help them. A Chatbot is also able to help a customer with entry level questions and provide answers, eliminating the need for a customer agent to become involved in the first place.

Summary

While humans have always erred on the side of caution with Artificial Intelligence, (one need only look at science fiction to see the man’s worst fears about Artificial Intelligence come true) a chatbot is not something we need fear. A Chatbot learns by seeing, by interpreting and by understanding our languages and only responds to our inputs. Yes, if given the wrong learning material a Chatbot may give some sinister responses or have its purpose twisted (see the growth in Artificial Intelligence present in Sex Robots and how a Chatbot could be implemented), but these apply to all technologies their advancements in one way or another. A Chatbot used to help us solve our customer service issues, teach us a new language or skill or even as a point of interaction for our more isolated members of society is a good thing benefitting all of humankind.

Example chatbot interactions

Graphical user interface, text, application, chat or text message

Description automatically generatedGraphical user interface, text, application, chat or text message

Description automatically generated

Graphical user interface, text, application, chat or text message

Description automatically generatedGraphical user interface, text, application, chat or text message

Description automatically generated

Figure 6 Initial interaction options with the Optus Chatbot 8

Figure 7 Choosing an option pushes the user through to more funnelling options. 8

Figure 8 Choosing a further option then funnels the user through to a customer service agent. 8

Figure 9 Questioning a chatterbot can lead to some strange answers. When entering a Keyword loaded response the Chatterbot has a difficult time ascertaining the correct response. 8

## Autonomous Vehicles

## Blockchain-based Public Key Infrastructure

Introduction

As businesses begin to adopt cloud computing, moving away from the traditional centralized computing model, the typical user base now has the ability to access enterprise systems and exchange corporate data from their personal devices without the requirements of a VPN or using corporate assigned devices. The ease of accessing these systems have also increased with the likes of mobile devices such as tablets and smart phones over a cellular network and will continue to increase as 5G is rolled out. This presents a problem as these BYOD devices won’t have a corporate assigned digital certificate which the Public Key Infrastructure requires in order to encrypt data transmissions and establish trusts between different networks. Sure, a cloud service (whether this is AWS or Azure) will have their own Certificate Authority (CA) and their own digital certificate to hand out but the end user accessing these systems will not have a digital certificate assigned by a company from whom they represent. As we move towards a decentralized computing model, a new method is needed to improve the security of these devices. First, we need to understand how the public key Infrastructure works.

Public Key Infrastructure

What is the public key infrastructure

The Public Key Infrastructure (PKI) has been around for years and binds multiple technologies together to create trust and secure data exchanges over the internet (Posey, 2005). As the Internet is a public space allowing any computer to communicate with other computer networks, much like other internet service protocols (such as DNS) PKI is what allows different networks to communicate securely and provide evidence that the data is coming from the intended source. The technology behind PKI is based on distributing digital certificates to clients and between these digital exchanges are different levels of trust authorities. Digital Certificates are signed using a hash, contents encrypted via a private key (kept by the owner or CA) and a public key to decrypt the contents of the data and other metadata.

The Certificate Authority (CA) is responsible for auditing, issuing and revoking digital certificates. Some corporations will host their own CA which a security technician will be responsible to maintain the companies’ public keys, the Certificate Revocation List (CRL) and Auditing. A Registered Authority (RA) who verifies digital certificate requests. In layman’s term, identification of data exchange on the internet is similar to how we use passports in the real world (Fruhlinger, 2020)

PKI in Use

Graphical user interface, text, application

Description automatically generatedGraphical user interface, text, application, email

Description automatically generatedGraphical user interface, text, application

Description automatically generatedTo understand how PKI is used, let’s briefly look at a digital certificate and the handling of them. This is a digital certificate from the RMIT University website:

Digital Certificate from RMIT website, Images captured using Greenshot software from my computer.

Here we can see the Issuer (CA) which is QuoVadis Global, the Validation dates, the Signature hash algorithm used (sha256), the certification path, certificate polices and other meta data under the details tab.

A picture containing timeline

Description automatically generated

The above image Illustrates how certificates are handed out amongst the different governing bodies on the PKI. A user applies for a digital certificate with the Registered Authority (RA), The RA will confirm the user’s identity and pass over to the Certificate Authority (CA) to issue a digital certificate. The Validation Authority (VA) verifies the status on the digital certificate and updates it if necessary. Not mentioned in the graph is the Certificate Revocation Lists (CRL) which the CA manages. These are where all the revoked digital certificates are stored (Yang, 2021) PKI can get quite complex when adding more trusted authority levels and these are generally used for reseller CAs such as VeriSign or GlobalSign.

Outside of communications to a Web Servers, there are other ways in which PKI can be involved, such as securing communication to a database server, encrypted email communications, used with window’s domain networks, securing Internet of things (IoT) devices, physical access cards for building access (Fruhlinger, 2020)

Issues with PKI

Public Key Infrastructure has helped keep networks secure for years but it doesn’t come without its flaws. In short, PKI uses many different components which increases the attack surface and can be prone to user error. CA’s can be hosted internally, depending on how the company manages their IT Infrastructure, which means an administrator (a human) maintains their private and public keys, management of the Certificate revocation list (CRL) and maintains the CA server itself (Grimes, 2015). This becomes a concern when users begin to access their work on an unmanaged BYOD device, operating on their private network with no VPN Tunneling back to a corporate network.

This is just an example of a company handling their own CA server internally but there has been known evidence of CA resellers mishandling their digital certificates. One example is with GlobalSign who manage to take down a portion of the internet, sites that went offline include Wikipedia, Dropbox, and Financial Times (Cromwell, 2021)

Blockchain

What is Blockchain

Blockchain is decentralized, operating as a peer-to-peer (P2P) network. The core of the technology is performing transactions between multiple participating computers (nodes) that store the data in a distributed manner. Each computer participating in the blockchain will have its own copy which is updated whenever a new transaction is completed, this creates a new block of data (hence the name). The blocks within the blockchain will include the data, the Hash and the Hash of the previous block. Depending on the type of blockchain you can store any value, whether this is user data (document or file), money or even a digital certificate. The block also contains metadata which could contain the identity of the user or transaction logs (H., 2018)

Blockchain gained popularity with its first widely used digital currency, Bitcoin. Blockchain made it possible for these cryptocurrencies to exist as the system itself acts as a public ledger that captures transaction history. Coupled with the hashing algorithm used, this system is impossible to crack. The beauty of blockchain is in its decentralized computing, the file (depending on the blockchain) will update every 10 minutes to all the nodes which offers a level or redundancy. The other benefit is only being able to write new data on a blockchain. Through the hash file algorithm that this technology offers, you cannot update or crack the previous saved blocks as this will change the hash and that piece of data becomes (Token Metrics, 2021). Below are graphs on how the hashing mechanism works within a blockchain.

Hash intact:

A picture containing icon

Description automatically generated

Image used from (H., 2018)

Hash changed – chain broken:

A picture containing timeline

Description automatically generated

Image used from (H., 2018)

Another feature that blockchain contains is proof-of-work (PoW) which acts as a consensus. Proof-of-work is how a cryptocurrency mines and adds to the blockchain, this is achieved by solving mathematical problems which is how the new block is added to the blockchain. The nodes in a blockchain are referred to miners and the process for solving these mathematical problems called mining (Learn, 2020).

As blockchain has developed through cryptocurrencies, it has become increasingly noticed for its potential for decentralized data storage. This will cater for the emerging IoT devices and data exchanges from BYOD devices to cloud systems (Nexus, University of Michigan, 2020)Proof-of-work (PoW) offers a timestamp mechanism in which the nodes on the network solve computational puzzles to create the next block and push over the network and add to the blockchain (Learn, 2020). This mechanism will prevent denial of service attacks due to the scope of the peer-2-peer model that blockchain works on. The only downside to PoW is the sheer computing power that is required to mine the blocks and what is concerning is other countries are contending with mining crypto which is using the earth’s resources (Statista, 2021). Despite the usage of blockchain for cryptocurrencies, the technology itself will transform industries such as supply chains, retails, manufacturing, financial services and even security.

What is Blockchain-based PKI will fix

As Blockchain technology is used more outside of the cryptocurrency space, we will begin to see the Public Key Infrastructure running on blockchain. As of this point in time, the technology is still in development, but it will resolve several issues that we see with PKI. One of these issues would be the need for a Certificate Authority (CA), with Blockchain Integrity and Auditing built into the technology there is no longer a need for a 3rd party to oversee the handling of certificates and public keys. This is simply because of how Blockchain works, which is a distributed ledger which saves meta-data based on transaction history. However, in this context for PKI, it would be digital certificates and public keys (Fedotov, 2019)

This will also take the burden off IT administrators having to host an on-premises CA and eliminate user error with mishandling keys, server maintenance or malicious attacks to their CA servers. As the PKI model was built to support the older centralized model which companies are increasingly moving away from due to cloud computing, mobile devices, and BYOD devices. Blockchain is built for peer-2-peer communications which is distributed and supports the current trend for companies moving towards cloud systems. Because Blockchain is distributed, there is built-in redundancy as multiple nodes over the network are downloading the new blocks via Proof-of-work (PoW) (Remme, 2020).

The only downside to blockchain is that there’s no governing control, this is due to the nature of the technology working as a peer-2-peer model, however there is great trust within the code that drives blockchain. As Satoshi Nakamoto writes: “*The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they’ll generate the longest chain and outpace attackers*.” (Nakamoto, 2008) As long as this is the case, blockchain-based PKI will be revolutionary within the cyber security space.

Our Thoughts

Currently for work, I use my personal computer when working from home and most of our users in our organization do the same, this creates a challenge for our organization to keep these devices secure. However, BYOD devices are becoming increasingly popular and sure, you can enrol the computer or mobile device into a Mobile Device Management (MDM) system, but users do not want their companies’ IT team to be able to monitor their activity on their personal computer. As it stands, there are not many measures preventing a user’s access to cloud systems. Users prefer to use devices that they’re more familiar with (i.e their personal computer), whether it is because of their preferred OS, higher specs, or configurations etc. At least with blockchain-based PKI, this would cover some of these implications. Aside from blockchain-based PKI, there are other security vulnerabilities but what is important to note here is that if you are representing a company then there needs to be evidence that the data came from the device that represents your company, this will increase integrity and confidence within organizations and the vendors that they conduct business with.

Another benefit of this technology is no longer needing to administrate an on-premises CA server. None of the IT technicians on my team are trained security professionals and have to depend on a managed service provider (MSP) to look after some of these systems. As technicians looking after a customer, there have been cases of half completed work, “band-aid” fixes or simple mistakes like powering the server back on after an update. Although they have the expertise and skills required to operate these specialized systems, they can lack the care and attention that an employer of the company network provides. So far, this hasn’t been the case for our CA server but if it did, the repercussions could be catastrophic for our company.

On a broader level, blockchain will increase secure data transmission over the internet and reduce the level of human errors from CAs. Although without CAs, there is a level of concern as to who monitors the identity. Unless you are part of that blockchain, it will be very difficult for an ethical hacker to prevent criminal activity to occur due to the security and lack of overarching authority.

# PROJECT IDEAS

# GROUP REFLECTION

## The Group’s Reflection

O

verall, we consider it to be a very positive experience to be able to work together as a team. Each of us took responsibility for our allocated roles and tried our best to make a positive contribution. Fortunately, we did not encounter any impassable issues in terms of collaboration and teamwork. When a team member requested feedback, many of us actively participated in the discussion and provided constructive opinions.

Please find an example of our active forum of achieving a better outcome shown below.

Graphical user interface, text, application, email

Description automatically generated

Text

Description automatically generated

Graphical user interface, application

Description automatically generated with medium confidence

Graphical user interface, text, application

Description automatically generated

Text

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application, chat or text message

Description automatically generated

We have conducted similar brainstorm sessions (as to the example above) via Teams chats almost daily while maintaining formal online meetings twice a week.

Overall, we feel that our engagement in our bi-weekly meetings have made some level of improvement over time. Although we struggled to keep it structured initially, we quickly learnt to hold it more efficiently by strictly following a pre-agreed agenda. Another positive aspect of our team collaboration is the cross-sharing of our knowledge base. Through exchanging our first assignment and its feedback, we came to the conclusion that some members might have skillsets that were better suited to different content areas for assignment 2. In our team, experienced members were encouraged A screenshot of a computer

Description automatically generatedto share their expertise with others, creating a positive learning environment for the group. Examples were when Taylen assisted others in setting up the group’s GitHub with his self-made Youtube and when Brandon proofread the work prepared by a non-native English member.

GitHub traffic graph

A screenshot of a computer

Description automatically generatedChart, histogram

Description automatically generatedWe used the chats function in Teams for daily communications among members. While our daily chats were a great way for everybody to stay in touch and provide daily updates on the progress of their assigned section, we feel that this may not have been the best way to maintain our conversation records. Although we tried to keep a separate chat log for each topic, our chat history has cluttered over time, and become hard to review the past conversations. One solution may be to use the channel function or SharePoint instead of the chats function. We plan to have a planning session to brainstorm this further prior commencing assignment 3.

GitPulse History

GitHub commit graph

We have learned the hard-working nature of our group. The commitment and dedication of each member toward this assignment has been remarkable. It demonstrates our determination to succeed as mature-age students. Most of our members worked full time during the day while dedicating nights and weekends to study. We refused to waste our time and strived to take advantage of this learning opportunity.

To some extent, it was surprising to find that we functioned very well as a team. According to our personality tests, we were a relatively introverted group of individuals. We had concerns that this fact would negatively affect the way we could collaborate as a group. We are proud of overcoming our initial concerns and believe we have formed a well-organized team with a positive and supportive culture.

Each member surprised us for their uniqueness and intelligence. Ahmet is generally a quiet person but makes simple yet effective comments when he speaks up. Brandon has excellent interview skills, which surprised not only the team but also himself. Hugo has amazing people skill at such a young age. Taylen always surprises us with how skillful he is with IT. Tim is a well-balanced businessperson who is logical, thoughtful, and assertive. Tetsu is a hard-working individual who still enjoys studying in his mid-40s. What surprised us was that we all had unique strengths that positively impacted the team.

## Members’ Reflection

**A person taking a selfie with a cat

Description automatically generated*Ahmet Akgun***

Our team formed soon after the assignment period started. In our first meeting, we've become familiar with each other and discussed a draft plan about what our next steps will be. From the second meeting, we've started to allocate our tasks and formed alternative plans if the necessity arises. After the third meeting, we have set out for our tasks. Towards the last two weeks, I sustained some setbacks which caused me a delay in my deadline. Thankfully, another member of our team shared my burden and completed one of the reports about an information technology subject. I have learned that as an individual I can accomplish something but as with a group I can learn and gain much more.

The group communicated frequently and openly. We have expressed our opinions and intentions. No room was left for miscommunication. Due to each member having different life commitments, sometimes it was difficult to agree on a schedule for meetings. After discussing it thoroughly, we have set and met our schedules.

**A person with a beard

Description automatically generated with medium confidence*Brandon McPherson***

My initial thoughts beginning group work for assessment 2 was rather overwhelming as this is the first time engaging in group work on an academic level. At first, I wasn’t sure what to expect as my personality test from assessment 1 suggests that I was quite introverted and so interacting with 5 strangers would be rather difficult for myself to open up. However, I surprised myself on the level of engagement and contribution from everyone. Our first few meetings were a little disorientated and unorganised, it wasn’t until before our third meeting that there was some tension within the group, it was clear that we needed a leader.

Tetsu took the initiative and nominated himself as the project leader, he developed a very well, thought out project plan on an excel spreadsheet via teams and assigned each member their role and deadline dates. We now had clarity of our objectives; this was vital for our group’s success. Tetsu’s leadership was nothing short of amazing, he was very inspiring and great to work with.

I was quite impressed with Hugo’s IT Industry data, he went above and beyond by seeking other data sources to compare that with Burning Data, he was very engaging in meetings.

Tim’s level of work ethic was self-evident, he produced exceptional work for his IT Technology and the IT project, Tim was not only engaging in meetings but was also attentive.

Taylen displayed a level intuitiveness by building an astonishing video which assisted us all in using GitHub. As we began to push content to Git, he a remoted onto our computers and assisted us with the process. He took on all our ideas and his own to build a professional website to display our content.

Ahmet was going through a tough time as his computer died however, he still attended meetings, provided input, and completed two of the IT Technologies which displayed a great deal of dedication.

Throughout the weeks, I’ve had the pleasure of working with some great people whom I would easily work with again. I’m still not convinced that all group work will be collaborative as this one was but I’m glad that my overall opinion of group work has changed and excited to begin assessment 3.

***Hugo Hughes***

**A person wearing glasses

Description automatically generated with medium confidence*Taylen Robert Anderson***

When I initially joined this group, it was quite late in the piece. I was invited by our teammate Hugo, he seemed very enthusiastic and happy to work with me. Once we had our first meeting, followed by our second I was starting to worry in regard to how our group would work without central management. From a brief discussion we were able to determine our project leader Tetsu, who was able to quickly turn us around and direct us into a clean and efficient meeting three. From this point we were able to quickly delegate tasks and start getting our project moving onward.

The group tends to over communicate in a group setting when it may be more beneficial to communicate directly to the affected people. This has the unintended side effect of causing us to lose information before it is saved and organised. The upside of this is generally the group is fell of very happy and easy people to get along with. Any problems or tasks running behind, or any help needed is very easily and quickly accommodated.

All in all this has been a very interesting experience, and I am extremely glad I have had the pleasure of working with this amazing team.

***A picture containing wall, person, person, indoor

Description automatically generatedTetsu Watanabe***

I believe that we worked very well as a team. After we allocated tasks to each member, we actively tried to assist others when time allowed. We brainstormed daily despite our busy work, and our numerous chats histories prove our daily collaboration.

Graphical user interface, text, application

Description automatically generated One improvement that we can make for the next assignment may be a better use of project management tools. We used an excel spreadsheet to manage the work in progress and chats function for the team communication. Perhaps, we can consider implementing additional tools to manage both project planning and our conversation records. As Brandon suggested initially, it may be a good idea to evaluate the use of SharePoint.

I admit that I was pleasantly surprised by each of my teammates.

Ahmet surprised me with his intelligent hobbies such as chess and cosmology. Brandon is a person with fantastic literacy skills, which include not only writing but also interviewing skills. Despite his young age, I found Hugo is the best communicator who always brings our team a positive atmosphere. Taylen is a very effective self-learner who is also an outstanding teacher. As a business owner myself, I admire Tim's determination to run his business and study simultaneously.

It was an absolute pleasure to be surprised at each member's talents and persona.

Through this assignment, I was pleased to learn that we all determined to work as a team to achieve the best outcome possible. I, therefore, commit myself to support the team to the best of my ability.

**A person with a beard holding a book

Description automatically generated with low confidence*Tim Prast***

Group assignments can be a daunting prospect in any university curriculum. Often times when I see a group assignment as part of a unit I become filled with an impending feeling of anxiety, “what if we don’t work well as a team”, “what if our personalities clash” and “what if one member does not perform”. It is entirely safe to say that our group for this assignment has far exceeded my expectations. I’ve found all the group members to be proactive, communicative and team orientated. I do believe we had some teething issues at the start, as with all groups, I believe we were all too willing to compromise and allow others to lead with group members not wanting to step on another’s toes. However, an abundance of politeness and willing to compromise can also be a great thing in a new team environment as it allows each member to get a feel for the other and see how we all work.

Tetsu created an excellent spreadsheet to break down all the assignment requirements to help us divide the tasks. This was done in a very democratic way with each member letting the others know their preferences, perceived weaknesses, and strengths. Once the tasks were divided, we broke our Microsoft teams chat down into separate chats with the assigned members to facilitate better communication.

Weekly meetings allowed us all time to chat, get to know one another and collaborate and work on our assignment. Brandon showed great initiative in organizing, conducting, and facilitating an interview with an IT professional. Hugo’s boundless enthusiasm and quick wit also bought some laughter and smiles to the meetings – Not to mention is talent for writing and communicating. Taylen created an entire YouTube video to help members use GitHub to share our assignment, built our assignment website and has always been quick to help other members with problems. Ahmet worked tirelessly to complete his research task and although a quieter member of the group always had sage advice or a well-formed opinion when needed.

I’ve found the entire group assignment experience to be a very welcome surprise. I’ve learnt not to approach these situations with anxiety anymore. Each member brings something new to the table, each member has their strengths and weaknesses, and this is why group work is important, it creates a more rounded, more collaborative finished product. The group has been an absolute pleasure to work with and I can’t wait to continue working with them for assignment 3.

# LIST OF FIGURES

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# APPENDIX

## Appendix A

Graphical user interface

Description automatically generated

Chart, line chart

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## Appendix B

Graphical user interface, application, table

Description automatically generated

Table

Description automatically generated

## Appendix C

Link to YouTube Recording

[**https://youtu.be/134lUKZ\_nhg**](https://youtu.be/134lUKZ_nhg)

Interview Transcript

00:00:00.000 --> 00:00:06.490  
**Brandon McPherson**  
So thanks very much for ah coming to the interview today Martin as takes a little time out of your day to do this.

00:00:07.670 --> 00:00:11.160  
**Brandon McPherson**  
Uhm, so you OK with this being recorded?

00:00:11.460 --> 00:00:13.830  
**Martin Harrington**  
Yes, I'm happy for this to be recorded.

00:00:14.080 --> 00:00:19.530  
**Brandon McPherson**  
Cool. Uh, are you able to just tell us a bit about your role and what you do?

00:00:20.180 --> 00:00:24.880  
**Martin Harrington**  
Sure, uh at the moment I'm working for MS Queensland in Milton.

00:00:25.310 --> 00:00:45.280  
**Martin Harrington**  
uh, my job role or job title is systems administrator and being a small IT department, the role is quite varied and it's a mixture of primarily looking after these servers and infrastructure, which are Microsoft Windows based.

00:00:46.810 --> 00:01:10.540  
**Martin Harrington**  
Because our company also uses cloud, we look after a number of particular Microsoft Cloud services as well and also look after a bit of backups, hardware and some sort of end user devices such as workstations and mobile phones and support queries that come with that.

00:01:11.150 --> 00:01:19.470  
**Brandon McPherson**  
Oh cool, cool. and uh, how does that impact the business at MS Queensland in your role in particular?

00:01:20.700 --> 00:01:21.970  
**Martin Harrington**  
Oh look, I mean.

00:01:22.740 --> 00:01:43.240  
**Martin Harrington**  
the way I see IT in general is that it's needed by all businesses to operate without it they can't really operate and but basically the role and means that you know by making by keeping everything up to date and running correctly and

00:01:43.290 --> 00:02:01.020  
**Martin Harrington**  
and configuring it, configuring it to look after the business needs and it means that the business is able to run smoothly. So, I sort of see it as being a reasonably important part of the uhm, the operations of the business

00:02:02.320 --> 00:02:08.910  
**Brandon McPherson**  
Oh, thank you. Uh what was it like when you first began working in IT? Do you find it enjoying or challenging?

00:02:09.890 --> 00:02:39.690  
**Martin Harrington**  
Uh, well look I, I mean I started working out in IT after I… Actually, I started before I left for Uni. I had a couple of part time jobs assembling motherboards and things, but when I really started it was a bit of a jump into the unknown. What you learn at university and what it's like in real life, are two different things and I guess the one thing that I did learn is that what you're reading? Yeah, in textbooks and

00:02:40.520 --> 00:03:21.630  
**Martin Harrington**  
And study for and how things actually operated are quite, can be quite different and also the one thing you don't really get told too much about is that the sort of people skills you need, because you're usually, in IT. So, if you're not a programmer, but if you're in like a sysadmin, or you do IT support, you end up sort of interacting with all levels of the business, so you could be talking to the CEO if, if a job comes that way, so yeah, that’s sort of what I, what I’ve found, and compared to what I have studied it, it can be quite different.

00:03:22.080 --> 00:03:29.310  
**Brandon McPherson**  
I definitely agree there, it's uhm, you know, I think there is this, like this stigma that, you know, IT pretty much.

00:03:29.990 --> 00:03:40.640  
**Brandon McPherson**  
Uhm, like very isolated from, from people but that I guess it's not really the case. It's dealing with people on a day-to-day businesses and business and stuff. Yeah.

00:03:41.310 --> 00:03:59.550  
**Martin Harrington**  
Yeah. Yeah, because everybody's got a device of some sorts or is using some sort of software and when they need assistance using it or if there's a problem with some hardware, they'll soon, they’ll soon come to IT to discuss that.

00:04:01.400 --> 00:04:01.840  
**Brandon McPherson**  
Yeah.

00:04:02.530 --> 00:04:15.400  
**Brandon McPherson**  
Uh, was there another job in mind, or that you were doing before you got into the IT field? Uh and was there something about the other job or career path that led you into IT or exposure interest into the field?

00:04:15.960 --> 00:04:46.170  
**Martin Harrington**  
Ah yeah, look, that's a good question. To tell you the truth, when I was still a student, I kind of didn't have quite a clear idea of what I wanted to do, so I actually did a mixture of business and IT and even during the course then I still wasn't sure. So, when I actually did leave (Uni), my first job was an IT job and it wasn't quite how I perceived it to be, but I stuck with it. So, in all truthfulness since I've left Uni

00:04:46.220 --> 00:05:03.790  
**Martin Harrington**  
I've, I've just pretty much been doing, doing IT and yeah. So, if somebody gave me a different role, it wouldn't be, it be, it takes a little bit to get used to. So yeah, look IT has been primarily my, my work since I've finished.

00:05:04.570 --> 00:05:04.990  
**Brandon McPherson**  
Cool, cool.

00:05:05.900 --> 00:05:12.310  
**Brandon McPherson**  
Uhm, do you engage much with the other areas of the business? And if so, what do you discuss with them?

00:05:15.000 --> 00:05:19.700  
**Martin Harrington**  
Ah look, not as much as some previous roles.

00:05:21.350 --> 00:05:51.450  
**Martin Harrington**  
I think usually if there's a project that comes up where another part of the business, whether it's marketing, finance, etc that need something, then there's a higher level of interaction, but at the moment it's very ad hoc so it could be anybody who comes by and asks a question and get some, get some assistance or talk about a particular future project. But yeah, there's not a specific part of the business at the moment that I'm dealing with.

00:05:54.340 --> 00:06:00.970  
Brandon McPherson  
With umm, when you're at University, I guess cause obviously technology has changed quite a bit.

00:06:01.570 --> 00:06:18.280  
**Brandon McPherson**  
Uhm, you know, with me doing it now anyway, it seems like it's touching on things like artificial intelligence and machine learning, which I think is fairly, fairly new, or I guess it's uh as a bit more of a trend.

00:06:17.820 --> 00:06:18.740  
**Martin Harrington**  
Cutting edge?

00:06:19.330 --> 00:06:33.140  
**Brandon McPherson**  
Yeah, what was it like when you're in Uni? What were some of the, I guess the real new things at the time and how's that sort of shaped the IT space now?

00:06:33.450 --> 00:06:42.950  
**Martin Harrington**  
Gosh well, it's ah, this is gonna show my age, but I guess as I was sort of really getting doing IT at Uni

00:06:44.380 --> 00:07:02.720  
**Martin Harrington**  
The actual, I think underlying operating system was Linux that was running a lot of the systems for the university and umm when I was there, the command line was still quite popular.

00:07:03.480 --> 00:07:47.510  
**Martin Harrington**  
that I think windows 3.1 or umm was sort of around, and Windows 95 hadn't come out really by then. So, our talk was about, you know, object orientated programming. It was about the graphical user interface, and it was about talking about you know 32-bit programs, 64-bit hadn't really been discussed so that was that was the cutting edge was that I guess it was the GUI. Windows still booted into the command prompt, but then continued onto loading Windows itself before it was MS Dos. So, so yeah, that was that was where all the excitement was at, at the time.

00:07:48.510 --> 00:08:02.050  
**Brandon McPherson**  
And umm, with the GUI, I know that uh, obviously back then it was very popular for I guess, you know, users of, I guess, for the main public to get familiar with computers as the command line can be a bit scary, I guess or intimidating.

00:08:05.860 --> 00:08:06.780  
**Martin Harrington**  
Yeah.

00:08:03.250 --> 00:08:25.960  
**Brandon McPherson**  
For new users, but I guess now. I guess the GUI for a technician. It creates a lot of space on the, on the memory and hard disk. Is it sort of coming away a bit from the GUI or do you think the GUI is still being pushed?

00:08:26.940 --> 00:08:29.880  
**Martin Harrington**  
Uh, oh with the future of the operating systems?

00:08:28.980 --> 00:08:29.280  
**Brandon McPherson**  
Yeah.

00:08:30.690 --> 00:08:53.980  
**Martin Harrington**  
Oh I think the GUI is here to stay, umm but as you've seen and I've seen, Microsoft found that there was limitations on what the GUI could do. So, they’ve created PowerShell to really assist sort of administrators and people that needed to really control their computers to be much more powerful.

00:08:55.420 --> 00:09:31.370  
**Martin Harrington**  
So I, I still think there's, there's, you know, the GUI will continue to evolve and as Windows 11 is showing and that is always going to be there for either the general end user but the command line will, will always be prominent and I think there are though limitations with the command line and what made the GUI more popular was the fact that unless you know, that unless you know want to type. You never going to be able to do anything with it, so the GUI was, it was inevitable. Yes…

00:09:31.930 --> 00:09:41.720  
**Brandon McPherson**  
Yeah, that's ah that's really good. Uh what, which other aspects of work do you find most challenging within your role?

00:09:42.960 --> 00:10:17.650  
**Martin Harrington**  
Umm, I think it's, it's juggling the multiple tasks with limited resources, whether that's not having the funding for enough hardware available to swap, you know to, to swap things out, whether it's enough software licenses and just how rapidly the businesses is changing but at the same time they they're not supporting IT.

00:10:18.790 --> 00:10:28.320  
**Martin Harrington**  
Yeah, so I. I feel that that though that's the challenging thing is there's a, there's a lot of business change, but IT is not getting the funding

00:10:29.270 --> 00:10:43.220  
**Martin Harrington**  
The support that IT needs to, to sort of adapt and grow with the business for IT to be on the forefront rather than on the always on the back foot. So that that's what my perception is.

00:10:44.280 --> 00:10:55.540  
**Brandon McPherson**  
I think yeah, it's funny with like I guess. I know there's some people in uni that they come from all different backgrounds and from different careers. And one thing that sort of stood out to me was.

00:10:57.510 --> 00:11:23.300  
**Brandon McPherson**As they sort of in their prominent roles at time, they've seen how much IT is evolved and now they've, they're really doing uni to sort of learn it, sort of compliment them. It's kind of, even doing a case study the other day on a bank, they they've transformed their model now from “it's not just a bank, but now a Technology company that does banking or specialises banking.”

00:11:22.130 --> 00:11:22.780  
**Martin Harrington**  
Right.

00:11:24.310 --> 00:11:41.100  
**Brandon McPherson**  
It's kind of. It's funny to see, like maybe that might be something that MS Queensland can perhaps offer or change. Maybe with time or uh, maybe that's a trend that businesses are going towards where they're sort of pushing more or sort of building applications, and I don't know that that's.

00:11:42.070 --> 00:11:45.080  
**Brandon McPherson**  
So uh, what, what do you think on that one? What's your thoughts?

00:11:45.170 --> 00:12:14.850  
**Martin Harrington**  
Ah, oh look. I mean, banks have large resources to fund those kinds of projects. I think something like MS Queensland might decide to produce an application or get a third party to assist with producing an application that might benefit people were in with their MS. I don't, I don't sort of see that happening at the moment but knowing what the nurse call systems are and

00:12:14.920 --> 00:12:42.520  
**Martin Harrington**  
currently being used and paid for by the company to, to look up to assist people with multiple sclerosis. I think there there's certainly room for improvement there and but yeah, it's, it's difficult to say that MS Queensland would have that kind of appetite to produce its own software or become a sort of software led house at this stage, I think they've got some more growing to do before they, they look at that.

00:12:45.200 --> 00:12:49.810  
**Brandon McPherson**  
Uh, in what aspects about your job that you find most award rewarding?

00:12:51.100 --> 00:13:21.770  
**Martin Harrington**  
Ah, good question. I think that there's a certain level of freedom even though we can use change requests that, that you “know you're the things that you're doing”, that they're actually benefiting the company and obviously the end users are the client, the staff, and the people with MS, so where some jobs always feels like you're pushing a pen around, this one you can.

00:13:22.030 --> 00:13:53.470  
**Martin Harrington**  
You can put forward suggestions to improve either the software being used, or the way that the end users are interacting with their workstations or devices, and they get listened to, and you know, usually if there is, there's the costs is negligible or none, and it can be supported properly then there's usually an agreement quite quickly to say, yeah we can. We can do that that.

00:13:53.540 --> 00:13:59.340  
**Martin Harrington**  
That looks like a good suggestion. So yeah, being listened to by the company and by the IT team is, is great.

00:14:03.790 --> 00:14:16.400  
**Martin Harrington**  
that that's one thing. There's nothing. There's nothing better than creating something I think, and that that's certainly what we're able to, to achieve in this role.

00:14:17.170 --> 00:14:26.500  
**Brandon McPherson**  
Mmm, that's cool. And like you get, so I guess that's sort of yeah, you get to see that the technology. Sort of I guess helps there. I guess they work as well

00:14:27.070 --> 00:14:28.750  
**Brandon McPherson**  
Uhm yeah cool.

00:14:29.350 --> 00:14:36.240  
**Brandon McPherson**  
Uhm, are you able to share an example of some of the work that best captures the essence of your role?

00:14:37.440 --> 00:15:03.040  
**Martin Harrington**  
The work? Oh gosh, well, if I thought verbally I don't, I'll have to… I think when there were things that I sort of achieved when I came in that I feel shows that would be the, when all the desktops and laptops were sort of running and the mobile phone…

00:15:04.380 --> 00:15:44.950  
**Martin Harrington**  
So basically, the end user devices were set up and configured, they were all working, you know, reasonably well, but there was a lot of the management of them, the software and that they're just the general administration of them was a little out of date, so luckily the business allowed us to buy some better Microsoft licensing, which then allowed us to or allowed me to look at moving the devices from just a central computer that managed them into like a Microsoft Cloud based service called “Intune”.

00:15:45.020 --> 00:16:12.350  
**Martin Harrington**  
and when I think back to when I first started. Some sort of testing it out and seeing what it, what it could do to what it does now. It's become quite like an essential tool to, to manage the machines to deploy software and configuration, and to just keep an eye on what those machines are doing and the Windows updates there was. So now they're, they're more compliant and more standard with Microsoft practices.

00:16:13.120 --> 00:16:36.240  
**Martin Harrington**  
So yeah, to me that, that tool now has become, certainly from my point of view quite an essential tool to ensure that people have an up-to-date Windows operating system, or a managed Android phone and we can just yeah, manage and administer it much better than we could before.

00:16:36.540 --> 00:16:42.610  
**Brandon McPherson**  
Ah Brilliant, yeah. It's crazy. We've just learned about cloud in our uni studies.

00:16:43.670 --> 00:16:55.060  
**Brandon McPherson**  
Uh, could you tell us a bit about… ah obviously, I think from memory or is it cloud that was sort of around since 2008 by AWS?

00:16:55.880 --> 00:17:08.060  
**Brandon McPherson**  
Uh, I guess what was it like… were you around when servers, before servers began to be virtualized on computing? Or they, that sort of always been around?

00:17:09.520 --> 00:17:40.910  
**Martin Harrington**  
Uh well, like I mean AWS sort have, well I was working in IT and you know you started to hear people talking about it and how, I mean, Amazon Web Services came about because they, they realize they had so much compute power still available that they could maybe offer it to customers as a as a way of them offloading some of their on-premises stuff to work on their servers and the whole name of cloud kind of came about, and

00:17:41.240 --> 00:17:42.170  
**Brandon McPherson**  
oh, I don't know that.

00:17:42.690 --> 00:18:09.490  
**Martin Harrington**  
Yeah, yeah. I think they just yeah, Amazon obviously had the expertise, and they had the data centres around which were primarily for just optimizing their Amazon website and their back end and they just use that too, then start to offer it to business customers so I guess, sort of seeing the change was

00:18:09.540 --> 00:18:39.410  
**Martin Harrington**  
where you started to hear businesses talking about “We're going to”, you know there was the big data talk and all of that was where you know businesses realized they had a limitation on how much they could keep on their on-prem and then there was and I think it will kind of coincided with the having, you know, the cost of having a dedicated Internet line and Ethernet to a data centre just so

00:18:40.090 --> 00:19:03.390  
**Martin Harrington**  
because of obviously businesses could move their computers away from the office and put them in a data centre and then it was kind of a natural progression once the back end, once the Internet back end improved and the speeds were there that they could start to maybe move more things away from on-premises where there was that that ongoing cost of looking after the data centre.

00:19:03.920 --> 00:19:33.490  
**Martin Harrington**  
Uhm, and knew the risk around, the risk around there being outages, as I, sort of saw in someone I used to work for at Sun Super that they had problems with the flood, the big floods and it caused a lot of issues for them. So, I think there was the appetite from that point on to like go “OK, let's, let's see what we can move off the on-premises the into the cloud because Amazon is now offering it” though

00:19:33.790 --> 00:19:58.020  
**Martin Harrington**  
Microsoft was a little bit late to the party and some businesses I noticed were reluctant to go over to Amazon because it was quite a different level of expertise needed for that and there was nothing until Microsoft brought out, I think when they brought out, you know, moving your emails off (to O365) that’s when people really started to look at the Microsoft products.

00:19:58.630 --> 00:20:03.010  
**Martin Harrington**  
Uhm, and you know Amazon was obviously still offering it, specialized services as well. So yeah, I think that you know “Them seeing it” has made a real difference, I think nearly every business have wanted to move more and more things away, but I remember there being a sense of fear with my colleagues because they were concerned that they were going to lose their jobs

00:20:24.710 --> 00:20:25.030  
**Brandon McPherson**  
ah, yep.

00:20:25.210 --> 00:20:46.940  
**Martin Harrington**  
because if they move to the cloud, why do they need any of these people to look after servers and things like that, so that's what I kind of experienced, but so far I think it's just meant that everybody’s role has changed so you need to understand and be able to use the cloud services and yeah, that’s what I, That’s what I’ve noticed in my time.

00:20:47.800 --> 00:20:55.430  
**Brandon McPherson**  
And uh, has using the cloud technologies, has that made your life easier as a systems administrator?

00:20:55.780 --> 00:21:17.800  
**Martin Harrington**  
Yeah, I, I think so. Umm, we as sysadmins had to spend so much time out of hours patching servers and building new servers, but thankfully with virtualization that helped lot as well. So, outages you, you could have enough hardware so you could kind of build, build your hardware up without losing

00:21:18.420 --> 00:21:47.630  
**Martin Harrington**  
The end user losing any sort of that time with access to those systems so seeing, seeing the changes has made it made it sort of easier because the, I guess in a way, the responsibility for some of that has now moved off the sysadmin shoulders and onto the cloud provider and as the cloud provider has more redundancy and they've got more expertise

00:21:48.630 --> 00:22:07.370  
**Martin Harrington**  
In every single facet in their data centres, it means it takes a bit of the sort of weekly daily maintenance away, routine away from the sysadmin so that they can concentrate on other projects. Other services that are running.

00:22:08.490 --> 00:22:26.660  
**Martin Harrington**  
So I think it's been a, it's been a good thing that that there's less time needed to be spent on just general patching and updating on their servers, operating system, and even, even just like the databases and ah, yeah, the hardware.

00:22:27.820 --> 00:22:28.360  
**Brandon McPherson**  
Cool, yeah.

00:22:28.800 --> 00:22:47.790  
**Brandon McPherson**  
Uh, one last question too uh, where do you see the trend of computers and technology is going towards? Does this Excite you? Or makes you worried a bit about the future? Just before the, you know everything going virtualized and moving to the cloud, you know, I guess you know when you look at shows like Mr Robot.

00:22:48.580 --> 00:22:49.300  
**Martin Harrington**  
Yeah.

00:22:48.800 --> 00:22:52.750  
**Brandon McPherson**  
Cyber-attacks, so, what's your opinion on that?

00:22:53.220 --> 00:23:24.890  
**Martin Harrington**  
oh look, it’s interesting that you mention Mr Robot. I think there's quite a bit of fact based in, in those, in that show and I think there's, I think there's going to be a day where, there's going to be that you know, there's always going to be risk when you're getting more connected, but everything is getting more connected and I think that there's going to be a day where there's going to be some big outage on mobile phones, I can see that coming

00:23:25.580 --> 00:23:55.490  
**Martin Harrington**  
I think there's going to be some great things where the computers will be, you know, like they've been, already been used, you know, in sort of intelligence to build better CPUs so that the computers themselves are using AI to assist with that and I'm sure that that's helping with building better if more efficient data centres. I think the world needs, needs to sort of have more, more kind of intelligence from AI and, and that, because I think the world is

00:23:55.680 --> 00:24:10.380  
**Martin Harrington**  
in a bit of a mess in terms of the environment and that, and we, we need, you know, seeing Covid and obviously the only reason we could get the vaccine was because of the, the raw compute power that was there to, to kind of come up with some, some

00:24:10.000 --> 00:24:11.930  
**Brandon McPherson**  
Oh I did not know that, that's crazy!

00:24:12.220 --> 00:24:48.080  
**Martin Harrington**  
Yeah, you know that, that could’ve been the only reason there could have been developed that quickly was because they could throw it into some cloud based, you know, systems that could crunch the data very quickly, umm so I think that there's some great things that they're going to come for it and I think the pace is just going to continue, and I think the price ,once we get over the Covid short, the costs of the, the sort of hardware components at the moment in a couple years, I think there's, you know, technology is just going to continue to be cheaper and when you look at what a smart watch can do now, so I ,I think there's going to be more

00:24:48.310 --> 00:25:00.920  
**Martin Harrington**  
Uhm connection with, with what's out there, any device you know you're gonna sort of get a receipt and it's going to be a small receipt or it will be kind of connected to the Internet, something they'll be something like that.

00:25:02.210 --> 00:25:30.960  
**Martin Harrington**  
umm I, I think there's gotta be, I'm concerned about how people are becoming so tide to their, their mobile phones, their smartwatches to their devices that there, there’s sort of society and the way it interacts with each other and the way that sort of like there's that misinformation and all the, there's the good side of something like social media but there's also the bad side, so I think it's going to be

00:25:31.010 --> 00:25:47.540  
**Martin Harrington**  
there's going to be growing pains, but there will be more rules around it just like the Internet was like the Wild West when it first became popular and used more and everybody could do everything. There's going to be more policing around all their software services and

00:25:48.330 --> 00:26:02.050  
**Martin Harrington**  
things such as, you know, social media but I think it's, it's exciting times but how people are going to balance it with reality interacting with the technology and interacting with reality? I think that's where I’m unbothered.

00:26:02.740 --> 00:26:07.330  
**Martin Harrington**  
I'm, that’s what I’m concerned about. Not, not to worry about Skynet just yet.

00:26:09.170 --> 00:26:22.940  
**Brandon McPherson**  
Yeah, I guess that's, that's one thing that gets me really worried, but you know, like, I think one thing, I'm always thinking about is before these systems go into the cloud, like what happens if some malicious, you know software gets

00:26:23.510 --> 00:26:32.380  
**Brandon McPherson**  
I mean it, it would be hard for it to do, I'm sure. Yeah, I mean all it takes is malicious software to, you know, enter like, let's say Google's data centre and just sort of start, you know.

00:26:33.270 --> 00:26:42.780  
**Brandon McPherson**  
Propagating against their, their systems and you know, like take a big portion of the Internet down, and I guess something that on the Internet. Yeah.

00:26:39.540 --> 00:26:40.100  
**Martin Harrington**  
Yeah.

00:26:43.750 --> 00:26:44.110  
**Brandon McPherson**  
Yeah.

00:26:44.920 --> 00:26:50.800  
**Martin Harrington**  
It's relied on so much just like the, the other day, there was that DNS error

00:26:51.830 --> 00:27:21.060  
**Martin Harrington**  
and then it's caused Facebook and Instagram and everything to go down and you know, so many organisations rely on Facebook to communicate with people. So, it, it does make you know it doesn't make me realize, make businesses hopefully realize that they can't just rely on one form of, you know, they can't put all their eggs in one basket that that's the quickest way to sum it up. because if they do, there's going to be these outages, even Microsoft services, you know, we experienced those once in a while service degradation

00:27:21.250 --> 00:27:43.490  
**Martin Harrington**  
service degradation with, with their products so yeah, yeah, a business, I think and people just should not always rely, you should always assume that maybe all those photos you've got backed up to the cloud. I've got my photos on three different providers so that if one goes, if Google goes, I’ve got Amazon Glacier or I've got Microsoft one drive.

00:27:37.840 --> 00:27:38.270  
**Brandon McPherson**  
Wow.

00:27:44.260 --> 00:27:48.510  
**Martin Harrington**  
So umm, yeah, don't put your eggs in one basket that, that’s my thinking.

00:27:47.740 --> 00:27:48.040  
**Brandon McPherson**  
Yes.

00:27:49.390 --> 00:27:59.510  
**Brandon McPherson**  
So uh, what do you, just really quickly. What's your thoughts about the evolution of human ethics with, with computers and the privacy and stuff?

00:28:00.380 --> 00:28:03.460  
**Martin Harrington**  
Ah yeah, look well.

00:28:04.930 --> 00:28:16.990  
Martin Harrington  
We, when we joined Gmail or joining Google, get a Google account or Microsoft, we're already agreeing to some, some quite, you know questionable I guess

00:28:18.320 --> 00:28:47.190  
**Martin Harrington**  
legislative, not legislation but rules within, within the user terms and conditions. I think the governments have got to keep on top of it because you know, they're the Google and Microsoft and, and Apple and so on all scraping our data and collecting it so they already have a large pool. Even though they say synonymized large pullover information, but we've just got, I think you just have to accept if you say something

00:28:47.240 --> 00:29:24.300  
**Martin Harrington**  
if you put something on the Internet, you know, just accept that, that could be used against you. It could be copied, so just, you just have to be mindful of that and I think no matter what rules the government put in place, there's, and even if the businesses abide by them, all it takes is a breach and all your data or some of your data is out there. So, Just yeah, I think you just gotta be guarded and make sure you've got paper copies of things and accept that what you’ve put out there, could you know, have sensitivities. You just gotta be careful.

00:29:25.750 --> 00:29:32.780  
**Brandon McPherson**  
That's really good! Thank you very much for doing the interview with me Martin. It's been really good.

00:29:33.270 --> 00:29:34.060  
**Martin Harrington**  
Oh, you're welcome.

00:29:32.830 --> 00:29:38.650  
**Brandon McPherson**  
Just taking the time out of your day to do this, so I've, I've learnt a lot, so thank you very much.

00:29:39.100 --> 00:29:41.830  
**Brandon McPherson**  
Uhm yeah, thank you.

00:29:42.680 --> 00:29:46.700  
**Martin Harrington**  
No worries, Brandon. Thank you for those, they they're good questions. They definitely got me thinking.

00:29:47.360 --> 00:29:47.700  
**Brandon McPherson**  
Thanks.

00:29:47.990 --> 00:29:50.330  
**Martin Harrington**  
Alright, well thanks very much, bye then.

00:29:50.690 --> 00:29:51.330  
**Brandon McPherson**  
Thank you, bye.