

Infrastructure Technician Level 3

Summative Portfolio

By Reece Small



HIVE
Communications

UNIT 1 - Communication: *Works both independently and as part of a team and following the organizations standards; competently demonstrating an ability to communicate both in writing and orally at all levels, using a range of tools and demonstrating strong interpersonal skills and cultural awareness when dealing with colleagues, customers and clients during all tasks.*

UNIT 2 - IT Security: *Demonstrates the necessary skills and behaviours to securely operate across all platforms and areas of responsibilities in line with organizational guidance, legislation.*

UNIT 3 - Remote Infrastructure: *Effectively operates a range of mobile devices and securely add them to a network in accordance with organizations policies and procedures.*

UNIT 4 - Data: *Effectively records, analyses and communicates data at the appropriate level using the organization's standard tools and processes and to all stakeholders within the responsibility of the position.*

UNIT 5 - Problem solving: *Applies structured techniques to common and non-routine problems, testing methodologies and troubleshooting and analyses problems by selecting the digital appropriate tools and techniques in line with organization guidance.*

UNIT 6 - Workflow management: *Works flexibly and demonstrates the ability to work under pressure to progress allocated tasks in accordance with the organisation's reporting and quality systems.*

UNIT 7 – Health & Safety: *Interprets and follows IT legislation to securely and professional work productively in the work environment Understands and applies. Health & Safety policies to everyday work.*

UNIT 8 - Performance: *Optimizes the performance of hardware, software and Network Systems and services in line with business requirements.*

UNIT 9 - WEEE: *Understands and responds to the correct processes associated with WEEE (the Waste Electrical and Electronic Equipment Directive)*

**ALL CENSORSHIP IN THE FOLLOWING WORK IS TO COMPLY WITH GDPR TO PROTECT
INTERNAL BUSINESS INTELLIGENCE AND KNOWLEDGE, THIS FALLS IN LINE WITH OUR
PRIVACY POLICY.**

Introduction to my portfolio

My Name is Reece Small, and I work for Hive Communications in Salisbury UK, at Hive my official title of employment is Customer Service & Technical Support Apprentice. During my employment at Hive I have studied for my Infrastructure Technician Level 3 Apprenticeship and this is my portfolio of my work.

Some of my skills include the following:

- Windows Server Deployment & Administration
- Mac OS System support and diagnostics
- Windows Desktop Management, Support & Deployment
- PC Building, Hardware analysis & comparison
- Office 365 Setup, Management, Support & Deployment
- Computer upgrading (SSD, RAM, CPU)
- Network Setups (Routers, access points, switches, cabling)
- Data Backup, recovery and restoration
- Telecommunications deployment & support

At Hive my job role includes the following aspects that I cover / look after, this can be found attached.



Evidence - 1.6.1 -
Jobs falling under H



MY ATTITUDE, TARGETS & GOALS AT HIVE

My primary target is to achieve the highest possible grade with the level of detail I have put into my work in the individual portfolio pieces which represent my competency in the role. My second target is to achieve the targets Hive Communications as a business set, e.g. Hive sets a gross income target for the year which the staff are told about, I would then focus on gaining clients when I attend networking meetings representing the business, as this would then help us raise our income in hopes of reaching our targets.

On top of this I have always prided myself in customer service ability and my passion to have a friendly atmosphere with the people who I provide a service for. I intend to make the customer feel welcomed and, in the loop, so they understand what I am doing to improve their satisfaction of their service Hive provides. I aim to make them understand the simple version of the massively technical adjustments and improvements I apply to what I support or provide them with.

In addition, I aim to stick to timeframes of jobs which Hive quotes for, better still, complete the job with some time to spare to perform final sanity checks of the work performed to ensure the quality of the job is at the highest possible standard, as this makes the company image be presented in a better light. This kind of attention to detail and dedication is exactly the kind of attitude Christoph (Company Director), wants me to have when I work.

I hope the following portfolio pieces can prove to you my ability to provide a service which covers all of Unit 1, 2 and 3. Enjoy the work. The following sections will highlight my ability to cover a wide range of skills and abilities I possess and can perform in my position to prove my competence in the sector.

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About Hive Communications

Since 2004, Hive's mission has been to provide the best service in internet, or cloud, communications for small and medium-sized companies and other types of businesses. Their target is to have clients who only need to phone one number whenever they need help or have a question. As all of Hive Communications' services are managed under one roof with a small team, it aids staff developing a more personalised relationship with the clients.

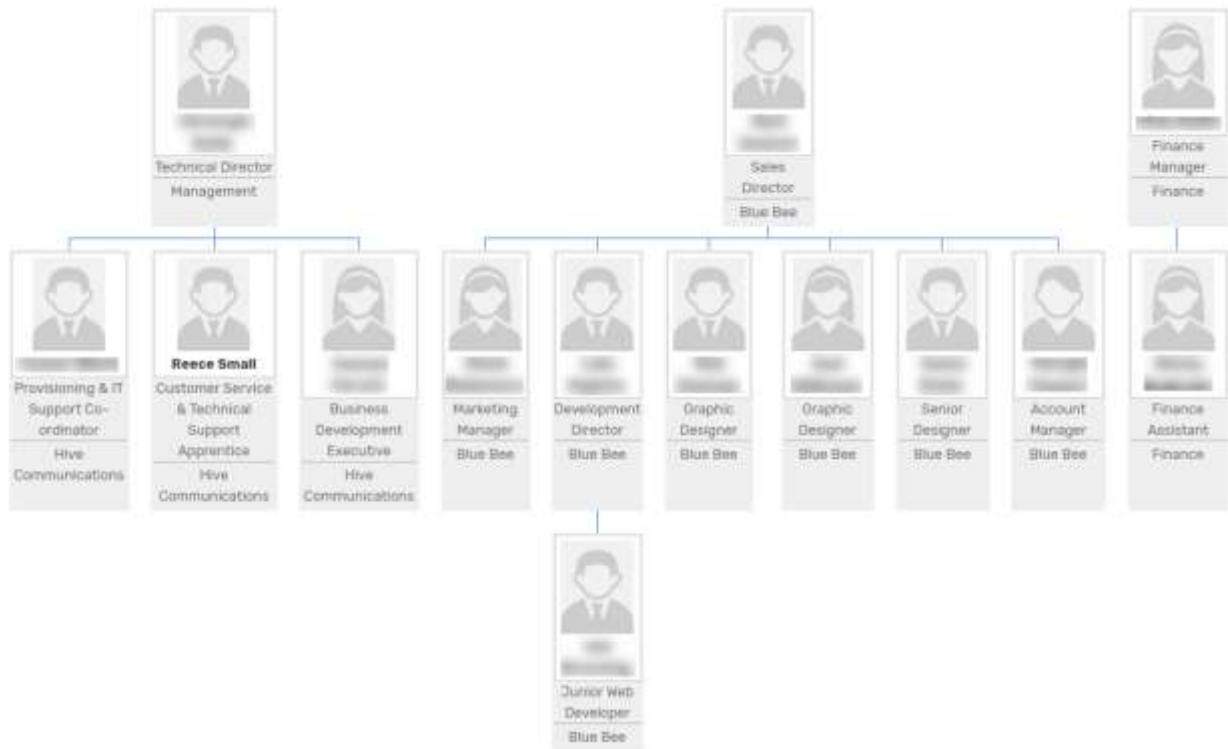
WHAT HIVE DO

Hive Communications specialise in telecommunications, network and IT systems. I provision, support, manage and deploy telecoms systems, IT hardware, networks for businesses varying from one person all the way up to enterprise level sized environments.



COMPANY HEIRARCHY

In the following diagram, my position in the company is presented as directly below Christoph who is the Director. My colleagues from different departments all report to Christoph. I don't directly have any affiliation company hierarchy wise with Blue Bee, however I do still assist them due to the fact our companies are partnered.



COMPANY CULTURE

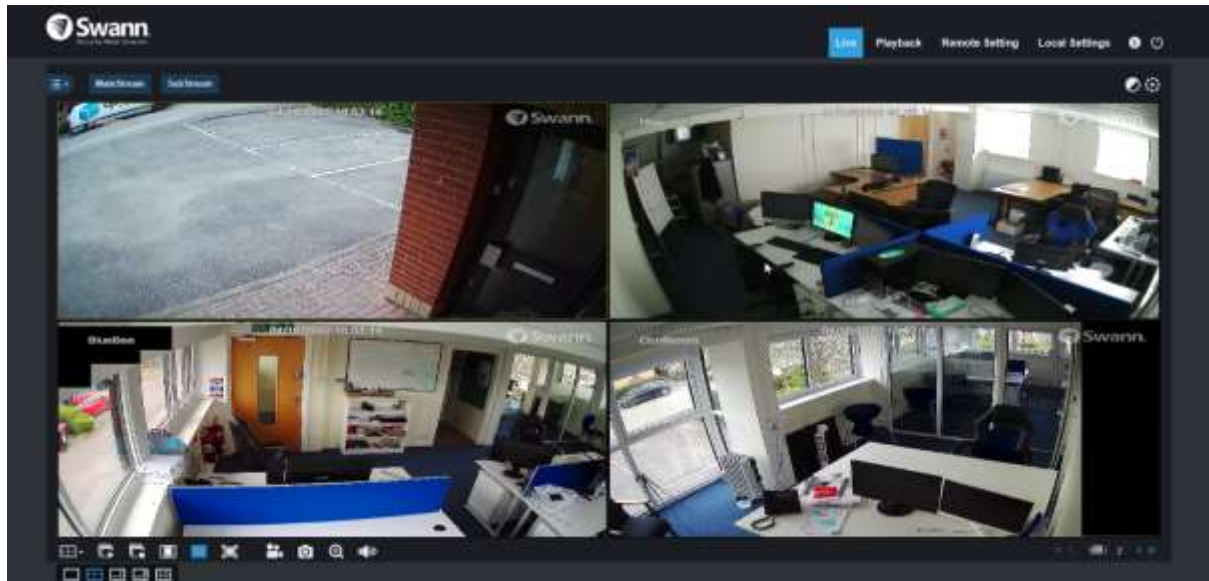
Hive is an extremely friendly and open environment, due to its small size in personnel, it allows all the staff to get to know everyone better, meaning people have more personal relationships with everyone in a professional sense. This allows for office conversations to be more friendly and not all formal. I enjoy the culture of the company because I feel comfortable socialising with all the staff, they are all welcoming and make my time at work more enjoyable. Overall Hive is an extremely positive environment to work in.

SECURITY

At Hive Communications there are many security measures which Hive have in place to maximise the security of the premises and our property on site. Some of which are detailed briefly below.

CCTV

Outside and inside the building Hive has CCTV which covers key areas that need surveillance. Our CCTV records when movement is detected so recording space is saved on the storage device which stores the recorded video. The cameras cover most, if not all of each room they are installed in, meaning that majority of the property is recorded at all active times, maximising the security of the premises.



Door Security

On the front door of the building there is a master key which unlocks the heavy-duty metal door. This key is in possession of only management level staff.

When inside the office, there are security key code locked fire doors, there is one for Blue Bee and one for Hive. These codes are known to all staff. All staff know the codes because on occasion, we'll lock one of the offices to all be in the other one, meaning the front door can remain open and unlocked while one of the offices is locked.

Screen Lock / Credentials

For our computers, each user has their own login which only they are aware of as they change their password at first login, this means IT admins such as me don't know the end user's password.

Restricted areas

The only real restricted areas in the office include HR's desk and drawers, this is because all data in HR is of other personnel, this data is personal to each staff member and I am not authorised to see such information. I am obviously not allowed to read any other staff members private emails or work as that is not my concern. Other than that, I do not face many restrictions around the workplace

COMPANY POLICIES

All of our primary company policies are covered in the staff handbook which can be reviewed here:



This document is stored on our HR platform Breathe HR

GDPR

Page 39-42 – *'The Company holds Personal Data about job applicants, employees, clients, suppliers and other individuals for a variety of Business Purposes.*

This policy sets out how the Company seeks to protect Personal Data and ensure staff understand the rules governing their use of Personal Data to which they have access in the course of their work'.

Computer Misuse Act

Page 17-25 – This policy is large and covers a lot of areas which outline rules that show how I abide by the computer misuse act. This policy covers the following:

- Personally owned Phones and other Portable Devices
- Monitoring of Personal Communications
- Company Mobile Equipment
- Monitoring of Personal Communications
- Misuse of the e-mail or Internet
- The Company's rights
- Legal Action against the Company
- Usage
- Virus Protection Procedures
- Use of Social Networking
- Internet
- Email
- Software
- Computers
- Unauthorised Access

Health & Safety in the workplace

Page 46 – The H&S policy of the business it outlined

'Issued in accordance with the requirement of section 2 (3) of the Health and Safety at Work etc. Act 1974'.

Equality Act

Page 64-65 – This policy outlines how our company follows anti-discrimination processes in the workplace.

'The Company is an equal opportunities employer and will not tolerate discrimination against any applicants or employees that is based on age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex or sexual orientation.

The purpose of this policy is to ensure a place of work that provides equality of opportunity for applicants and employees with dignity and respect for all'.

Unit 1.1: Use a minimum of 3 tools to communicate

Communication is a key part of conveying information, I use it to convey information to others to get across key facts and points, below I will go in depth and explain how the following three tools of communication I have selected are used by myself. In this Unit I will be showing my ability to communicate in multiple forms, demonstrating the ability to communicate in both oral and writing formats, this is to represent my ability to communicate with interpersonal skills and cultural awareness when handling scenarios with colleagues, clients, customers.

ORAL

Verbal communication can be conveyed in multiple ways, over the phone, leaving voice messages etc. In the workplace I communicate with clients and colleagues either orally in person, by leaving a voicemail, or over the phone. I will also use software such as Microsoft Teams to communicate orally over the internet instead of using a phone line, in turn I use video conferencing and screen sharing to convey further information.



Unit 1 Oral Evidence-2019-02-19_02080510543.wav

This recording of a phone call I have had with a client which demonstrates me communicating orally. The call is regarding installation of software which allows a user to connect to the cloud hosted VoIP system, below I go into depth of some areas of the call.

0.00-0.40: I use welcoming language and enquire as to how the client is getting on, making her feel comfortable in the call with me.

0.50 – 3.27: General explanation and background of product I am installing for client, it's features and more. I answer the clients queries as to what their interpretation of what I am offering is. I explain there will be an email going to her inbox with installation instructions and login information, I then direct her on how to open a site which lets me remotely access her system.

3.27 – 4.40: While the software I proposed is downloading and installing I fill the time with friendly conversation such as asking how her week has been. I guide her through the process of what the installation is doing so she knows what's going on, what she will see once it is installed.

4.40 – 9.40: I ask her if she has her credentials to hand, ensuring her if she doesn't that the information can be recovered from our documentation. She makes attempts to login so I open the relevant information I will require to access her account. I have issues logging in due to issues with the service provider at the time and it has experienced issues following updates, I inform the client of this after trying numerous methods to log in. I then confirm I can train her without logging in as most features are just settings based initially.

9.40 – 17.36: I train the client on the features of the system, she confirms what she understands with the use of 'okay' and 'gotcha', which infers she understands what I am explaining. I spend majority of this period explaining the features and their use. I attempt to log in again for her with no prevail due to the service issue. The client enquires as to if she can add to the corporate directory from this software, I then show her on screen in the remote session while explaining over the phone. The client says on numerous occasions how certain features are 'nice' implying she is impressed or pleased with the available features. I reassure the client I will be speaking to the supplier to resolve the login issue and that I will be available to help with any further issues.

17.36 – 17.44: I close off the call with a positive tone which the client returns when saying goodbye to end the conversation.

Above I have explained how I verbally communicated using oral techniques over the phone to tutor a client with her software installation.

Obstacles in communication and overcoming them

Working at Hive and doing this Apprenticeship doesn't come without obstacles which I had to overcome. Learning new things such as programming languages, new networking standards and more.

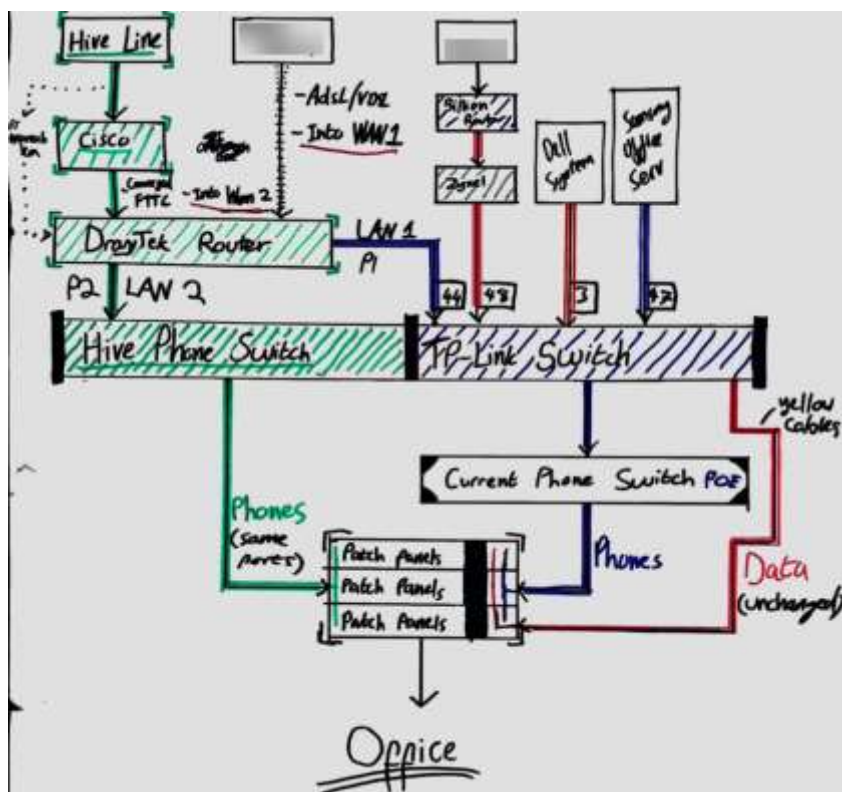
One primary obstacle which I overcame rather quickly was the ability to handle clients with unresolved conflicts, this can be issues with their service or even their bill, due to GDPR reasons I am unable to provide evidence of myself resolving these kinds of issues. However, in a given instance whereby a client was unhappy and wanted a resolution to an issue they reported via email, I would contact them over the phone after sending an email in response to their discrepancy, the phone call would be to discuss the issue they have and work around a resolution for the client, this in turn presents my ability to deal with conflict, and clients who are conflicted with what I provide them and the service they expect. I always aim to close a conversation with a conflicted client on a positive note, with the end goal being that myself and the client have come to a solution where they are content.

Other than the previously mentioned obstacles, there isn't much else which has proven difficult for me to overcome during this course.

DIAGRAMMATIC

Information can be conveyed via the use of diagrams, signs and symbols, using annotations and pictures to describe information in a visual form. I have used this form of communication in the workplace with clients to show them visually the outcome of a product and how it will function when completed.

This is a diagram of I proposed to **Client 2** which shows the proposed network topology I planned to install for them in their premises



[EVIDENCE: CLIENT 2 NETWORK TOPOLOGY PROPOSAL]

All the lines with arrows in this diagram represent ethernet cables and all the colours represent different functions of the network, explained further below.

Green represents the proposed method in which I would integrate our hardware. The green outlining the black lines communicates across to the client a clear flow of how our proposed system works from the Broadband line socket all the way to the office. The green represents phone and broadband coming through in one line.

Black is the general outline for an item and the text colour, this keeps the theme of the proposal clear and easily readable. I use black text next to the flow lines to show what each cables function is. Furthermore, black boxes are also used to write numbers of ports to clearly indicate where certain cables needed to remain plugged into after cables were reorganized to fit our proposed product.

Blue is used to indicate the flow of the old phone system, and the hardware which it uses to get broadband and phone services to the office.

Red is used to primarily indicate the flow of data in the network, however green is used also to show the proposed topology to the client.

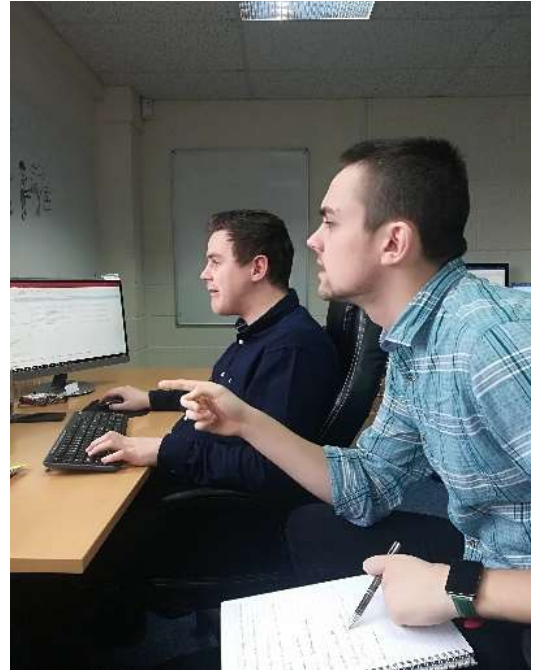
The use of coloured lines (/) on the specified hardware in different colours represents the hardware which will be kept post install. The reason for representing the hardware like this is so I can communicate clearly to the client which hardware will become redundant post installation and what will be replaced with our proposed system.

FACE-TO-FACE – COLLEAGUE / WITNESS STATEMENT

Communication can also be conveyed in person by speaking to someone directly, by communicating in this manner you can portray emotion and tone physically with the use of facial expressions, pitch and tone modulation in verbal communication, hand gestures and sign language.

The photos shown are me speaking to my colleague Connor, while referring to notes, and directing him where changes need to be made with the product I am delivering to a client, in correspondence to my notes, I was implementing an IP to MAC Bind on a printer.

The photo shown on the right is myself and my colleague highlighting an issue I noticed with the printer not being mapped to an IP address via its Mac, you can see we both acknowledge this and communicate to each other that there was an issue using negative facial expressions, verbal communication and hand gestures.



The photo shown on the left highlights me identifying why the IP/MAC Bind isn't working and informing Connor on how to resolve it, highlighting where the issue can be rectified and communicating with him with positive facial expressions such as smiling, I used verbal communication to confirm the resolution and pointing with my hand to provide further in-depth confirmation of my explanation and direction for the project.

Here is the witness statement linking to the process.



Unit 1-1 Witness Statement

CULTURAL AWARENESS

It is key to be aware of other cultures when communicating with individuals or groups, no matter what method is used to communicate. It is important to exercise sensitivity towards colleagues and customers alike to present respect to those whom you are communicating with. It is key to not be offensive or insensitive towards others.

Some examples of things that should be identified before communicating with people are differences in:

- Religion: A person's religion is a staple point of their personality and forms a large amount about their beliefs. It is heavily important to not discriminate against another person's religion as this is extremely offensive to the person you are communicating with. An example of cultural awareness against religions would be in Islam, where it is extremely disrespectful to speak ill of The Qur'an to Muslims, Discrimination against religion is often seen as a hate crime.,
- Gender: Some cultures have genders which are nor male, nor female. There are now so many more genders due to the expansion of the transgender community. In most cultures it wrong to discriminate against someone else's gender and can also be considered a hate crime.
- Race: The colour of someone's skin should never be a topic of discussion in any environment, especially in a derogative and offensive manner as it quite simply is unacceptable.

In summary, I exercise cultural awareness with all people I interact with, so I can ensure I am communicating effectively with my colleagues and clients. I do this to make sure I am not offending my peers and people I speak to.

Unit 1.2: Demonstrate and compile three different forms of written professional correspondence

Written professional correspondence can come in multiple forms, it can be represented in different ways that can convey the information clearly in the way it is intended to be, but also in a way that is relevant to the subject and target audience.

E-MAIL

I use e-mails daily within the workplace, I use them to receive information from suppliers, clients, support assistants and so on, I also use them to convey information to the client regarding the status of their order or service. When communicating with clients I predominantly use emails to leave a communications thread which holds information such as the full conversation between us and the client, the thread is stored for referral later down the line when I am processing the clients order or request, so I can analyse the thread for the key language which I identify as important for the project's delivery.

In emails I use a formal address to ensure appropriate communication with clients. When I am handling non-technical clients, simpler non-technical language is used to convey the functionality of a product in a way that is easy and simple to understand, I tend to restrict using technical terminology to just the recipients who understand it e.g. technical support representatives, business IT admins.

When addressing clients, suppliers and anyone else from the Office@hivecommunications.co.uk email address, I always begin and end with formal address as shown below:

Good Morning/Afternoon Name

I hope you are well, and you are having a nice day.

I also end an email with formal language and a signature to present professionalism, below is an example of how I have closed an email to a client:



As you can see with the use of welcoming and positive language such as

'If you need anything else at all let me know'

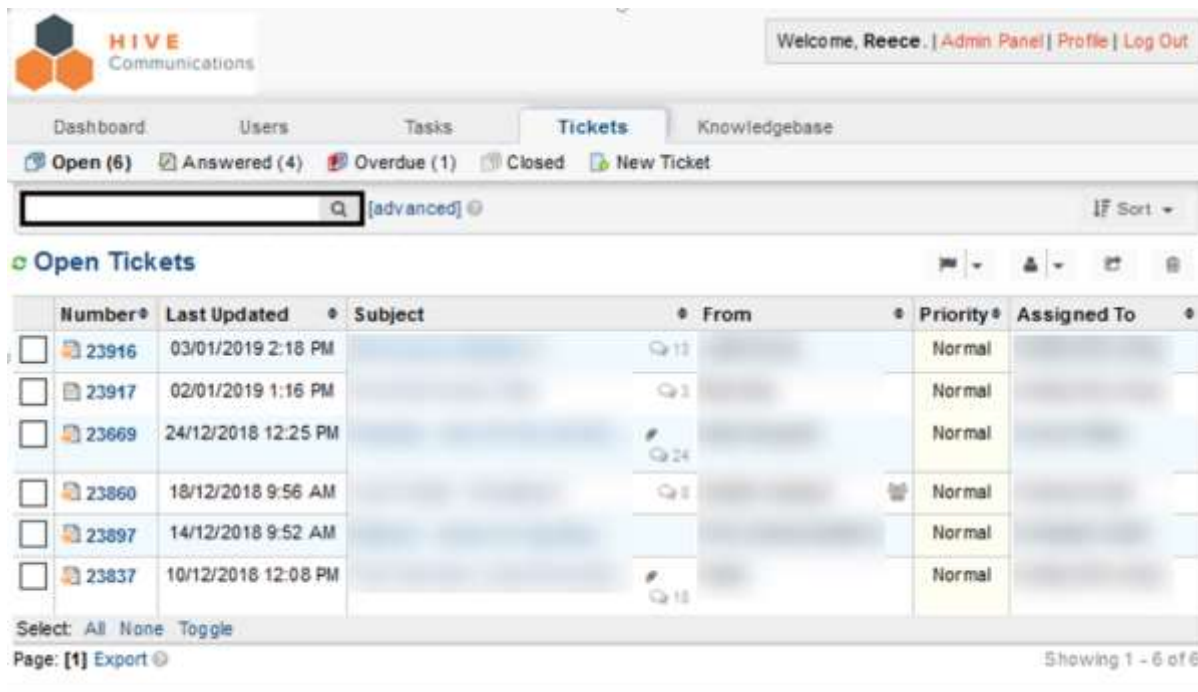
'Have a lovely afternoon'

You can see that the style of language used is formal, welcoming, and positive to read, this makes the target audience feel comforted in the sense they have someone in IT support who is willing to help and be there, at the same time as remaining professional.

Furthermore, this also abides by the organizational procedure of sending written correspondence with relevant and accurate signature material, to highlight what I distribute in our communication as legitimate and formal.

SUPPORT TICKET

Hive use a web based self-hosted piece of software called OSTicket to communicate with the client when they have a request or issue that they need attending to with their product, tickets are organized by numbers, so I can refer to them in future if an issue ever reoccurs.



The screenshot displays the Hive Communications OSTicket web interface. At the top, the Hive logo and 'HIVE Communications' text are on the left, and a user greeting 'Welcome, Reece.' with links for 'Admin Panel', 'Profile', and 'Log Out' is on the right. Below this is a navigation bar with tabs for 'Dashboard', 'Users', 'Tasks', 'Tickets' (which is active), and 'Knowledgebase'. A status bar shows 'Open (6)', 'Answered (4)', 'Overdue (1)', 'Closed', and 'New Ticket'. A search bar contains the text '[advanced]' and a 'Sort' dropdown. The main section is titled 'Open Tickets' and features a table with the following columns: Number, Last Updated, Subject, From, Priority, and Assigned To. The table lists six tickets, all with a 'Normal' priority. Below the table, there are links for 'Select: All None Toggle', 'Page: [1] Export', and a status 'Showing 1 - 6 of 6'.

Number	Last Updated	Subject	From	Priority	Assigned To
23916	03/01/2019 2:18 PM			Normal	
23917	02/01/2019 1:16 PM			Normal	
23869	24/12/2018 12:25 PM			Normal	
23860	18/12/2018 9:56 AM			Normal	
23897	14/12/2018 9:52 AM			Normal	
23837	10/12/2018 12:08 PM			Normal	

The style of language used to communicate with the client when using the ticketing system is as formal just like when I communicate via email, the only thing I do not include is the email signature as that takes up space on every response of the ticket, making it easier to scroll through a ticket to find the information needed.

The use of the Hive logo at the top of the interface communicates to the users they are on Hive Communications support and not somewhere else receiving support from an unfamiliar source.

WELCOME DOCUMENT

The welcome document is a document made by Hive, adjusted recently by me to look more professional than it already did, I provide this to the client when the scope of the project is completed, and the product is delivered and put in place for them. In this document is their full specification of their order with the details they require to interact with the product they have purchased.

To convey this information clearly, I slightly redesigned the current welcome document to show the clients data in a structured and sometimes tabled form, so anyone who reads the document can scan down to find the section they need to extract the data they require. The orange tables clearly show each form of data in columns while the quantity of people who require the data is represented in rows.

The yellow highlighted sections indicate important credentials, while the blue underlined links are hyperlinks to websites to either help them access their information, or login to relevant online portals to access their product.

This document also uses small but in-depth sentences to communicate the information simply to the client in terms they will understand.

I provide them with this information document, I also keep a copy ourselves instead of conveying the information orally, as then it is on record and can be referred to in case it is required later to be reiterated or resent to the client in the case the client loses this document, I also amend and resend it if there are ever changes which I know about that can be updated to keep our records for the client up to date.

HIVE Communications
Unit 9 Centre One, Lyander Way, Old Barn, Salisbury SP4 8BU
Tel: 01222 777226 Email: info@hivecommunications.co.uk Web: www.hivecommunications.co.uk

Thank you for registering with Hive Communications. The following detail is important, you should read this and record the information for use later.

VOIP ACCOUNT
Your VoIP account has been set up. To access the VoIP Control Panel, go to <https://www.hivecommunications.co.uk/infocentre/signin> and enter login with the following details:

Username	Password	Extension	DDI	Extension Password	Email Address (for password verification)
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]

Host Groups

Host Name	Extension	DDI	Extension Password	Email Address (for password verification)
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]

Voice Portal Extension: **555** Voice Portal DDI: **01222777999** Voice Portal Password: **1324567**

Sub clients

Extension	Password	Extension
[Redacted]	[Redacted]	[Redacted]

Download the "Hivemom Smartphone App" for [Android](#) or [iOS](#).

DOMAIN HOSTING CUSTOMER ACCOUNT
Your client account has been set up from where you can control any domain hosted with us. Should you wish to access the Domain Hosting Control Panel, visit <https://www.hivecommunications.co.uk/customer-area> where you must give the following details:

Login
Password: [Redacted]

DOMAIN ACCOUNT
Your domain of [Redacted] has been set up. The domain can be fully controlled as mentioned above. Other important details are:

FTP login
FTP password: [Redacted]

BROADBAND ACCOUNT
We have set up a broadband account for you as requested. Details are as follows:

Broadband / router

Account	Comments/Addresses
Broadband Username	[Redacted]
Broadband Password	[Redacted]
Public IP Address(es)	[Redacted]
Router Username	Client-Hive
Router Password	Linkpass generated password
Router Local IP	http://192.168.1.1
Router Public IP	http://192.168.1.1

Wireless Properties

SSID	Channel	Power	Mode	SSID
XXX	Abc123	[Redacted]	[Redacted]	SSID 123456789
YYY	Abc123	[Redacted]	[Redacted]	

Minimum contract terms are shown below. In every case, one month's notice of cancellation is required.

EMAIL ACCOUNT
We have set up an email for you as requested. Details are as follows:

Email Address	Username	Local Password
[Redacted]	[Redacted]	[Redacted]

PORT: 995 | Incoming POP3/Internet Mail Server: mail.hivecommunications.co.uk
PORT: 587 | Outgoing SMTP server: mail.hivecommunications.co.uk
SSL ON For incoming and outgoing connections
Outgoing server port should be set to "My server requires authentication"

To set up your email account, please visit <https://www.hivecommunications.co.uk/email/setting>.

WEBSITE
To access your email using website, please follow the relevant login link from our website <https://www.hivecommunications.co.uk/customer-area>. At the welcome page, you will be requested to submit your full email address and password.

Unit 1.3: Explain 3 types of communication styles to ensure cultural awareness and appropriateness for the customer is taken into account

ASSERTIVE

This form of communication derives from having high self-esteem, it is considered to be the most effective form and healthiest method to communicate. When being assertive, communication portrays confidence, it doesn't end up with manipulation. Assertive communication It is the midpoint between being too passive and too aggressive.

Assertive communication comes with its characteristics, some of which include; expressing emotions, being socially expressive, making decisions and taking responsibility for them, achieving a goal not to the detriment of others, asking for a target to be reached while acknowledging the fact you may get rejected, and being protective of my own rights alongside other peoples. Some non-verbal behavioural characteristics include maintaining eye contact, having an open posture which presents the feeling of relaxation speaking in a medium level volume, pitch and speed.

SUBMISSIVE

The submissive communication style focuses more on avoiding conflicts with others and instead pleasing them. Submissive people behave as if their needs are far less important than the needs of others, as other people may have more to contribute.

Some of the behavioural characteristics include self-exclusion from things, feeling like a victim, refusing compliments, avoiding confrontation, being apologetic and inexpressive, opting out of things, facing difficulty in taking responsibility for actions or decisions, and blaming others to defer attention from active decisions that you make.

Some non-verbal behavioural indicators as to if someone is submissive in their communication would be having a soft voice, not maintaining eye contact with people, make themselves physically alter their posture to seem smaller than others, and so on.

MANIPULATIVE

This form of communication uses techniques to influence and skew to the advantage of the person communicating. The communication portrays an underlying message to hint the other person towards an outcome in favour of the communicator.

Its behavioural characteristics can include controlling of others using deceptive or insidious methods, asking directly for a set requirement to be met, fake crying to achieve receiving an intended response, being cunning and making others feel obliged to do as the communicator wishes.

Furthermore, some non-verbal behaviour characteristics which are noticeable from a manipulative communicator are using facial expressions when speaking to portray an emotion which can mislead the addressed person/people feel inclined to agree. Another non-verbal behavioural characteristic would be modulation of the voice, speaking in an envious, patronizing manner, or even by adjusting the tone of voice is a technique used to manipulate the target.

Unit 2: Common types of security threat to an organization, its IT system and its data, with relevant methods and procedures for protecting it.

In this Unit I will be showing my knowledge of IT Security, and its relevant areas, IT security doesn't just cover the protection of data on your machine, it includes general physical security too, this can include protection of hardware and peripherals using stronger materials and surroundings. The security of a device or system depends completely on the measures implemented and the type of measures that are put in place, along with how they are implemented.

In this section I will be explaining the common forms of security threats and organization faces with its data, IT systems etc. and how it can be protected through a variety of methods.

COMMON FORMS OF SECURITY BREACH

Security breaches are bad and should be taken seriously when occurring, attackers can cause irreparable damage if they so desire, this can substantially affect the end user negatively if they do not have isolated backups or failover systems in place, below are some examples of security breaches.

Data Theft/Copying without permission

This can be an unnoticeable attack to the untrained eye, this form of security breach entails a person, whether they are a system user or not, to use methods to gain access to a system to extract data from it, often for personal gain. The person could use remote access software to gain access to the system to perform the extraction, they don't necessarily require physical access to the machine, especially if the systems security measures and implementations are weak.

Use of a system without permission

Similar to accessing the system to extract data without permission, this type of breach means the infiltrator uses the system whether it be remotely or physically. Either way, they have gained access which isn't permitted so it is considered a security breach. The authorized users will have no way of knowing they have had a security breach unless the logs on the accessed system are viewed, however without not knowing what to look for in the logs, unauthorized system access can often go unnoticed.

Damage/Destruction with intent

This form of breach consists of accessing a system without permission, to then either destroy data on the system in question or use the system to access other systems to destroy the data on the other accessed systems. This can also be viewed as a '**Denial of service attack (DOS attack)**'

This kind of attack can brake systems, prevent them from turning back on, cause them to lose data, and so on. This is the worst kind of security breach as it physically and negatively impacts the end user of the system as they are prevented from using the machine as they knew it.

DATA PROTECTION METHODS

In the modern technological world, there are hundreds of methods in which even someone with very little understanding of technology will be able to apply measures to their system to protect themselves from security breaches. Below are some of the methods people implement.

Virtual

Virtual data protection methods are controlled and managed via interaction with the system and its configurable options/settings, these alter and manage the functionality and availability of resources and features the end user is permitted to use, these are stated by the user with elevated permissions who implemented the configuration and permissions, this user is commonly known as an administrator.

BitLocker

This Windows based encryption software that is implemented into Windows allows a user to encrypt storage devices, including the storage device that Windows is running on. You can encrypt the storage devices with several encryption methods, some stronger than others, but generally the encryption methods shown in the photo on the right are very strong. To use BitLocker, you must have an eligible version of Windows, generally Pro or higher.

AES-CBC 128-bit (default)
 AES-CBC 256-bit
 XTS-AES 128-bit
 XTS-AES 256-bit



Newer computers with a TPM Module will be able to take advantage of hardware verification features to allow the PC to boot as normal without asking for BitLocker credential verification, this is a positive and a negative due to the fact that you have your data encrypted without having to enter information to verify you're permitted to access the data, however having a user with a password is key to maintaining the inaccessibility of your data to external attackers. The lack of manual verification can be negative if you forget or misplace your recovery key and password, so be sure to back them up to safe places.

On the other hand, older PC's without a TPM, they can still utilize BitLocker, but users must provide a passcode or USB key with the credentials to boot the BitLocker protected system drive. This is considered a 'soft lock'. Overall BitLocker is an incredibly secure method of encrypting and protecting your data.

Antivirus

Antivirus software is imperative to system protection as it protects the system in a multitude of ways.

- Firewall and network protection: This enforces rules which allow or deny traffic onto your PC, allowing select connections through your network to your system will prevent unauthorized connections from reaching your system.

- Real-time protection: Live, ongoing scans to the system which analyses incoming downloads, executed files, websites (Browser protection) etc.
- Memory Analysis: This allows the RAM to be scanned for malicious code
- Ransomware protection: Protects your files from being altered by unrecognized programs.
- Core Isolation: This allows protection of the core parts of the computer by using virtualization-based security.

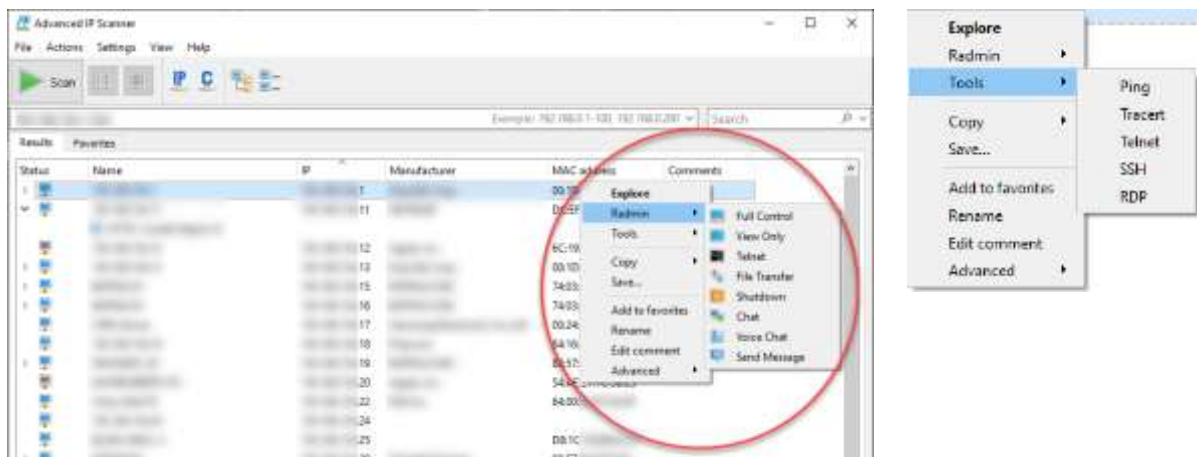
The above-mentioned features of antivirus software and many more (depending on OS and antivirus selection) are key to protecting an IT system online and offline.

Wireshark

This useful tool can be installed on numerous OSes to monitor and capture live network traffic, it can be isolated and traced to identify who or what is on the network, when data is flowing, where it is going to, and so on. This depth level of analytics allows people who understand the captured traffic to pinpoint information and its trace, this is useful because it can allow attackers to be identified, it can highlight when unauthorized content was moved through the network.

Advanced IP Scanner

This is another useful but simpler tool which allows people to see what devices are on the network, and with its partner software Radmin Viewer, numerous network analytical tools can be used to communicate with and control other systems. Below are screen captures of its features.



The effects of configuring security efficiently and preventing breaches

It is imperative to maximize security and to implement measures appropriately, so systems are protected and function correctly. Using the above measures in conjunction will maximize security and allow users to feel safer when using the system. Most modern systems warn the user when the security measures aren't enabled, prompting users to implement security features to lock down any possibility to let threats in.

MFA (Multi Factor Authentication)

This is a protection method which requires a user to verify they own the account they are logging into by other means than just their password. On services such as Google or Office 365, after entering the password for the account, the user is greeted with extra methods in which they can also verify a sign-in, every service has different methods but also some are also globally accepted they are;

- Access Codes: Uniquely generated numeric codes which are only usable to sign into the account they belong to

- Device Verification: This uses another device i.e. Phone or tablet, to verify the sign-in, however the account you are logging into must be signed in on the other device to use it as a verification method.
- SMS / Phone call verification: This method generates a code over a text or phone call which
- Authenticator App: This is an app which generates a 6-digit code every 30 seconds, meaning you generate the codes when you want to login, this is a very secure method.

Overall the methods are extremely useful when it comes to securely logging into services which contain sensitive data.



Permissions

There are three common permission types in IT, they are user, group and file.

Simply put, when specifying the permissions of files, on most systems you can state which user groups or individual users are permitted to read, write and execute files/programs, this is implemented to prevent basic system users from accessing admin level features and files, it is also done to prevent unknowing or knowing people from deleting or breaking the system itself, or any other sensitive data for that matter.

Some of the systems in which I implement such permissions include Computers (Mac, Linux, Windows), Buffalo NAS' and Office 365 Users.

User permissions are a set on an individual basis, anyone with the same user type has the same permissions allocated to their user as any other user, unless specified directly depending on system type. (e.g. Windows: Administrator, Standard User). Groups on the other hand have permissions set on a level where any user part of that group will have the same permissions. (Admins, Moderators, Users, Guests). File permissions are stated on a per file basis, this states which users are allowed access to it on multiple levels, those levels are read, write, execute.

Physical

These are measures put in place which physically can protect users from unauthorized access to a system, monitor access without directly being attached to the system, and restrict visibility of the system if you are not positioned correctly.

Access control devices

Using physical media for account access verification can be a huge benefit to a system as it requires users to be physically present for any files to be accessed, the downside to this is that if these hardware measures fail then an alternate verification method will need to be put in place, alternatively these systems can reduce security if the required access credentials are spoofed or stolen and used without authorization.

Some physical access control devices include fingerprint/retina scanning, smart cards, key fobs or Bluetooth range detection which identifies if the user is away from the system with another device that they paired with the main system.

CCTV / Motion Detection Systems

This is perfect in any scenario with IT, this allows system owners to view physical in real life footage of their systems and premises, with this the user can identify if anyone has had physical access to systems when they shouldn't have, and (dependent on the scenario) will be able to narrow down what possible devices or people may have accessed the system without authorization.

Screen Privacy filters

These are physical attachments for monitors which allow the users monitor's viewing angles to be reduced to narrow the field of view on the monitor, this highly reduces the ability of anyone to snoop over your shoulder so to speak and be able to read the data you are viewing. The benefits of these are that they can prevent data theft by reducing the viewing angles of a monitor to only someone sat directly in front of it.



Visual hackers are kept in the dark.

Unit 2.1/2.2: Organizational Security Processes, Policies & Legislation

At Hive there are numerous processes which I follow and abide by to maintain a general work practice which helps us achieve the same goal in fixing products & services to then deliver them to the client, to the specification we promise them to be. Below are some examples of our policies along with where and how Hive stores them.

PROCESSES

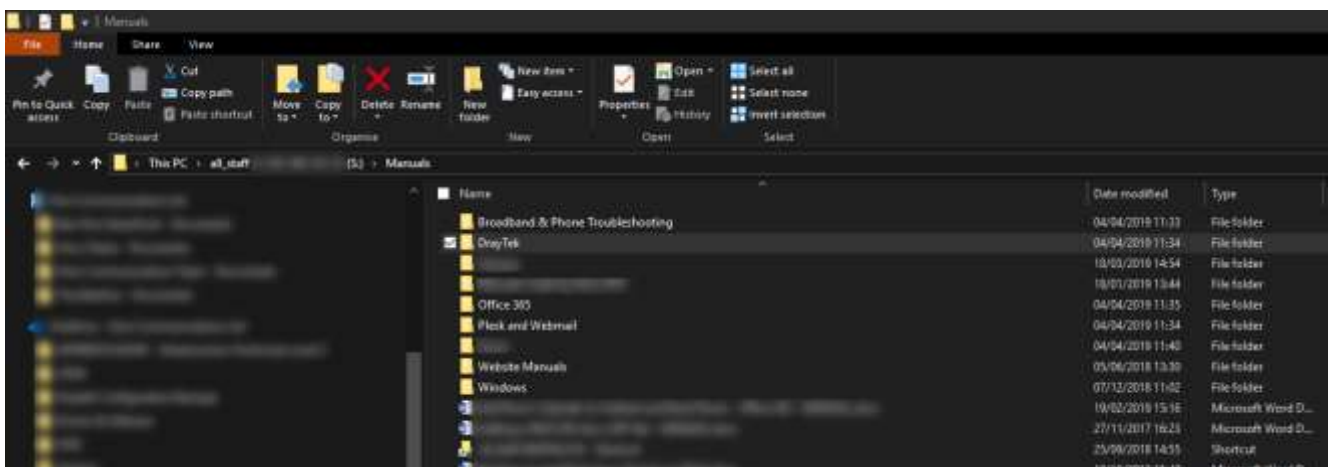
Manuals

Internally at Hive we produce, use, and often redistribute our own manuals. The business processes that Hive make manuals on are not redistributed, however they are made to clearly outline the format in which general reoccurring tasks are processed, these can be tasks like broadband orders, generating passwords and how they are stored, computer naming, admin account credentials, VoIP system orders, and so on.

The manuals are stored in Hive headed documents on our NAS (S:\Manuals).

Customer manuals are stored here also, it is useful having them in the same place, so they can be referred to at any time and edited if needs be. The Hive headed paper mentioned prior can be seen in use in my 1.1 Communication work submission.

Majority of these manuals are user friendly, step-by-step guides which are designed in a way we collectively deem redistributable to clients directly, or even in the near future, place on the website.



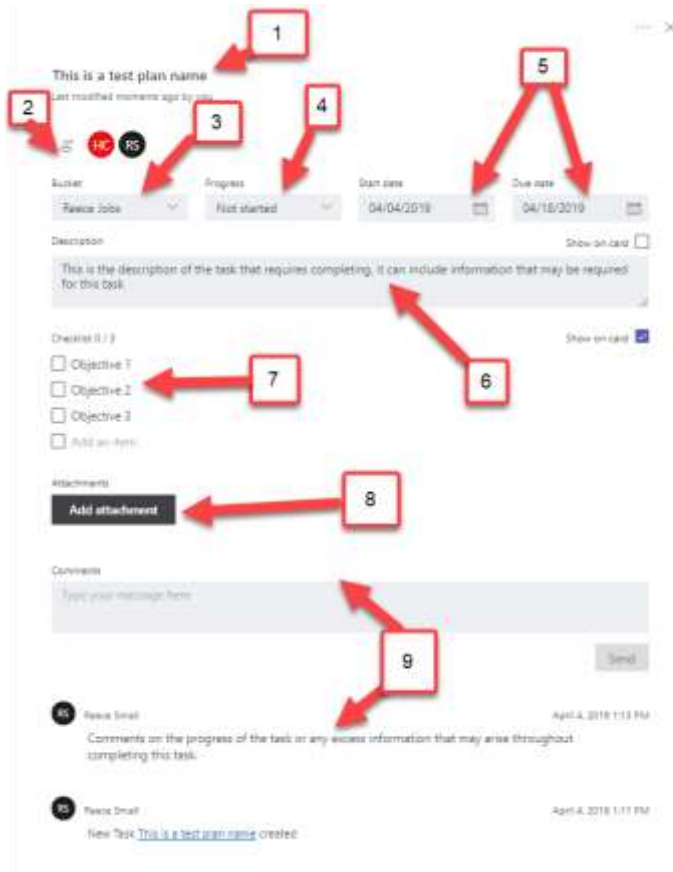
Verification from client

In cases that our suppliers require authorization to proceed with work that needs a third party to handle, i.e. BT Open Reach engineers. I would forward the authorization check to the client who needs the work, I would get them to clarify their availability, confirmation of charges, and contact details. Without this I can't proceed with the work, if I were to proceed without direct permission and the supplier requires payment for work, I cannot pass on the charges to the client as they haven't declared they would accept any possible charges.

Microsoft Planner

Planner is where I predominantly plan the processes and order of events in which I will progress with a client order, this is really useful as it helps us ensure that all steps are completed with evidence to refer to in the case any issues arise. Below is an example of a plan I would make.

1. Planner Task Name



2. Which Users are 'Collaborators', who are responsible for the progression of the task.
3. Which bucket the task is in, our primary Planner is called Internal tasks, we have our own buckets with our outstanding jobs in them.
4. Progress: Not Started, In progress, complete.
5. Start and due date
6. Description of the task
7. Objectives of the task
8. Attachments to task: URL, file, SharePoint link.
9. Comments on the task
10. Category of the job.

POLICIES & LEGISLATION

Passwords

When it comes to passwords, there are several policies which we follow depending on the service the password uses, all policies are stated below:

At Hive we store all our frequently used services in LastPass, a password storage and organization software which allows you to search through and view all your passwords using one master password, it uses **256-bit AES encryption** which is very secure, some of the services I organize and save passwords on include:

- Office 365 Hive admin user account for clients
- DrayTek/Cloudtrax Access Points and Routers
- Online Software and Licenses (GoToAssist, SnagIt, Remote desktops for CRM, Ticketing system, VoIP Control Panel)
- Supplier or reseller accounts Hive make purchases and orders through
- Our Plesk Server
- Office PC Logins, Client PC Hive Admin logins
- Buffalo NAS' Admin Logins

On the services we provide we do **NOT** store passwords for users; this includes all passwords for client's user accounts and services they access unless it is software, in that case Hive will provide for them the software.

I randomly generate passwords using LastPass' generator feature, you are given mass customization with the options on how long and complex your password is.

Expanding on this I use the 2FA feature (Two factor authentication), to verify login's to LastPass, this maximizes security by demanding a second form of verification to permit a login session to LastPass, furthermore the LP session's IP address is logged to prevent rogue people accessing your passwords from another location.

When I provide clients with initial passwords either over email or in their welcome document, I advise them to change the provided password to something secure, using a multitude of characters ranging from upper- and lower-case letters to numbers and symbols. For most services we provision, I push for the user to change their password at first login which takes the requirement for us to prompt, but I still state to change passwords anyway as it is good practice to for the sake of data protection.

Employee departure procedure

This is a checklist document which highlights all the services a member of staff has access to which are admin level or lower, along with the accounts and services setup in the name of the employee. All associated services credentials are handed over to management, where they extract any required client data, then delete their accounts after being backed up.

Upon departure the departing employees' credentials are changed to prevent the user from logging back in to any services immediately after leaving, any admin passwords to major services are altered and saved to LastPass, this means the password change doesn't have to be announced and credentials are seamlessly altered without question allowing continuation of work within the office.

I cannot provide a copy of this document as HR are the only people with access.

Privacy Policy

As one of my internal tasks I was requested to review and amend the Privacy Policy of the Hive Communications website, this entailed checking the policies that I follow when it comes to capturing, storage, sharing, and backup of user data when they are interacting with the content on the website. The policy can be located here:

<https://www.hivecommunications.co.uk/privacy-policy>

All of the content in the policy is in compliance with GDPR, as I follow the processes stated in the policy, it covers how I am efficient with cleaning and removing data after a set period, I do this to make any potential risk of user data being taken minimalized.

PRACTICAL PORTFOLIO PIECE: Apply security measures & Monitor security procedures (Unit 2)

Demonstrating how to securely connect a minimum of two different types of devices, to access the organizations network services in accordance with organizations policies and procedures (Unit 3)

The primary focus of the following piece is to build a network and set up systems to function as per stated requirements. I am building from scratch a network to function for a client per their request.

SCENARIO

We had a new client who is a one-person business, they required the following:

From: [REDACTED]
Sent: 14 January 2020 12:20
To: Hive Communications <office@hivecommunications.co.uk>
Subject: Re: IT Help required

Good Afternoon Hive,

I am wondering if you can help me, I am a small business owner and I am looking to setup my new office and some of my current hardware to help with my work. I have a brief techy background but I am sure you will be able to help iron out all the things I need I require below, thanks.

- I have a Buffalo NAS I need setting up on my laptop so I can store a backup of my computer files, it connects over the local network I believe
- I need a new router as my current one doesn't allow guest networks, I intend to have people come into my office and use the WiFi but not be able to access my Buffalo or computer etc.
- I have Office 365 but I am paying for Business Premium, I cant work out how to get the apps on my machine, I hope you can help. I use OneDrive
- My Norton licence has expired so I need your recommended antivirus (preferably a free version of the software for now as I like to try before I buy when it comes to software)
- Occasionally when I am out of office with my laptop, it would be convenient to be able to access the Buffalo from wherever I go. I was told a VPN should be the way to go with that?
- My friend set up a Last Pass password manager for me as I am always forgetting passwords so I need to access that on my phone and computer
- My phone needs setting up to use the Office 365 apps also.

I look forward to hearing from you as I am eager to get setup. Please provide me with a quote for this kind of work and let me know if you need anything else from me. Thanks.

Kind Regards

Paul [REDACTED]

From this I gathered they required:

- Office 365 setup on PC and Phone
- New router with 2 isolated Wireless Networks & 2 LANs
- VPN Profile on laptop to use while away from office which connects to office network
- Buffalo NAS setup on network, mapped on laptop
- Malwarebytes Antivirus Free installed on Laptop
- LastPass app setup on laptop (in Chrome) and on Mobile
- Office 365 App installation on computer and mobile

With these requirements identified, we confirmed with the client the cost of the work and what needed to be done. With that in mind we sold them a DrayTek 2830n and the cost of all the setup time. I went on site to where the router was installed already in the cabinet, it just needed configuring. The Buffalo was plugged into the router already and was getting an IP address from DHCP.

All the other software was accessible online to install.

PERSONAL NOTES PRIOR TO PRACTICAL

I personally would have used 1 managed switch if I had access to it for this build, this way I could have more devices connected to the 2 LANs I made, allowing a true demonstration of what a working isolated networked environment would look like.

I use the Google DNS 8.8.8.8 and 8.8.4.4 as they are two known working DNS providers I have used with other clients.

The switch would be for wired networking for the users, while guests would predominantly remain on Wi-Fi, they could still gain cabled access to the Guest LAN if required. This is because I would also use a newer router such as a DrayTek 2862ac which allows better VLAN, LAN and Strict IP Mac Binding, meaning I could create a scenario where if a device attempts to join the network, and it is not on the Strict bind list, it automatically joins the guest LAN.

I will complete the work in the following order:

- 1) Network setup
- 2) Computer Setup
- 3) Phone Setup

IN PRACTISE

1) Network Setup – DrayTek 2830n

To begin I will setup my network with the **DrayTek 2830n**, to prepare for the devices I will have on the network. I log into the router and begin by setting up the internet connection.

WAN Setup

For the WAN setup I used a routed IP from a range already available on the broadband line, I applied the relevant subnet mask in accordance with how many IP addresses there were assigned to the internet line.

LAN Setup

LAN1, VLAN0 – 192.168.35.1
(Default Gateway)

- Subnet /35
- **192.168.35.10-250**, Pool 240 devices, DHCP

LAN2, VLAN1 – 192.168.2.1
(Default Gateway) - ISOLATED LAN

- Subnet /2
- **192.168.2.10-250**, Pool 240 devices, DHCP

I have used two different subnets to isolate the traffic between user and guest devices, /35 is the user network, and /2 is the guest.

Index	Status	DHCP	IP Address
LAN 1	V	V	192.168.35.1
LAN 2	☑	☑	192.168.2.1
LAN 3	☐	☐	192.168.3.1
LAN 4	☐	☐	192.168.4.1
IP Routed Subnet	☐	☑	78.33.1

VLAN Setup

VLAN Configuration

	LAN				Wireless LAN				Subnet	VLAN Tag		
	P1	P2	P3	P4	SSID1	SSID2	SSID3	SSID4		Enable	VID	Priority
VLAN0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	LAN 1 ▾	<input type="checkbox"/>	0	0 ▾
VLAN1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	LAN 2 ▾	<input checked="" type="checkbox"/>	101	0 ▾

In the image shown, I have set the VLAN's up in a way where 2 LAN's are active.

VLAN0 uses subnet **LAN1**, so all traffic in ports 1, 2 and 3, and traffic on SSID 1, 3 and 4, goes to everyone who is connected via LAN1, these would be users.

VLAN1 uses subnet **LAN2**, so all traffic in port 4, and traffic on SSID2, goes to everyone who is connected via LAN2, these would be guest users.

SSID 3 and 4 are disabled so these tick boxes don't matter.

The VLAN tag is used as an identifier number for the data packets to route to the correct VLAN, this predominantly comes into play when you have a network with 2 or more devices transmitting data through one ethernet cable.

Wireless LAN Setup

For Wireless LAN, I setup 2 SSID's. One for Users and one for Guests, the guests will remain isolated when people connect to the network, meaning they cannot communicate between other devices on the same Wi-Fi. Both networks are encrypted with a password. Examples of passwords I use are below:

SSID1: **gMs!W1fi1***

- This password is secure enough as it incorporates upper- and lower-case letters, numbers and symbols

SSID2: **GMsg*W1fi35!**

- I made this password secure but easier to type out for most devices as it makes it user friendly for guest users to access a secure network, however if a malicious user enters the guest network, due to the fact they are isolated from other users when connected, everyone will be protected on the network. Furthermore, the symbols used are different, so hackers cannot predict the password by mimicking the guest one.

☒ **Enable Wireless LAN**

Mode : Mixed(11b+11g+11n) ▾

Channel: Channel 11, 2462MHz ▾

	Enable	Hide	SSID	Isolate Member	Isolate VPN
1	<input type="checkbox"/>	<input type="checkbox"/>	_____	<input type="checkbox"/>	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____ Guest	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Mode: Mixed(WPA+WPA2)/PSK ▾

VPN Setup

This VPN profile uses a secured password and a username to grant access to the selected network on the router from a remote location's internet connection, using the credentials and the public IP address of the router.

Of the VPN options available, I select PPTP as the primary encryption method, it is a secure connection method for a

VPN, it becomes weaker if poor credentials are used, by poor credentials I mean weak passwords and generic usernames. The password I have used is 16 characters long with a variation of upper- and lower-case letters, numbers and symbols, this maximises security as the credentials are more complex. When reviewing the user on the router, the password is cut down in dot format to censor the actual credential.

IP MAC Binding Setup

The following 2 devices are bound by their MAC Address to a specified IP as they are devices intended to be on the network which require regular user access. By binding the MAC address to an IP, I can clearly organize and identify devices on the network, and even prioritize their usage over other devices.

If I had a newer model DrayTek, I would enable strict IP binding to MAC addresses because the newer models allow select LANs to be strictly bound, this would mean staff machines would have to be manually bound to an IP on LAN 1, then all other machines automatically join LAN2 if configured to do so on the VLAN Screen.

Bind IP to MAC

☒ Enable ☐ Disable ☐ Strict Bind

ARP Table		Select All Sort Refresh		IP Bind List		Select All Sort	
IP Address	Mac Address			Index	IP Address	Comment	
192.168.35.2	10- [redacted] 32			1	192.168.35.2	Buffalo-Mini	
192.168.35.12	E8- [redacted] A			2	192.168.35.12	User ([redacted])	

The Buffalo is mapped to 192.168.35.2

The User's system is mapped to 192.168.35.12

Router General Setup

With the current configuration shown, I am able to alter the accessibility of the management interface, making it available over the internet and over LAN. I have disabled auto-logout to prevent my session expiring.

System Maintenance >> Management

IPv4 Management Setup	IPv6 Management Setup
<p>Router Name <input type="text"/></p> <p><input checked="" type="checkbox"/> Default: Disable Auto-Logout</p> <p>Internet Access Control</p> <p><input checked="" type="checkbox"/> Allow management from the Internet</p> <p>Domain name allowed <input type="text"/></p> <p> <input type="checkbox"/> FTP Server <input checked="" type="checkbox"/> HTTP Server <input checked="" type="checkbox"/> HTTPS Server <input checked="" type="checkbox"/> Telnet Server <input checked="" type="checkbox"/> TR069 Server <input type="checkbox"/> SSH Server <input type="checkbox"/> Disable PING from the Internet </p> <p>LAN Access Control</p> <p><input checked="" type="checkbox"/> Allow management from LAN</p> <p> <input checked="" type="checkbox"/> FTP Server <input checked="" type="checkbox"/> HTTP Server <input checked="" type="checkbox"/> HTTPS Server <input checked="" type="checkbox"/> Telnet Server <input checked="" type="checkbox"/> SSH Server </p> <p>Apply To Subnet</p> <p> <input type="checkbox"/> LAN2 <input type="checkbox"/> LAN3 <input type="checkbox"/> LAN4 <input checked="" type="checkbox"/> IP Routed Subnet </p>	<p>Management Port Setup</p> <p> <input checked="" type="radio"/> User Define Ports <input type="radio"/> Default Ports </p> <p> Telnet Port <input type="text" value="23"/> (Default: 23) HTTP Port <input type="text" value="8080"/> (Default: 80) HTTPS Port <input type="text" value="443"/> (Default: 443) FTP Port <input type="text" value="21"/> (Default: 21) TR069 Port <input type="text" value="8069"/> (Default: 8069) SSH Port <input type="text" value="22"/> (Default: 22) </p> <p>TLS/SSL Encryption Setup</p> <p> <input checked="" type="checkbox"/> Enable TLS 1.2 <input checked="" type="checkbox"/> Enable TLS 1.1 <input checked="" type="checkbox"/> Enable TLS 1.0 <input type="checkbox"/> Enable SSL 3.0 </p> <p>External Device Control</p> <p><input checked="" type="checkbox"/> No respond to External Device</p>

I have strictly applied that only the Routed IP used to give the DrayTek internet, and LAN 1 Gateway are permitted to access to the network management interface.

On top of this, I would change the routers **admin** username to **rsadmin**. But I can't due to hardware limitations, I can't. The reason I would do this is because it prevents any potential hackers from attempting to login with the default username.

Bandwidth Management Setup – For Guest LAN

As shown in the photograph I have restricted bandwidth to 1mbps for every device on LAN2 (192.168.2.x), I have done this to highlight how guests on a network can be rate limited to prevent bandwidth hogging, this in turn ensures users don't suffer when countless people join the network.

By entering '0' in the field for limit specification, I have specified all devices on the user network have unlimited bandwidth to use, the reason why I have set it to unlimited is because the devices I will be configuring to be used on the network, will not exceed the bandwidth available.

Speed Test

The below speed tests of the network are from onsite hardware

Device	User Type	Connection Type	Download [Mbps]	Upload [Mbps]	LAN	IP Address	IP Assignment
Client System	User	Ethernet	74.87	19.22	1	192.168.35.12	Bound MAC
Client System	User	Wi-Fi	72.68	15.24	1	192.168.35.23	DHCP
My Laptop	Guest	Ethernet	1.02	0.95	2	192.168.2.15	DHCP
My Laptop	Guest	Wi-Fi	0.87	0.68	2	192.168.2.17	DHCP
Client Phone	User	Wi-Fi	74.12	13.02	1	192.168.35.21	DHCP
My Phone	Guest	Wi-Fi	0.92	0.88	2	192.168.2.19	DHCP

All tests above were done using Speed Test by OOKLA.

As you can see by the results, the devices on the Guest network were subject to the bandwidth restriction causing their speeds to peak at just under 1Mbps for both upload and download. On the other hand, users with no bandwidth limit were subject to reduced speeds depending on their connection type. Ethernet based connections were slightly faster than Wi-Fi in the download region but for uploading, depending on the connection method, the values changed substantially in comparison to Ethernet.

Conclusion to network

All devices on LAN 2 have no ability to communicate with devices on LAN 1, showing that I can successfully create a network where there are 2 LANs with differentiating restrictions and abilities. E.g. Bandwidth allocation, LAN isolation, Device Isolation.

Bandwidth Management >> Bandwidth Limit

Bandwidth Limit

☒ Enable ☐ IP Routed Subnet ☐ Disable

☒ Allow auto adjustment to make better use of the available bandwidth.

Default TX Limit: 1000 Kbps Default RX Limit: 1000 Kbps

Limitation List

Index	Start IP	End IP	TX limit	RX limit	Shared
1	192.168.2.10	192.168.2.250	1000K	1000K	N
2	192.168.35.1	192.168.35.254	OK	OK	N

Specific Limitation

Start IP: End IP:

☒ Each ☐ Shared

TX Limit: Kbps RX Limit: Kbps

Add Update Delete

☐ Smart Bandwidth Limit

For any LAN IP Not in Limitation List, whose session number exceeds 1000

TX Limit: 200 Kbps RX Limit: 800 Kbps

Note:

1. For TX/RX Limit, a setting of "0" means unlimited bandwidth.

Hardware & Software Setup

<p>Client Machine: OS: Windows 10 Pro x64 build 1909 CPU: Intel i5-3210M 2.5GHz, 2 cores, 4 threads RAM: 6GB Storage: 2.5" 500GB HDD Networking: Wired Ethernet + Wi-Fi</p> <p>I will be installing and setting up:</p> <ul style="list-style-type: none"> - Windows Updates - NAS Navigator – to locate the Buffalo - Office 365 Professional (Business Premium) - Google Chrome with LastPass Browser Extension - Malwarebytes Antivirus - Windows Defender Periodic Scanning also - DrayTek Smart VPN software 	<p>Client Phone: OS: Android 7.0 Networking: Wi-Fi</p> <p>I will be installing and setting up:</p> <ul style="list-style-type: none"> - Android Updates - File Explorer - Google Chrome - Office 365 Apps (Word, OneDrive, Excel, Outlook) - LastPass Password Manager - Malwarebytes Antivirus - Microsoft Remote desktop to access laptop
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2) User PC Setup – Windows 10 Laptop


The following video is of me setting up Windows 10 on a machine without an OS, this demonstrates my ability to install an OS to a machine with the correct settings for the user.



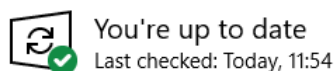
For this machine, to save time as it was a pre-setup laptop which the user already had their documents on. It had been setup past the user creation screen, connected via ethernet and now left at the desktop.

Windows Updates

These are critical to maintaining the security and stability of a Windows system. Not updating Windows can lead to an insecure and unstable system which leaves vulnerabilities open to attackers and viruses. To trigger Windows Updates from the desktop, I did the following on the target machine.

1. Go to  Start and type '**Windows Updates**' and press **Enter**
2. Click '**Check for Updates**'; or '**Retry**' if a previous update failed.

Windows Update



Check for updates

3. Then wait for the updates to install and in some cases ask for a reboot to finish updates.

After these updates are installed, I repeat the steps until it says '**You're up to date**'

Malwarebytes Installation

As the client doesn't want to pay for antivirus, I be using the free version of what we distribute to our clients.

Malwarebytes is Hive's go-to antivirus software we provide for people due to its effectiveness in removing threats. To install it I visit the following link to download it:

<https://www.malwarebytes.com/mwb-download/thankyou/>

After it is downloaded, I run the installer with admin privileges:

1. After selecting my language, I click '**Agree and Install**'.

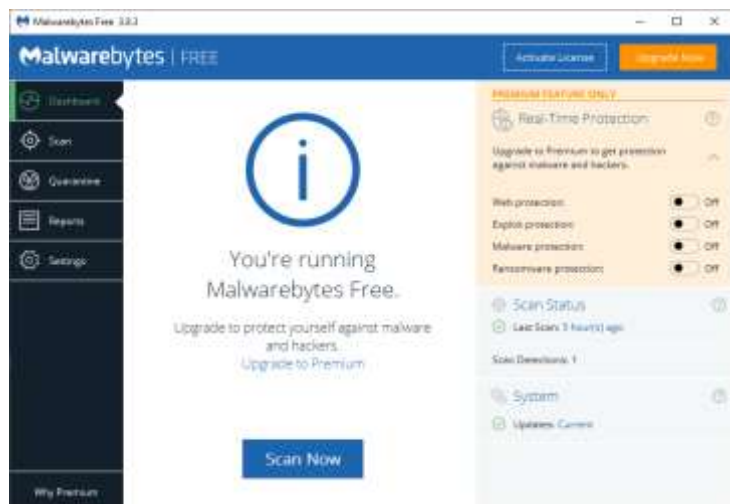


2. Upon finishing installation, the installer greets me with the screen to click '**Finish**'
3. Malwarebytes should now automatically open, if not, there is an Icon in the taskbar tray as shown here with the blue '**M**':



4. From this screen, antivirus scans can be triggered, I click '**Scan now**' to initiate a scan.

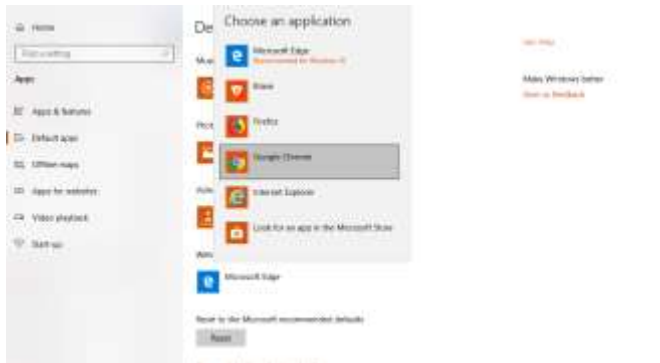
Malwarebytes sits on top of Windows Defender as an extra layer of protection, meaning that while Windows Defender runs real time scanning and detections for malware and other malicious content, Malwarebytes will focus on dedicated scans of the system to identify if anything slipped through the net so to speak.




Google Chrome Installation + LastPass Extension.

Chrome is not yet the default browser on the machine however it is one I recommend above all other browsers due to its compatibility with modern websites and ability to link applications as extensions, such as LastPass which gets added after the installation.

1. Download Chrome from: <https://www.google.co.uk/chrome/>
2. Run the Installer with Administrator privileges
3. When it launches Click '**Open Windows Settings**'
4. The following screen opens showing default apps, under '**Web Browser**' click '**Microsoft Edge**', then Click '**Google Chrome**'.



5. Now Chrome is the default browser, open <https://chrome.google.com/webstore/detail/lastpass-free-password-ma/hdokiejnpimakedhajhdcegeploahd> and click '**Add to Chrome**'.
6. After a few moments LastPass is installed.
7. Log in to LastPass by clicking  and entering the relevant login details, if the authentication is successful then passwords can now be accessed.

DrayTek Smart VPN Setup

The software is downloaded from: <https://www.draytek.com/products/smart-vpn-client/>

Once I finished installing it I setup the profile to connect to as shown on the picture. When the public IP address, username and password (setup earlier) are saved as a profile, it can be connected to, to establish a VPN connection. The VPN can only be connected to when the device connecting, is on a network that isn't the network that is being connected to.



When the connection is successful, the resources usually accessible on the LAN are available through the VPN, this includes the Buffalo and even the web interface of the router.

When the VPN drops it has an auto-reconnect feature to attempt to reconnect to the network to retain access.



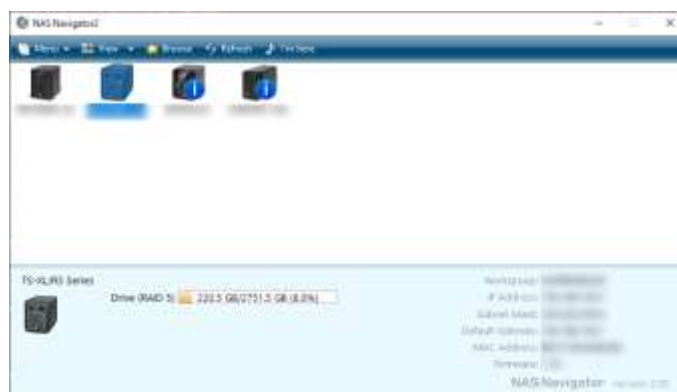
NAS Navigator Installation

This tool is used to discover and navigate the Buffalo Network drives on the network. It can be downloaded from:

<https://www.buffalotech.com/support/download>

When downloaded, open the relevant zip file and navigate to the NASNavInst.exe and run it.

When it has finished, open NAS Navigator, you will see the following (On Windows):



From here, right clicking on a Buffalo will allow the following options to be selected:

Browse Shares – Allows the user to view all available and browsable shares on the NAS, when one is selected, a user login prompt is required.

Settings – Redirects the user to the web interface to login to the admin portal to adjust settings.

Properties – allows adjustment of the Buffalo's IP address.

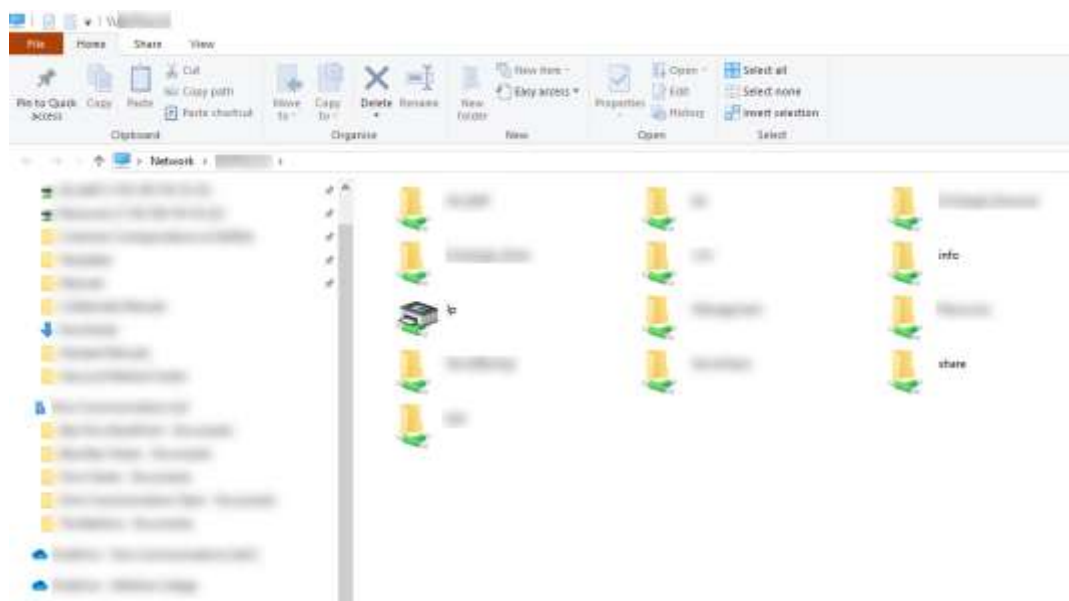
Map Share – Allows the user to map a select share

Disconnect share – disconnects the mapped share

I'm here – The buffalo will make a sound.

Browse Shares
Settings
Properties...
Map Share
Disconnect Share
Create Desktop Shortcut
I'm here

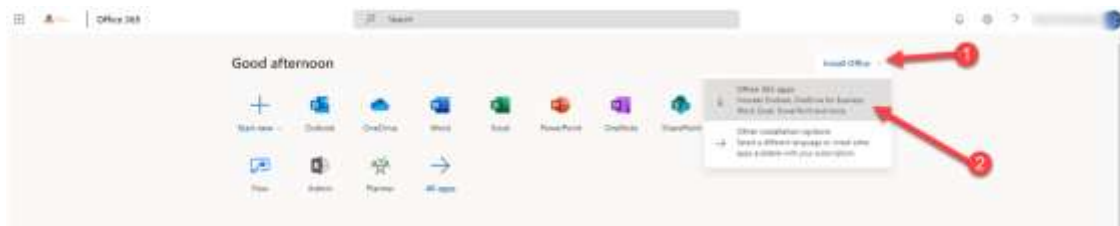
After logging into the Buffalo with the username and password of the client, the shares are displayed and mappable, as shown here:



Right click a share and click '**Map Network Drive**'. This then maps a drive. Files can now be explored in the share. This share is now mapped.

Office 365 Installation + Setup

When I log into <https://login.microsoftonline.com> with the client credentials, I am greeted with a screen as follows which is the clients Office 365 dashboard.



Select to install Office 365 Apps. Run the installer, and it will install the rest automatically. After it has installed, a user needs to be signed in. To do that, open **'Office'** from the Start Menu, the following will appear.

To login with the work account, the following steps need to be taken:



1. Click **'Sign In'**.



2. On this screen you click sign in to sign into the Microsoft account, click **'Workplace or School Account'**.



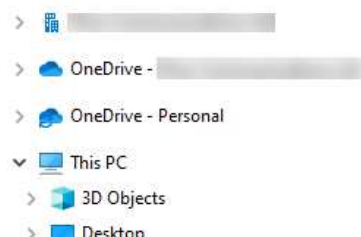
3. Sign in with your Work based Microsoft Account email address and password.
4. When you have signed in, tick the following and press **'Yes'**.



5. Then press **'Done'**. Office has now been signed into.

Word, Excel, PowerPoint and other Office Apps can now be opened, the apps will be licensed with the user. Now all the resources can be accessed on OneDrive and SharePoint, and files can be stored on the cloud, to be accessed on the go.

With all the computers resources set up, the mobile is the only remaining device to get setup for the client.



3) User Phone Setup

Screenshots will be taken from a RescueAssist recorded remote session

The users phone already has fingerprint scanning security and a pin for backup

Initially I need the applications on the device for me to setup the client resources, to do that I go to the app store for the device and download the following applications:

- Google Chrome
- Microsoft Word
- Microsoft OneDrive
- Microsoft Excel
- Microsoft Outlook
- LastPass Password Manager
- Malwarebytes Antivirus
- Microsoft Remote desktop

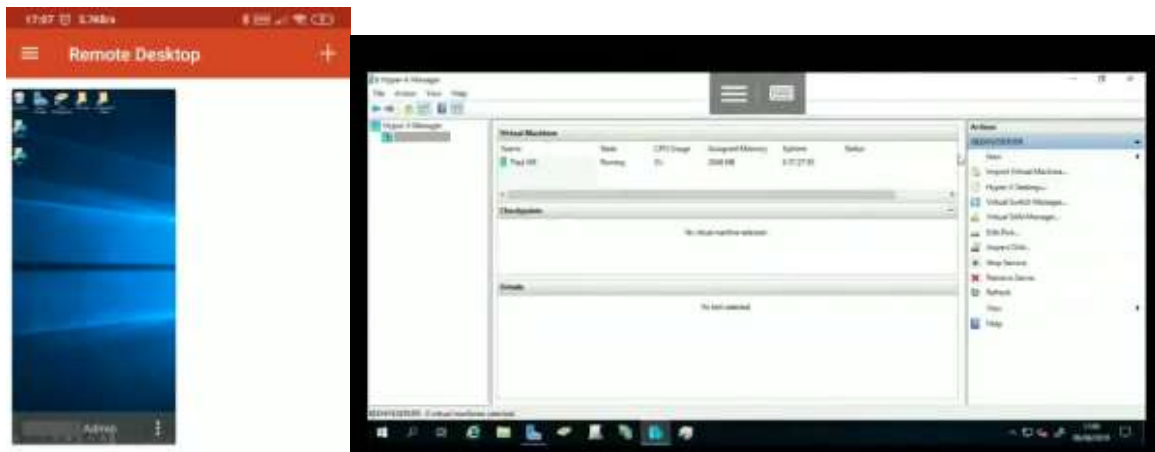
VPN Setup

On the mobile device I setup the VPN to the client's network as shown in the pictures below, this allows the local Buffalo and site computer to be accessed when the VPN is connected.



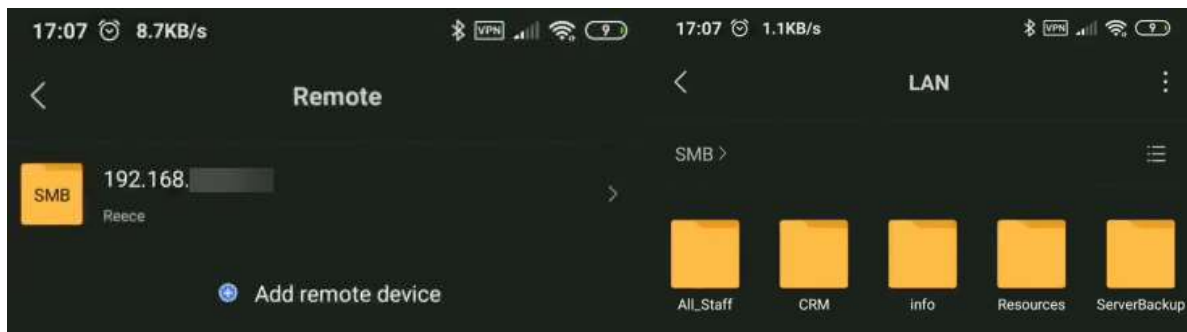
Microsoft Remote Desktop

As shown in the pictures, the computer can be connected to when it is in the office on the work network. The profile I added connects to the local IP 192.168.35.12.

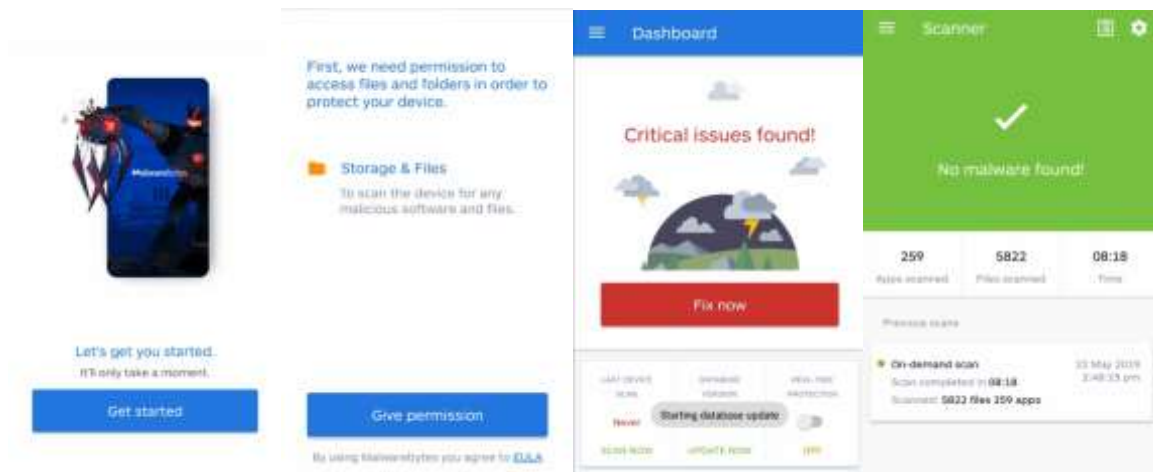


File Manager – Buffalo

Once connected to the VPN, the file manager on the phone can connect via SMB to the Buffalo shares. This is shown in the photos below:



Antivirus (Malwarebytes)

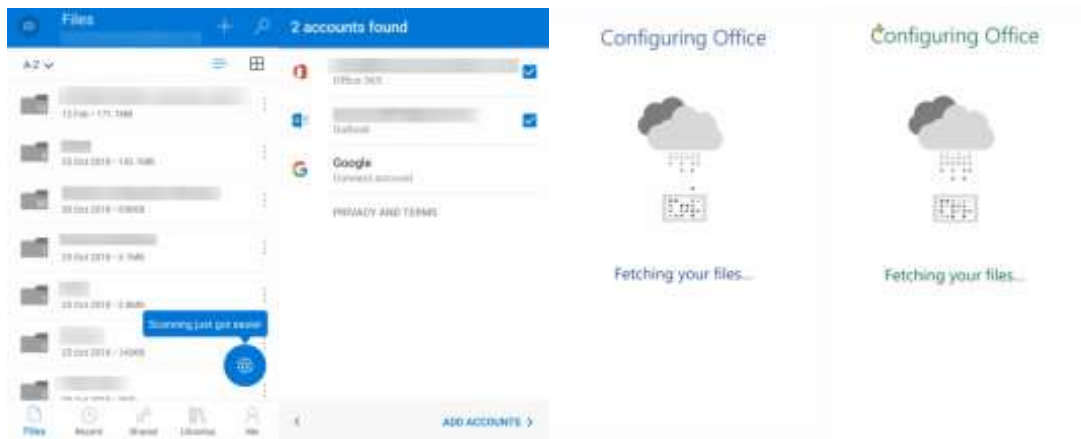


This will prove useful when it comes to maintaining general upkeep of the device and its performance, it monitors apps and ensures no rogue applications or processes are running on the phone. Furthermore, it makes sure the device isn't being slowed down by any intensive applications.

Web Browser (Google Chrome)

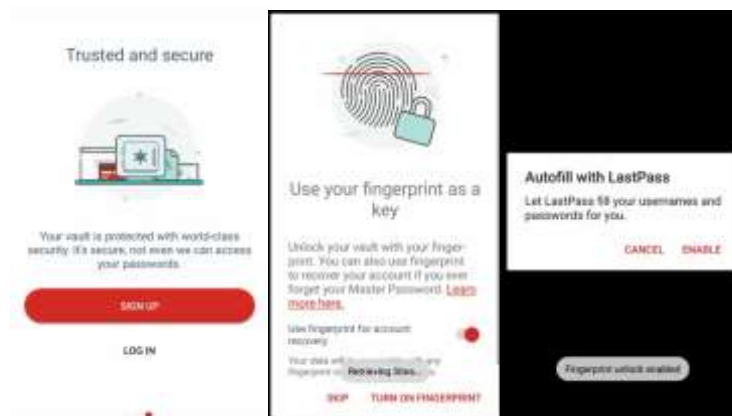
This browser comes built into most android phones and is available on Windows, Mac, and iPhone, it is extremely useful and always updated to maintain compatibility with modern websites and mobile web applications.

Office 365 (Word, OneDrive, Excel, Outlook)



All the Office 365 apps I will setup play an integral part in my day to day productivity within the client workplace. The apps I setup used the client's office 365 login credentials, the pictures above show the apps being setup to use the client resources.

LastPass Password Manager



With this client setup on LastPass, they can access passwords that they can access on their Chrome browser on their work computer. The configuration of the app allows it to autofill passwords on websites and apps, this makes it convenient for the client to login to their services more easily and quickly.

That is the end of the setup of both the phone and the computer on the client network.

Unit 4.1: Select and securely use three appropriate tools when working with and analysing data.

With the work you are about to read, I aim to cross over elements I mention to convey the interlinking some of the resources I use in our work environment, why I use the resources I use, and how I implement them to achieve an end goal of providing a service which improves the quality of experience our consumers have with their product.

The tools and resources I use all work together to unify the information and data stored on our cliental, this allows us to maintain a historic timeline of the work I have done, who did the work, and what the outcome was.

The three tools mentioned below are interacted with on a day to day basis, they are used to collect, manipulate the view, and simplify the data I am provided to analyse.

OSTICKET – TICKETING SYSTEM

This online software, stored and ran on our private webserver, allows us to obtain support tickets from clients or even prospective clients, in which they detail the problem they have in an issue summary, the can include relevant contact information allowing us to reach them on multiple platforms in the event one of their contact methods does not prove successful.

The server is hosting the support ticketing system has SSL allowing it to transmit data securely over HTTPS (Hypertext Transfer Protocol Secure).

New Incoming Tickets

When the client/customer creates a ticket and details their issue, or sends an email to Support@hivecommunications.co.uk, the contents will be emailed to our Office@hivecommunications.co.uk mailbox. I see this as an automated ticket email link that I can open to go straight to the ticket page. The ticket data/information that I am provided is then made simple, by us converting what needs to be done into a simple step based internal note on the same ticket, this then allows us to refer to shorter notes later on, which convey a clearer message so an understanding of what needs to be done can be referred to more quickly.

Actioning Tickets

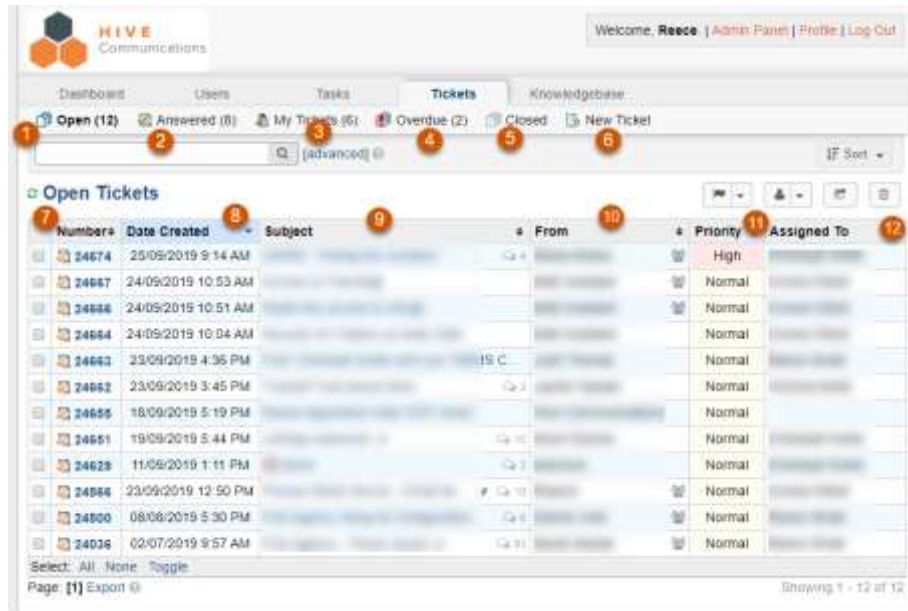
Following this, the ticket is then appropriately actioned (when required, either urgently or scheduled), it will be assigned to the relevant agent who can take on the case. In turn it is then also added as a task on Planner (More on this later). The assigned agent will then process the work, complete it, leave an internal note detailing the work that has been done and the time it took to complete.

Resolving Tickets

Once the client has confirmed they are happy with the completion of the work, the ticket is closed, with the ticket number, subject, resolution and ticket URL added to our Hive Communications CRM, on the companies tickets tab, this is so it can be referred to at a later date if I ever need to revisit an issue that may arise again for the client.

User Interface

The screenshot below is taken from the user interface of the ticketing system on the admin side. It has a very minimalistic interface which shows the support agent (me) the information they want and need to see.



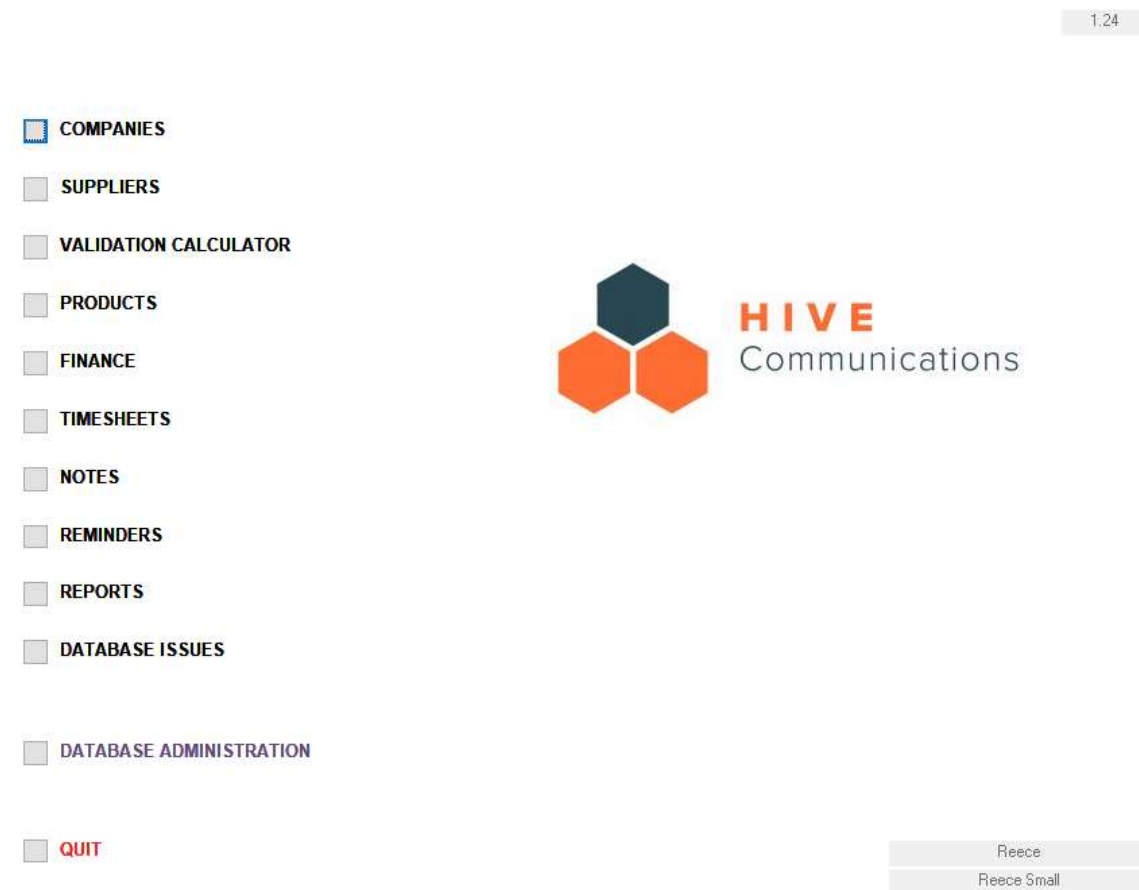
1. **Open Tickets:** This screen shows a list of all open and unanswered tickets to the agent.
2. **Answered Tickets:** This screen shows a list of all open and answered tickets which are currently being worked on.
3. **My Tickets:** This screen shows me which tickets are assigned to me.
4. **Overdue:** This screen shows tickets that are past the response time of 48 hours, indicating that neither party has responded on the ticket within 48 hours.
5. **Closed:** These are all our completed and closed tickets which are archived into our database, these can be reopened or reviewed at any time, allowing us to look over past resolved issues to remind ourselves of the solution I provided.
6. **New Ticket:** This screen allows the agent to create a new ticket for a client or internally, this way I can generate a client's issue into a ticket if they are detailing their problem over the phone.
7. **Ticket Number:** This is a unique identifier for the ticket which allows us to quickly navigate to tickets by entering their number into the search field, I store these on the CRM to refer to if I ever need to.
8. **Date Created:** This column displays what date the ticket was first generated, allowing us to get a quick analysis of how long the ticket has been open.
9. **Subject:** This column is key to showing us a brief description of the issue and sometimes even the company name, this depends on how clients use the field, some place the company name followed by the issue, and others just put the issue.
10. **From:** This field shows which client reported the issue, with this I can see the issue was reported by the specific employee.
11. **Priority:** This indicates what level of importance the ticket is and how soon it should be dealt with, this level also indicates the severity of a ticket, as highlighted by its colour behind the priority level.
12. **Assigned To:** This field shows which user the ticket is assigned to. New tickets will usually not be assigned to anyone.

In conclusion, OSTicket as a tool is extremely secure and useful when it comes to helping us analyse and resolve client issues. It's simple to use and minimalistic user interface allows it to be easy to understand.

HIVE COMMUNICATIONS CRM – MICROSOFT ACCESS

Our CRM is custom made making it perfect for managing the data which I am storing and referring to. Our CRM is stored locally inside our LAN on a NAS (Network attached storage), which I access with private Usernames and Passwords over SMB3 (a secure data transfer protocol). The NAS is on a strictly bound IP address which belongs to a LAN only other strictly bound devices can access; this prevents unauthorized devices accessing the NAS let alone the CRM data.

CRM Home Screen:



I use our CRM for multiple things, some of which are detailed here:

Billing

Hive bill our clients from the CRM, using the data me and my colleagues enter onto our timesheets. The billing team calculate which companies need to be billed for chargeable time, retainer hours and one-off/monthly products they have on their account. This then links into Sage (our billing platform).

Cannot provide examples due to sensitive data being in that screen.

Product Search

Using our products area, I can review and add products to our catalogue that me and the other staff can make prices for and provide to clients, this then gets verified by additional product codes being added to Sage. Using this screen, I can navigate our entire catalogue and adjust information if required, changes must be authorized by a permitted user.

ID	Priority	Sage Code	Description	Price	Cost	Price Variable	Discontinued	In Sage	Date Added	Date Edited
279		CALLCC	IC	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	01/11/2018
279		SPADH	IF	£215.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
287		VDPP5	IF	£1.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
337		VDPPC	IF	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
338		VDPPC	IF	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
339		VDPPC	IF	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
339		VDPPC	IF	£12.50	£0.00	<input type="checkbox"/>	24/04/2019	<input checked="" type="checkbox"/>	01/01/2018	24/04/2019
339		VDPPC	IF	£45.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
377		VDPPC	IF	£17.50	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	23/04/2019
338		VDPPC	IF	£45.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	23/04/2019
384		VDPPC	IF	£15.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	23/04/2019
234		VDPPC	IC	£119.00	£0.00	<input type="checkbox"/>	24/04/2019	<input checked="" type="checkbox"/>	01/01/2018	24/04/2019
233		VDPPC	IC	£271.00	£0.00	<input type="checkbox"/>	24/04/2019	<input checked="" type="checkbox"/>	01/01/2018	24/04/2019
333		VDPPC	IF	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
338		VDPPC	IF	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
379		VDPPC	IF	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
225		VDPPC	IC	£15.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
238		VDPPC	IC	£200.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
385		VDPPC	IF	£25.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	23/04/2019
385		VDPPC	IF	£10.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
337		VDPPC	IC	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
337		VDPPC	IC	£280.00	£0.00	<input type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	
336		VDPPH	IF	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	23/04/2019
333		VDPPH	IF	£0.00	£0.00	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	01/01/2018	23/04/2019

1. **Sage Code:** This is a unique product identifier which can be entered Sage to locate the product which gets charged on the bill. When looking at a company's one-off or monthly product, these Sage codes can be seen on their account.
2. **Description:** This is a short string which contains the full products name / model.
3. **Price:** cost to the client when charged on the company products.
4. **Price Variable:** this tick button dictates whether the price of the product can be adjusted when charged.
5. **Discontinued Date:** This is when the product is ceased from ability to be added to a client's company bill. The end date specified in the field enforces that the product cannot be seen after that date.
6. **In Sage:** This shows us if the product has been added to Sage
7. **Date Added:** The date when the product was added to the database
8. **Date Edited:** The date when the product was last edited on the product list

With the sheet above, I have full control over the analysis of the products Hive have, and which ones are active in comparison to discontinued.

Company Data - Client Product Analysis

With the companies screen I can load an entire company Hive provides a service for, I can view the broadband, VoIP, PSTN, one-off and monthly packages, websites, important logins, tickets, timesheet entries across all users, contacts, notes/reminders and finally invoices for the selected company:

The screenshot displays the Hive CRM 'Companies' screen. On the left, a sidebar contains fields for company details like name, address, VAT rate, and hourly rate. The main area on the right shows a table of products (broadband, VoIP, etc.) with columns for status, follow-up dates, and other metrics. Some rows in this table are highlighted in yellow. At the bottom, a navigation strip allows switching between different data views like 'CONTRACTS', 'TIMESHEETS', 'WEBSITES', etc. Numbered callouts (1-6) point to specific UI elements: 1. Top tab navigation; 2. Company filter dropdown; 3. Telephone filter textbox; 4. Left sidebar; 5. Notes table; 6. Bottom navigation strip.

1. The tab navigation panel allows us to switch between different sections of the CRM to analyse / review different data. Tabs can be closed by clicking the x button.
2. These 2 entry boxes; Company filter (dropdown), Telephone number filter (Textbox) are used to help us locate a company by either their alphabetical company name entry. The telephone filter textbox is used to refine a company by their main telephone number.
3. The 'Free search' textbox is used to find a company via either its main company name or aliases associated to the company, some clients have subsidiary company names within the parent company, so I associate the parent company with set aliases referring to the subsidiaries.
4. On the left pane Hive store the primary data on the company, this is usually the contact, address, VAT, hourly rate and setup info. This data is first point to check when attempting to review client data.
5. These note entries indicate important data which can be navigated to promptly, the notes can even be highlighted to make it marked high importance. These notes can be issued a follow-up date which in turn create a reminder which shows up in the assigned users reminders tab on the date of the follow-up requirement. The category assigned the note can be used to filter the company notes based on the category of work.
6. The bottom strip of the company's tab is a navigator for the company:
 - a. **Close form:** Closes the companies tab
 - b. **Contacts:** Displays a pop-up windows showing the contacts for the company, informing which contacts are decision makers, authority for costs, third party support etc.
 - c. **Timesheets:** This button opens the timesheets screen and filters all work done on the company by filtering the timesheets to the work done on that company, it will then show every time sheet entry.
 - d. **Websites:** This pop-up menu shows the details of the website (FTP Login, CMS type, Hosting type, registrar and domain information, expiry/renewal date). A company can have multiple domains, so each domain is put in as an entry on the company.

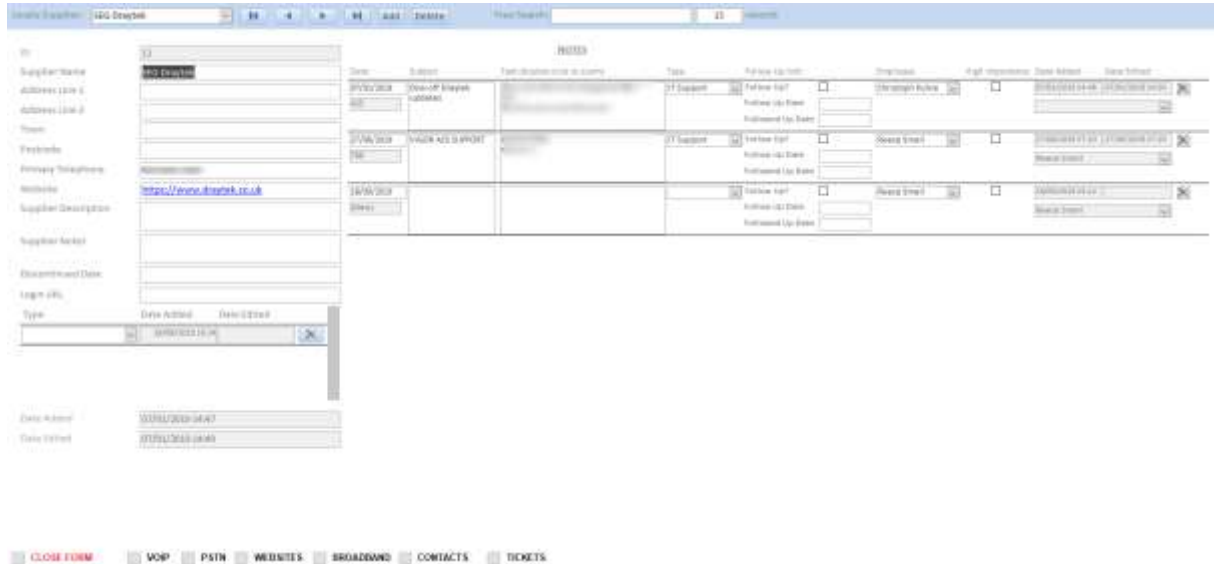
- e. **Broadband:** Like Websites, broadband has a pop-up menu which displays an entry for the company listing their broadband lines (some have multiple). So, on these entries, information such as the supplier, WAN IP, WAN PORT, PSTN Line No, location of line, install date, broadband username/password and package type. This information is first point of analysis when it comes to referring to the data on a client's broadband line.
- f. **VoIP:** The VoIP pop-up menu shows us what telecommunications platform their number belongs to, along with their contract start date for that entry, a brief description of the numbers function is commonly put in the entry also.
- g. **PSTN:** Again, like VoIP, the supplier of the PSTN, line number, setup date and description are shown to help us analyse the line information of a client.
- h. **Logins:** The Logins pop-up window is used to help us store frequently used logins for the client company which we are regularly asked to enter on hardware or services. The credentials can be hidden from select CRM users or be made read-only to prevent unauthorized changes being made to the credential.
- i. **Monthly Products:** This tab shows products the client pays for monthly, with their quantity, a bespoke description of the item associated with the product (this can be an exact line number for a broadband attached to a product code for FTTC Broadband). There is also the start and end date of when they are charged for that product. When a product has been added to the monthly products, it is then approved by Vicks manually as her account on the CRM manages billing.
- j. **One Off Products:** Identical to monthly products, except one-off products are single charge product entries which have a set date in which they are charged in comparison to a start and end date.
- k. **Invoices:** This page allows reviewing of a company's previous invoices, all invoices since the company's creation.
- l. **Invoice Text:** Text displayed on the invoice to the client declaring the T&Cs
- m. **Tickets:** This pop-up menu provides a historic look at the support tickets previously opened by the company, with a brief subject and description telling us info about the ticket before I click the link to open the ticket.

In summary to this, all the tools provided on the CRM assist in analysis of the data I input, I can efficiently use it to navigate and refer to any previous work or service that Hive have provided.

Suppliers

Screen shots of pop-up menus contained client data so were not captured for this segment.

Like Companies, with this page I can review a list of our suppliers, their contact details, notes on the supplier etc.



The one major difference with the suppliers screen, is that depending on the supplier you choose to review, by clicking any of the VoIP, PSTN, Websites or Broadband, you receive a complete export of the companies who have that supplier for any of those categories to an excel workbook. This makes data analysis of entire suppliers extremely simple because I can then compile that data into graphs and charts to review and compare against other suppliers, showing which supplier is monetarily more beneficial to us, which companies are using more of one supplier in comparison to another, and so on.

Validation Calculator – Mid-month to end of month costing

If a client is starting a monthly payment of a product midway through the month before the next billing period, I can accurately see how much I need to charge them Pro rata, to ensure Hive are not losing money upon opening an account for a product. To do a pro rata charge for a client I would enter the date of the product's beginning, followed by the day of the next billing period, then finally the amount the monthly cost would be. The output is the pro rata cost, this is then added as the cost of the monthly product as entry in the one-off products section.

Start Date:	<input type="text" value="18/09/2019"/>
End Date:	<input type="text" value="01/10/2019"/>
No of Days:	<input type="text" value="13"/>
Monthly Amount:	<input type="text" value="100"/>
Pro Rata Answer:	<input type="text" value="£42.74"/>
<input type="button" value="CLEAR"/>	

Reports - Data Exports

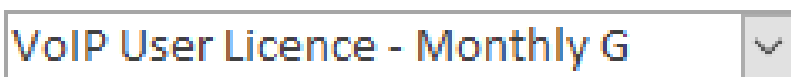
With a few clicks in the database I can export entire excel spreadsheets which contain requested data of either a list of Microsoft Teams channel links, exports of timesheets from users and which companies are using a select product. A few examples are detailed below:



Team Channels



Timesheet Export



Companies Using Selected Product

E.G. 1: If you want to know which users have broadband from one supplier:

- Going to **Suppliers**, selecting the supplier, then pressing '**Broadband**' would export all companies with broadband from that supplier.

E.G. 2: To find out which companies have a certain product and the quantity:

- Navigating to **Reports**, selecting the product, then clicking '**Companies Using Selected Product**' will export a spreadsheet with the relevant product and which companies have that product on their account. The excel spreadsheet would then open viewing the data from the exported elements in the database.

All these features are imperative as they allow us to quickly and efficiently navigate to the data I require to proceed with in our work, with the excel spreadsheets I can use the filter tool to reduce the entire export down to the data I require.

Timesheet Referral

Our timesheets are key to logging work that I do for our clients and internally. I categorise our timesheets in the following format (Columns left to right):

The screenshot shows a web-based timesheet application. At the top, there is a header bar with a search filter and a 'PROCESS TIMESHEETS' button. Below this is a table with columns for various timesheet fields. The first row of data shows a date of '20/01/2018', employee 'Reece Small', company 'Hive', and a duration of '0.25'. The table also includes columns for 'Notes for Client', 'Notes for Internal Use', 'Duration (Hrs.)', 'Category 2', 'Category', 'Processed', 'Date Added', and 'Date Edited'.

- **Date of the time sheet entry:** DD/MM/YYYY
- **Employee:** Automatically defaults to me as I am the logged in user to the CRM
- **Company:** Auto-fills from the companies on the database by typing the relevant first letter of the client.
- **Notes for client:** These notes appear on the bill for the client
- **Notes for Internal Use:** These are some extended and more technical notes I can refer to when I need to detail the work performed.
- **Duration (Hrs.):** This is how long I have spent on a job measured in 15-minute intervals represented as 0.25.
- **Category 2:** This entry is predominantly department based, allowing refining of which department had what work, performed when, for what length of time, when it comes to the reviewing of the data. (Departments include IT Support, VoIP, Sales etc.)
- **Category:** This category defines what type of work it is, if the work is costed within retainer hours, one off chargeable work, non-chargeable, costed within project scope etc. I use this information to refine and analyze what clients are getting more unpaid work than others, or which clients are going over or are in fact under their retainer contract hours. With this analysis I can proactively alter our approach to clients to best suit them to ensure they are treated appropriately.
- **Date Added:** The date the timesheet entry was initially added.
- **Date Edited:** The date the timesheet entry was last edited.

In summary, the timesheets are a key part to tracking, reviewing and analysing what work has been done for companies during work hours across the board for every staff member. The data helps improve time management for the future and allows us to provide integral support to clients who need it.

OSTicket Ticket Filtering & Referral

One of the aspects touched on earlier in the document, I mentioned tickets from customers on our ticketing system being processed. This part of the database is on each company and supplier Hive have. The tickets are placed on the relevant client or supplier depending on a few variables.

If the ticket is opened with the supplier directly because the query is regarding non client material, the ticket will be logged in the supplier's ticket tab. On the other hand, if the ticket is regarding a client's Issue, the ticket is logged on the company's ticket tab.

Hive have multiple platforms in which I receive tickets on, all of them go in the same tickets tab on a company and are organised by date.

ID	Company	Ticket Date	Ticket Number	Ticket Subject	Ticket URL	Notes	Invoice	Date Added	Date Edited
112		09/04/2019	24000	N	https://helpdesk.hivecomm.com		<input type="checkbox"/>	09/04/2019 13:28	09/04/2019 13:27
113		09/04/2019	24003	B	https://helpdesk.hivecomm.com		<input type="checkbox"/>	09/04/2019 13:24	09/04/2019 13:20
114		09/04/2019	24008	N	https://helpdesk.hivecomm.com		<input type="checkbox"/>	09/04/2019 13:27	09/04/2019 13:30
115		09/04/2019	24014	A	https://helpdesk.hivecomm.com		<input type="checkbox"/>	09/04/2019 13:30	09/04/2019 13:33
116		09/04/2019	24064	T	https://helpdesk.hivecomm.com		<input type="checkbox"/>	09/04/2019 13:33	09/04/2019 13:43
117		12/02/2019	24063	U	https://helpdesk.hivecomm.com		<input type="checkbox"/>	27/02/2019 14:25	27/02/2019 14:25
118		12/02/2019	24063	U	https://helpdesk.hivecomm.com		<input type="checkbox"/>	17/04/2019 09:46	17/04/2019 09:46
119		09/04/2019	24108	Q	https://helpdesk.hivecomm.com		<input type="checkbox"/>	09/04/2019 13:34	09/04/2019 13:44
120		26/02/2019	24108	K	https://helpdesk.hivecomm.com		<input type="checkbox"/>	26/02/2019 13:55	26/02/2019 13:01

- **ID:** Unique Ticket ID, every entry generates another ID in the database. This ID is how many tickets are in the database.
- **Company:** This field is automatically populated with the selected company I want to view the tickets of.
- **Ticket Date:** This is the date in which the ticket was opened.
- **Ticket Number:** The number on OSTicket which identifies the ticket(s)
- **Ticket Subject:** Like-for-like copy of the subject title of the ticket, or a brief technical subject name as written by us only if the ticket subject wasn't given a proper subject by the client.
- **Ticket URL:** The URL to directly open the ticket from the database.
- **Notes:** General small notes on the resolution of the problem.
- **Invoice:** This indicates if Hive invoiced for the work done on the ticket, generally it is added to the monthly invoice, so this tick box isn't used.
- **Date Added:** This section shows when the entry to the tickets was originally added to the CRM
- **Date Edited:** This shows when the ticket entry was last edited on the CRM

In conclusion, the CRM is an extremely useful in assisting us to securely analyse data and sensitive information. The ease of use of the CRM allows us to quickly navigate to the data I require and therefore action work more efficiently.

MICROSOFT EXCEL

Excel is a Microsoft Office program which I use daily at Hive in our work, in my position I use Excel to analyse multiple different kinds of data. This can range from monthly call statistics, user lists, monthly bills, internal inventory filtering etc.

Call Statistics Data

Using the Horizon portal, when I export call statistics, they are put into a .csv file which structures the call statistic data into rows. With the filter tool in Excel, I can filter date ranges to narrow down calls to specific days and times, then by using the filter tool on other columns like calling number and destination number I can further reduce those statistics to exact callers and call lengths.

Below is an **example** of call data when exported into an Excel spreadsheet.

Type	Site	Call Date/Time	Duration	Calling Number	Destination Number	Outcome
Incoming	2653LysanderWay	25/09/2019 09:04	00:01:33	17224455xx	17224455xx	Answered
Outgoing	2653LysanderWay	25/09/2019 09:04	00:01:33	17224455xx	17224455xx	Answered
Incoming	2653LysanderWay	25/09/2019 09:15	00:00:03	17224455xx	17224455xx	Answered
Outgoing	2653LysanderWay	25/09/2019 09:15	00:00:03	17224455xx	17224455xx	Answered
Incoming	2653LysanderWay	25/09/2019 09:16	00:00:29	17224455xx	17224455xx	Answered
Outgoing	2653LysanderWay	25/09/2019 09:16	00:00:29	17224455xx	17224455xx	Answered
Incoming	2653LysanderWay	25/09/2019 09:44	00:00:11	1722777999	17224455xx	Answered
Outgoing	2653LysanderWay	25/09/2019 09:44	00:00:11	1722777999	17224455xx	Answered
Outgoing	2653LysanderWay	25/09/2019 09:56	00:01:23	1722775500	17224455xx	Answered
Incoming	2653LysanderWay	25/09/2019 09:56	00:01:23	1722775500	17224455xx	Answered

The call data (shown above) is a snippet of a whole month's call statistics, I have refined the filter to 25/9/19 and the time between 9am and 10am. I have also censored the last 2 digits of some calling and destination number to retain data protection for the business.

Auditing – Billing

I commonly export monthly bills from our relative suppliers, I do this to cross reference the bills with what Hive charge our clients for, this is to ensure Hive haven't forgot to charge a client for a product, meaning Hive don't pay for these services unnecessarily. To make this process easy, I tend to replicate an identifier from the supplier's bill onto our forwarded charge to the client. An example of an identifier would be a broadband line number, a service/order id for a product, or even the product name itself. With this method I can simply identify if I have not charged a client for a product I have ordered.

Inventory Management

Excel is used internally to manage our inventory of computers and devices on our network. I personally designed the spreadsheet which manages our inventory so I can input our bespoke data for each user, this information can arguably be put on the company logins section of the CRM, however I predominantly use that for client data, not our own internal data.

Below is a screen shot of the inventory management excel spreadsheet with all the data censored. When any of the fields are updated in real life, then the information is updated on the spreadsheet.

Page Index	Hive Communications Account Name	Computer Information										Make User	User Admin Account				Operating System	
		Mac Address	IP Address	Vendor	Model No.	Serial No./Barcode	RAM (GB)	Drive Size (GB)	Y/N				Username	Password	Version	License	OS	Version
1		00:0C:29:00:00:00	10.10.10.1	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
2		00:0C:29:00:00:00	10.10.10.2	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
3		00:0C:29:00:00:00	10.10.10.3	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
4		00:0C:29:00:00:00	10.10.10.4	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
5		00:0C:29:00:00:00	10.10.10.5	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
6		00:0C:29:00:00:00	10.10.10.6	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
7		00:0C:29:00:00:00	10.10.10.7	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
8		00:0C:29:00:00:00	10.10.10.8	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
9		00:0C:29:00:00:00	10.10.10.9	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
10		00:0C:29:00:00:00	10.10.10.10	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
11		00:0C:29:00:00:00	10.10.10.11	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
12		00:0C:29:00:00:00	10.10.10.12	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
13		00:0C:29:00:00:00	10.10.10.13	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
14		00:0C:29:00:00:00	10.10.10.14	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
15		00:0C:29:00:00:00	10.10.10.15	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
16		00:0C:29:00:00:00	10.10.10.16	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
17		00:0C:29:00:00:00	10.10.10.17	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
18		00:0C:29:00:00:00	10.10.10.18	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
19		00:0C:29:00:00:00	10.10.10.19	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
20		00:0C:29:00:00:00	10.10.10.20	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
21		00:0C:29:00:00:00	10.10.10.21	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
22		00:0C:29:00:00:00	10.10.10.22	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
23		00:0C:29:00:00:00	10.10.10.23	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
24		00:0C:29:00:00:00	10.10.10.24	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
25		00:0C:29:00:00:00	10.10.10.25	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
26		00:0C:29:00:00:00	10.10.10.26	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
27		00:0C:29:00:00:00	10.10.10.27	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
28		00:0C:29:00:00:00	10.10.10.28	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
29		00:0C:29:00:00:00	10.10.10.29	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
30		00:0C:29:00:00:00	10.10.10.30	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
31		00:0C:29:00:00:00	10.10.10.31	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
32		00:0C:29:00:00:00	10.10.10.32	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
33		00:0C:29:00:00:00	10.10.10.33	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
34		00:0C:29:00:00:00	10.10.10.34	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
35		00:0C:29:00:00:00	10.10.10.35	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
36		00:0C:29:00:00:00	10.10.10.36	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
37		00:0C:29:00:00:00	10.10.10.37	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
38		00:0C:29:00:00:00	10.10.10.38	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
39		00:0C:29:00:00:00	10.10.10.39	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
40		00:0C:29:00:00:00	10.10.10.40	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
41		00:0C:29:00:00:00	10.10.10.41	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
42		00:0C:29:00:00:00	10.10.10.42	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
43		00:0C:29:00:00:00	10.10.10.43	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
44		00:0C:29:00:00:00	10.10.10.44	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
45		00:0C:29:00:00:00	10.10.10.45	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
46		00:0C:29:00:00:00	10.10.10.46	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
47		00:0C:29:00:00:00	10.10.10.47	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
48		00:0C:29:00:00:00	10.10.10.48	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
49		00:0C:29:00:00:00	10.10.10.49	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134
50		00:0C:29:00:00:00	10.10.10.50	HP	HP Elite 840 G1	12345678901234567890	8.00	100.00	N				hive.com		Windows 10	10.0.17134	10.0.17134	10.0.17134

Hive store a lot of important data on each user and their service access, we do this to monitor who has access to what services, adjust accordingly if they require excess access to other services, on the other hand we also revoke access where necessary.

Each of the fields in that spreadsheet can be analysed using the filter tool, allowing us to filter the data down if necessary, to find the specific credential or detail of a user when required. The workbook is stored under managerial only access, this means only authorized staff can access the document to retrieve or update passwords.

Unit 5.1: Select and use three appropriate tools for testing, troubleshooting and analysing problems

We use multiple tools at Hive to analyse, identify and resolve technical issues. Some tools are specific for certain issues, but before diagnosing and resolving an issue, I identify key details from the reported issue to get a rough understanding of what needs to be done to fix the problem. With these minor details to start us off, I can deduce what tools and what method would best suit the task. In some ways, the following tools crossover with their ability to not only test, but also analyse problems, while others may automatically analyse and troubleshoot the problem.

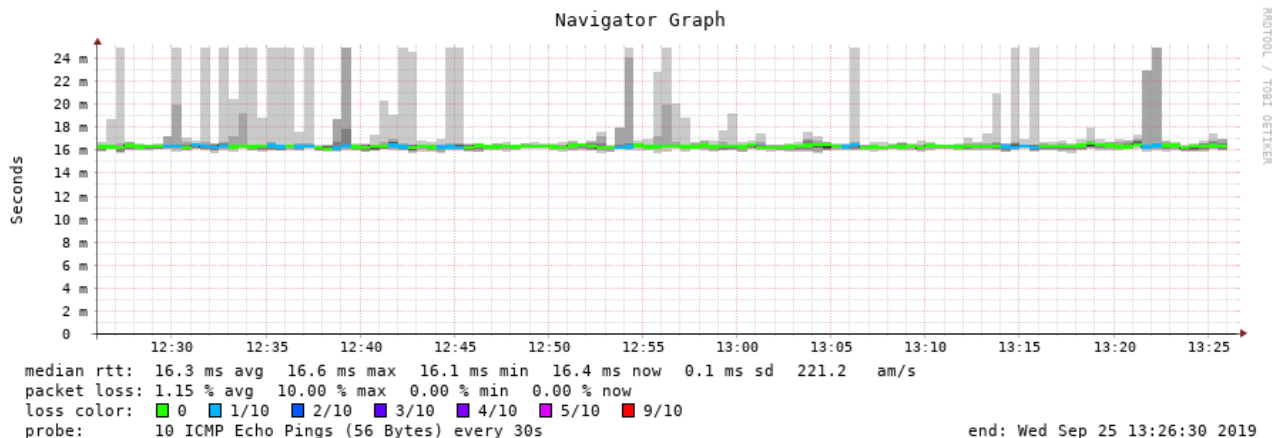
NETWORK DIAGNOSIS TOOLS

I have many diagnostic tools at our disposal which allow us to test networks and connectivity between devices, below are some of the primary tools which I use most of the time.

Smoke Ping

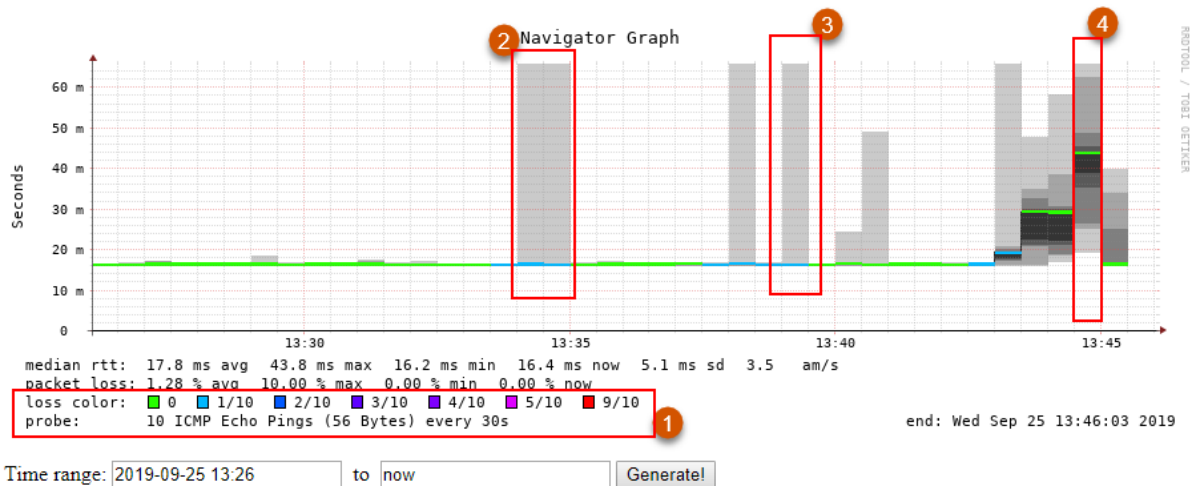
This is a tool which is hosted on our secure webserver 24/7, the tool pings every router IP address of our clients, this returns in-depth diagnostics which show the response time and packet loss of the connection. With these statistics to analyse I can gather an understanding of the current status of a line by reviewing the statistics in real-time.

Every 30 seconds, 10 ICMP ping packets, 56 bytes in size are sent to the IP, the time of each individual packet is measured then added to the graph to show detailed information about how long it takes for that set of 10 packets to get a response.



The horizontal axis is time, this can be filtered by zooming in on the graph to narrow down the time frame that is being analysed.

The vertical axis dictates how many milliseconds (ms) it takes for the ping to return with a response. As you can see from this screenshot, the response is averaging out at 16.5ms response time from smokeping's 10 pings. The light grey vertical bars going higher than the 16.5ms line indicate some packets took longer to get a response. The following image breaks down how to read the data.



1. The different colours shown on the graph all indicate different levels of packet loss,

0 1/10 2/10 3/10 4/10 5/10 9/10

e.g. red = 9/10 packets were lost in one ping of 10 packets.

In this example taken from our own router I can see the following:

2. 25/09/2019 - 13:34:00-13:35:00:
 - Out of 2 sets of 10 packets sent, 2/20 packets did not get a response.
 - There was a maximum of 65ms latency on a few of the packets.
 - Average latency was 17ms, this is indicated by the blue coloured line.
3. 25/09/2019 - 13:39:00 – 13:39:30:
 - Out of 1 set of 10 packets sent, 1/10 packets did not get a response.
 - There was a maximum of 65ms latency on a few of the packets.
 - Average latency was 17ms, this is indicated by the blue coloured line.
4. 25/09/2019 – 13:44:30 – 13:45:00:
 - Out of 1 set of 10 packets sent, all packets got a response.
 - There was a maximum of 65ms latency, however all the packets had various response times as you can see from the darker grey areas, this means at this point in time the response from the router wasn't as quick as previous pings as shown by the more green (and less grey) lines.
 - Average latency was 44ms, this is indicated by the green coloured line.

In conclusion, Smokeping is an incredibly useful tool for analysing the reliability of someone's internet connection. It displays a graphical representation of how responsive a connection is and how many packets of data it retains when sending data to it. I would use this tool to analyse as to why the end user may be experiencing connectivity issues.

DrayTek Diagnostic Tools

As there are multiple tools on a DrayTek router which allow diagnostics which help us analyse, troubleshoot and test, I shall expand on some which I use primarily:

Data Flow Monitor

This tool is predominantly used for analysing which devices are transmitting the most data over the network. The censored areas are the device hostnames, these names highlight individual users which I

can instantly recognise allowing us to identify the cause of the mass bandwidth utilisation. On the right of the presented photo you can see there is a 'Block' function, which blocks the IP address for 5 minutes, allowing time for the device to be capped for when it re-joins the network.

WAN2 shows the total available bandwidth on the line and how much is being used from the totalled data use on the data flow monitor.

Diagnostics >> Data Flow Monitor

☒ Enable Data Flow Monitor

Refresh Seconds: 10 ▼ Page: 1 ▼

| Refresh |

Index	IP Address	TX rate(Kbps)	RX rate(Kbps) ▼	Sessions	Action	APP QoS
1	192.168.154.138	95	2138	47	Block	None ▼
2	192.168.154.123	119	186	64	Block	None ▼
3	192.168.2.16	0	122	4	Block	None ▼
4	192.168.3.10	66	57	2	Block	None ▼
5	192.168.154.141	31	54	36	Block	None ▼
6	192.168.2.19	18	12	1	Block	None ▼
7	192.168.154.121	98	1	67	Block	None ▼
8	192.168.154.120	0	0	91	Block	None ▼
9	192.168.154.131	0	0	41	Block	None ▼
10	192.168.154.148	0	0	38	Block	None ▼
11	192.168.154.10	---	---	1	Block	None ▼
12	192.168.2.11	---	---	1	Block	None ▼
13	192.168.2.12	---	---	4	Block	None ▼
14	192.168.2.13	---	---	3	Block	None ▼
15	192.168.2.14	---	---	1	Block	None ▼
		Current / Peak / Speed	Current / Peak / Speed	Current / Peak		
WAN1	---	0 / 0 / Auto	0 / 0 / Auto	0		
WAN2	51.219.	329 / 27448 / Auto	748 / 88784 / Auto	69		
WAN3	---	0 / 0 / Auto	0 / 0 / Auto	0		
WAN4	---	0 / 0 / Auto	0 / 0 / Auto	0		
Total		329 / 27448 / Auto	748 / 88784 / Auto	69 / 77		

RX Rate: This is the receive rate, the download speed.

TX Rate: This is the transmission rate, the upload speed.

Ping Diagnostics

This tool allows pinging from the router level to devices within the network and external connections (if connected to the internet).

Predominantly I ping through 'Auto' as most of our clients have one broadband line. In the event they have more than one line I would select the WAN depending on the test I am trying to do.

Ping diagnostics can identify broken connections to internal devices. I usually Bind IP to MAC address all computers, laptops, printers, access points and other bespoke network attached peripherals. This is so I can use this tool efficiently and know that the IP I are trying to ping is the one that belongs to the device having issues.

Ping Diagnosis

☒ IPv4 ☐ IPv6

Ping through: Source IP:

Ping to: IP Address:

Result | [Clear](#) |

```
Pinging 216.58.204.78 with 64 bytes of Data through WAN2:
Receive reply from 216.58.204.78, time=20ms
Receive reply from 216.58.204.78, time=10ms
Receive reply from 216.58.204.78, time=10ms
Receive reply from 216.58.204.78, time=10ms
Receive reply from 216.58.204.78, time=10ms
Packets: Sent = 5, Received = 5, Lost = 0 (0% loss)
```

If a device cannot be reached, then the diagnostics log will return 'Request Timed Out'.

Result | [Clear](#) |

```
Pinging 192.168.154.13 with 64 bytes of Data through LAN
Request timed out !!!
Request timed out !!!
Request timed out !!!
Request timed out !!!
Request timed out !!!
Packets: Sent = 5, Received = 0, Lost = 5 (100% loss)
```

In conclusion, this tool is perfect for analysing and troubleshooting connectivity issues between networked devices. It is one I use a lot to identify why devices are not communicating with each other.

DHCP Table

The DHCP Table is a key tool in showing us which devices on a network are connected to which LAN via DHCP, the attached photo shows which IP's are allocated a DHCP lease in comparison to devices which are bound to an IP via MAC address, those are represented by the term 'FIXED IP'

DHCP Leases allow us to analyse how long a device will remain on its current IP address before the lease expires. It has no other major method of assisting in

troubleshooting other than showing us if it has a fixed IP or not.

Show : ALL LANs

DHCP IP Assignment Table					Other IP Assignment Table		Refresh
Index	IP Address	MAC Address	Leased Time	HOST ID			
LAN1	: DHCP Server On	IP Pool: 192.168.154.10 ~ 192.168.154.209					
LAN2	: DHCP Server On	IP Pool: 192.168.2.10 ~ 192.168.2.209					
LAN3	: DHCP Server On	IP Pool: 192.168.3.10 ~ 192.168.3.109					
Index	IP Address	MAC Address	Leased Time	HOST ID			
LAN1							
1	192.168.154.10	3C-44	FIXED IP				
2	192.168.154.11	84-D0	17:35:54				
3	192.168.154.12	00-DE	0:34:25				
4	192.168.154.13	10-62	FIXED IP				
5	192.168.154.14	00-98	0:35:56				
6	192.168.154.15	74-47	FIXED IP				
7	192.168.154.16	74-46	FIXED IP				
8	192.168.154.17	00-F9	0:36:49				
9	192.168.154.18	4C-98	FIXED IP				
10	192.168.154.19	00-02	FIXED IP				
11	192.168.154.20	98-60	17:40:52				
12	192.168.154.23	00-05	FIXED IP				
13	192.168.154.25	F0-8E	FIXED IP				
14	192.168.154.80	4C-14	FIXED IP				
15	192.168.154.116	3C-50	FIXED IP				
16	192.168.154.117	84-B5	FIXED IP				
17	192.168.154.118	8C-64	FIXED IP				
18	192.168.154.119	D8-57	FIXED IP				
19	192.168.154.120	D0-4F	FIXED IP				
20	192.168.154.121	64-0F	FIXED IP				
21	192.168.154.122	00-F9	FIXED IP				
22	192.168.154.123	14-BC	FIXED IP				
23	192.168.154.126	02-50	FIXED IP				
24	192.168.154.127	50-DF	FIXED IP				

NAT Sessions Table

This tool allows us to see which connections the devices on the network are connecting to, this tool is powerful as it helps us analyse if a device is connecting to something that it shouldn't be.

NAT Active Sessions Table (Limit: 128 entries)

Private IP :Port	#Pseudo Port	Peer IP :Port	Interface
192.168.154.122 49680	65296	40.100.443	WAN2
192.168.154.120 49951	65311	68.64.443	WAN2
192.168.154.122 49732	65348	52.1.443	WAN2
192.168.154.122 49733	65349	52.1.443	WAN2
192.168.154.122 49736	65352	40.100.443	WAN2
192.168.154.120 50021	65381	68.64.443	WAN2
192.168.154.122 49780	65396	23.214.443	WAN2
192.168.154.122 49782	65398	51.5.443	WAN2
192.168.2.11 63992	65401	10.20.53	WAN2

The table shows which device is connecting certain IP's, allowing us to analyse and isolate which device is connecting to that IP. It is a useful tool as it allows us to see which WAN the connection is coming through, along with which IP the connection is coming from. If the connection is malicious, I can block the IP on the firewall,

THIRD-PARTY SUPPORT TOOLS

RescueAssist

This is a service provided by LogMeIn which allows support agents (me), to easily remotely connect to another computer in another location. The user must manually let the support agent onto the machine by entering a support key provided by the agent. When on the machine the agent can request to gain administrator/elevated access, with this permission level the agent can then access more of the core system programs which can be used to troubleshoot issues.

Some of our clients (primarily support retainer clients) allow us to set up 'Unattended access', which means I can remotely log onto their machine without a prompt from the user. This is useful for quick access to a client machine to analyse and hopefully resolve issues in a quicker manner. The reason behind us choosing RescueAssist over other remote support software is due to the vast offerings it has in comparison to other remote support software. With RescueAssist I can do the following:

- Securely Record Sessions: These can be reviewed later from the portal on the web, or by going to a generated link which requires the agent to be signed in before reviewing the footage. These sessions can be downloaded for offline storage and referral if required.



- Mobile remote support: I have the package which allows mobile devices to be remotely controlled, this includes Android and iOS devices, this is beneficial because I can perform a task such as adding email accounts or troubleshoot an application by physically controlling the device remotely.
- Unattended Computer List: This is a menu where I can navigate all computers that I can gain administrator/elevated access to without prompt from the user.















UNATTENDED COMPUTER	DEVICE NAME	HOST NAME	STATUS	VERSION	IP ADDRESS	GROUP	ACTIONS
40 Devices 41 → 39	DESKTOP-0000000	DESKTOP-0000000	Online	4.0 Build 1022	192.168.25.39	DESKTOP-0000000	
	DESKTOP-0000000	DESKTOP-0000000	Online	4.0 Build 1022	192.168.1.102	DESKTOP-0000000	
	DESKTOP-0000000	DESKTOP-0000000	Online	4.0 Build 1022	192.168.20.45	DESKTOP-0000000	
	DESKTOP-0000000	DESKTOP-0000000	Online	4.0 Build 1022	192.168.0.3	DESKTOP-0000000	
	DESKTOP-0000000	DESKTOP-0000000	Online	4.0 Build 1022	192.168.25.54	DESKTOP-0000000	
	DESKTOP-0000000	DESKTOP-0000000	Online	4.0 Build 1022	192.168.1.72	DESKTOP-0000000	
	DESKTOP-0000000	DESKTOP-0000000	Online	4.0 Build 1022	192.168.0.36	DESKTOP-0000000	
	DESKTOP-0000000	DESKTOP-0000000	Online	4.0 Build 1022	192.168.0.36	DESKTOP-0000000	

Overall RescueAssist is the perfect tool for helping us analyse, troubleshoot and test on remote machines as I can control devices as if they were in our hand, the only drawback to the software is that it requires an internet connection running at reliable speeds from both agent-side and also the customer side.

Gamma Support tools

Gamma is one of our suppliers, they have a partner portal which contains all the necessary tools to analyse and troubleshoot problems with broadband lines, VoIP phones and PSTN lines. I use these tools daily to get detailed analytical reports on service status, to ensure services are running as expected. The two tools I am about to elaborate on have comprehensive results which help us identify the cause of an

Horizon Health Check Panel

<div>  Access 1 </div> <p>Your Gamma Ethernet circuit is set up. If ext2003@hivecommunications.co.uk is experiencing calls dropping, call quality issues or are unable to make/receive calls intermittently please click here for more circuit details, or visit the Gamma Academy for Ethernet diagnostic support documentation by clicking here.</p> <p>Please note that this check depends on your user's handset and not their soft client.</p>	<div>  Call Diverts 7 </div> <p>ext2003@hivecommunications.co.uk has the following call diverts set up:</p> <p>When I'm busy: Send the call to voicemail.</p> <p>When I don't answer: Send the call to voicemail.</p> <p>When I'm unreachable: Forward the call to 07575 [REDACTED]</p> <p>No numbers are twinned.</p> <p>Call Forwarding is disabled.</p> <p>Sequential ringing is disabled.</p> <p>Remote Office is disabled</p> <p>Available In Office profile: Inactive</p> <p>Available Out of Office profile: Inactive</p> <p>Busy Profile: Inactive</p> <p>Unavailable Profile: Inactive</p> <p>If you'd like to change these settings, please click here, click Edit on the user to change and then go to the "Call Setup" tab.</p>
<div>  SIP ALG 2 </div> <p>We can see that the router you're connected to has SIP ALG disabled.</p> <p>This information is correct as of 2019-10-04 08:42:35</p> <p>Please note that this check depends on your user's handset and not their soft client.</p>	<div>  Number Presentation 8 </div> <p>Caller Id is disabled.</p> <p>Override site policy is enabled.</p> <p>Calling line identity is User configured UK phone number.</p> <p>Number presentation is 01722777999.</p>
<div>  Handset Details 3 </div> <p>ext2003@hivecommunications.co.uk currently has a Polycom VVX450 with MAC address 64:16 [REDACTED], using codecs G711.</p> <p>Click here to log in to Horizon. Once logged in, search for the user, click Edit and then click on the Phone tab</p>	<div>  Fraud Management 9 </div> <p>Your company is protected with Horizon Fraud Management and you are within the agreed limits. Click to see what these limits are: Fraud Management Settings</p>
<div>  Handset Registration 4 </div> <p>We can see that your handset Polycom VVX450 with MAC address 64:16 [REDACTED] has registered with ext2003@hivecommunications.co.uk at Fri Oct 04 09:35:08 BST 2019</p> <p>Please note that any changes to this panel's information may take 5 minutes to be reflected here.</p>	<div>  Do Not Disturb 10 </div>
<div>  Voice Portal and Voicemail 5 </div> <p>Your Horizon Company has a Voice Portal set up, and ext2003@hivecommunications.co.uk has a voicemail subscription allocated to them.</p> <p>If you'd like to set up Voice Portal for your company, please click here.</p> <p>If you'd like to change your Voicemail permissions for ext2003@hivecommunications.co.uk, then please click here to log in to Horizon. Once logged in, search for the user, click Edit and then click on the Services tab.</p>	<div>  Restrict Service 11 </div> <p>There are no call restrictions for your Horizon company, HiveCommunications. Click here to view and edit your restrictions.</p>
<div>  Site DDI 6 </div> <p>The site Lysander Way where ext2003@hivecommunications.co.uk is set up has a Site DDI assigned. If you would like to view these details then please click here.</p>	<div>  Site Call Barring 12 </div>
<div>  Site DDI 6 </div>	<div>  User Call Barring 13 </div>

Horizon is our hosted VoIP platform we distribute to our clients requiring telecommunications services for their business. With this hosted telecommunications platform I also have diagnostic and analytical data, which helps us identify the live status of the platform, as well as individual users service status. Horizon Health Check allows us to select individual users on the VoIP platform, and then pull their current status on the platform, showing information such as connection to the platform, successful or unsuccessful registration requests to the service from the user profiles handsets, and more.

1. **Access:** This indicates to us the broadband service availability for the client, if they have a Gamma provided broadband circuit, and the health check detects that, it can ensure the provided broadband completely supports the hardware on site, meaning the phones should have no issues connecting.
2. **SIP ALG:** By default, I disable this no matter what as it tends to be a protocol on routers which can negatively impact VoIP data packets negatively. SIP ALG can prevent calls reaching users entirely, this is analysed with the health check to ensure that it isn't enabled causing issues with calls reaching users across the network.
3. **Handset Details:** This shows what handset model along with its MAC address is assigned to the user, if the user does not have a device this field is blank.
4. **Handset Registration:** The result output from this part informs us if the handset has registered with the VoIP platform in the last 10 minutes, if it has not registered this helps us identify that there is an issue with the handsets connectivity to the platform.
5. **Voice Portal & Voicemail:** This indicates if the user has the voicemail bolt on or not, allowing us to identify if they will just return busy if a caller gets through to them, or if the caller will get through to the voicemail box.
6. **Site DDI:** This identifies if the site the user belongs to has a DDI attached to it, meaning the user can select between the user DDI or the site DDI as their presentation number.
7. **Call Diverts:** This dropdown shows us if any of the methods in which calls can be diverted are enabled or active, with this I can analyse and identify where call traffic will be diverted depending on the method that is active. If all methods are inactive or disabled, then the user will not forward calls. Depending on which method is enabled, I can identify call routing much more simply with this tool.
8. **Number Presentation:** This screen informs us if the user is presenting a different number when they call people, in comparison to the DDI they have on their user profile which they can receive calls on.
9. **Fraud Management:** This dropdown shows us the users on the company are within their daily call cost limit, there is a software cap which prevents expensive calls being made, if they exceed their daily spend for call costs the sites calls are barred. We are notified about this and promptly lift the barring to continue call flow for a client, following this I notify them with the exact calls which exceeded their limit. This is so they are aware of the charge and what call caused it with a time stamp attached to it.
10. **Do Not Disturb:** This indicator shows us if the user isn't receiving calls due to their profile being on Do Not Disturb which blocks all incoming calls and sends them to voicemail if programmed.
11. **Restrict Service:** This identifies if the users VoIP service has been restricted or not, meaning if they can or cannot make or receive calls.
12. **Site Call Barring:** This is a site level barring profile of calls, which specify users within that site cannot call the selected non-geographical and geographical area codes.
13. **User Call Barring:** This indicates if calls are barred on the user level, preventing that user from calling certain non-geographical and geographical area codes. If the client reports they cannot call specific numbers, this is the area of the health check I review.

In conclusion, the Horizon health check tool is imperative to assisting us in analysing, identifying and resolving issues users have with interacting with the platform.

Broadband Fault Diagnostics [KBD - Knowledge Based Diagnostics]

Hive have many clients with broadband services with us, varying from older line types like ADSL2+ which have a maximum download of 24mbps and upload of 1.5mbps, all the way up to dedicated Leased Lines with 100mb download and 100mb upload.

Any broadband line can fail at any time, some communication methods are more likely than others due to the materials in which the data is transmitted. For this reason, Hive have in depth diagnostic tools remotely available which can analyse and report a lot of diagnostic information for the line in question. For a line not performing as expected, I perform a KBD Test. When a line is restored to a working state after an engineer visit, I run another KBD test to ensure the performance has returned to an acceptable state, I would now expect a different message the original KBD test, now saying **'No issues have been identified in the BTW network.'**

For this section I cannot trigger a KBD test on a live line as it affects line performance for the end user due to the nature of the testing methods being direct onto the line, I generally run KBD tests on lines which have been reported to have a fault. However, I will provide screenshots from an older test which can show the process I follow to analyse, identify and resolve line issues for an end user.

- 1) Once I have logged into the technician portal, I would navigate to the following menu tree:
- 2) I then select the broadband line by filtering it from the list of available lines, I can filter the relevant line by multiple fields which are key identifiers on each line:



Broadband Order & Service Management

Partner Account: Hive Communications Ltd


Order ID:
CLI / ONT Ref: ✓
Customer Name:
IP Address:
Order Status: (Any)
Records Per Page: 25

Service ID:
Broadband Category: (Any)
Site Postcode:
CPE Username:
Service Status: (Any)
Max Results Returned: 500

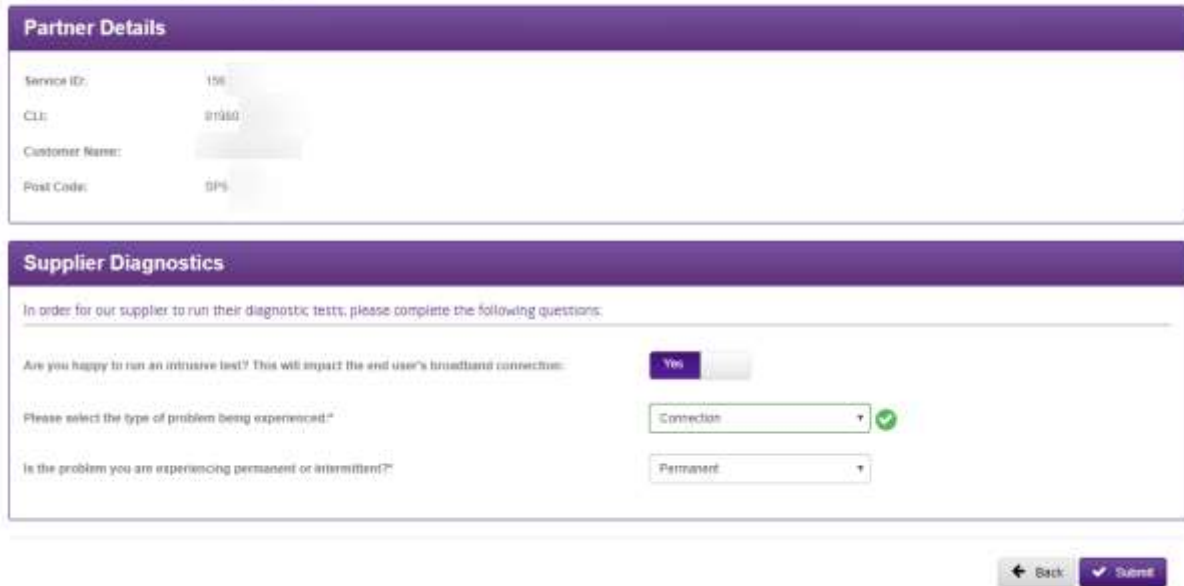
Reset Search

Download Showing 1 to 1 of 1

Order ID	Service ID	Channel Partner	Broadband Product	Circuit Status	CLI/ONT Ref	Customer Name	Postcode	Actions
11	158	4	Hive Communications Ltd	FTTC 8020	Active	01		Actions

- 3) Then from the  menu, I select KBD express.
- 4) This then brings the user to select the diagnostics type selection screen of the KBD test. Here, depending on the type of line issue, different options are selected.

Broadband KBD Express



Partner Details

Service ID: 156
 CLE: 01980
 Customer Name:
 Post Code: DP6

Supplier Diagnostics

In order for our supplier to run their diagnostic tests, please complete the following questions:

Are you happy to run an intrusive test? This will impact the end user's broadband connection:

Please select the type of problem being experienced: ✓

Is the problem you are experiencing permanent or intermittent?:

[← Back](#) [✓ Submit](#)

'Please select the type of problem being experienced':

- If the end user is experiencing a total loss of internet to the premises, '**Connection**' is selected.
- If the end user is experiencing problems with speed, '**Performance**' is selected.

'Is the problem that you are experiencing permanent or intermittent?':

- If the end user has random unexpected connectivity issues, '**Intermittent**' is selected.
- If the end user is offline no matter what troubleshooting methods are performed, '**Permanent**' is selected.

Following this selection, the options are submitted, and a test is performed. The test takes a few minutes to run, after this, a report is generated to either view, or download.

The following two screenshots show the difference between a result of finding no issues with a line test, in comparison to the type of issue message you would see if there was a problem detected, followed by the recommended resolution.

Passed KBD Test

Decision	
Status:	In Service
Decision Data	
ID:	NFS07
<div> Message Problem: No issues have been identified in the BTW network. Resolution: KBD tests indicate no BTW network fault. Please perform all CP and End User checks. BTW Performance/Speed test has not been run. </div>	
<div> Status Overall RAG Status: G BTW Status: G </div>	
Additional Information	
Circuit Service Status: The current circuit service status is IN SERVICE	
<div> DLM Info Service Option: N/A Indicative Line Quality: N/A Indicative Line Rate: N/A Capped Or Banded Profile Info: Rate Adaptive SNR Reset: - </div>	

It is important to note, even if the test has passed and the end user has reported issues still occurring, the problem can be a level below the line test, meaning the issue can reside with the end user hardware and internal network. So further tests must be performed to isolate the issue internally.

Failed KBD Test

Decision	
Status:	In Service
Decision Data	
ID:	0012
<div> Message Problem: The PSTN service associated with the provided Service ID is currently in fault. Resolution: Please refer the End User to their Telephony Provider to confirm the status of the open PSTN fault. </div>	
<div> Status Overall RAG Status: R BTW Status: - </div>	
Additional Information	
Circuit Service Status: The current circuit service status is IN SERVICE	
<div> DLM Info Service Option: 3-Static Indicative Line Quality: A Indicative Line Rate: 18230 Capped Or Banded Profile Info: Rate Adaptive SNR Reset: No Request </div>	

As seen here the error code for an issue/open issue is different alongside the message and resolution presented to the user.

This kind of in-depth information provides us with a solution and a reason behind issues. This information helps us proceed accordingly and handle problems accordingly depending on the result that comes out.

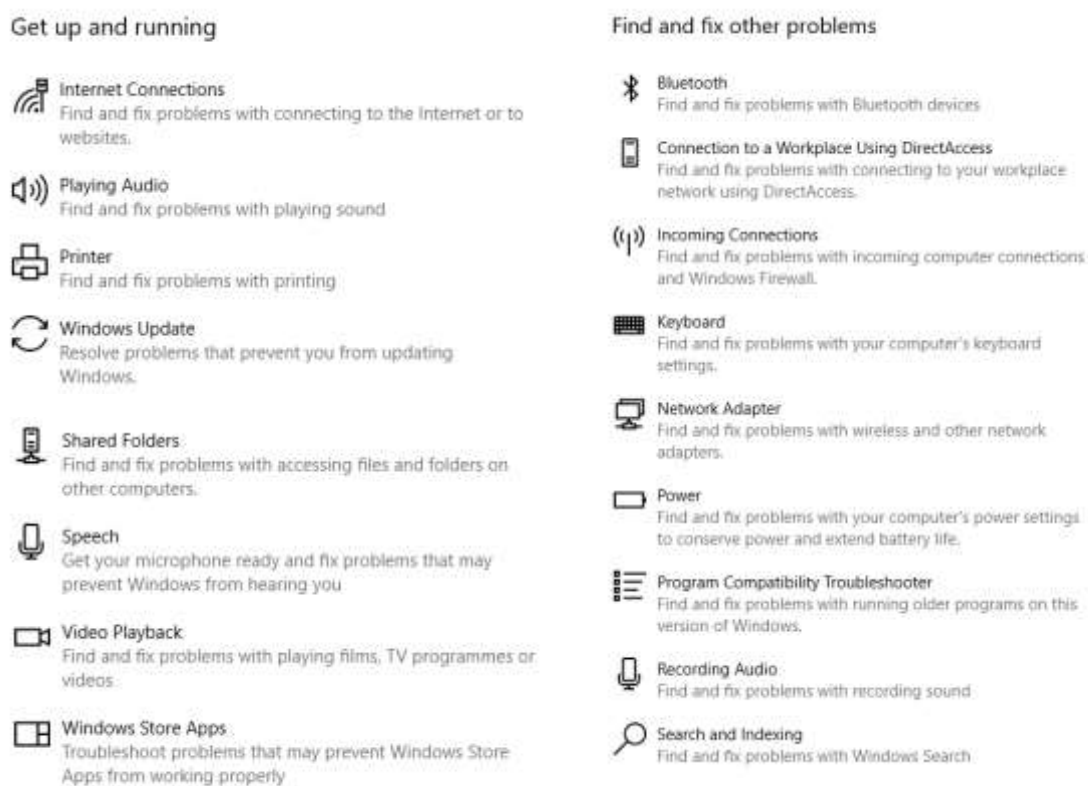
WINDOWS TROUBLESHOOTING TOOLS

Software plays a big part in our analysis of issues, troubleshooting of problems, and testing of resolutions. With software, I can identify problems and often receive detailed reasons as to why an issue occurred along with results showing the issue has been resolved.

Windows 10 is our default and primarily distributed operating system, I work with it on a regular basis and understand many of the in-built tools and software which can be used to analyse, identify and resolve issues that occur. One of the primary tools which I use when it comes to fixing these issues is the in-built Windows troubleshooting software. This software can diagnose every possible area of the issue to provide a detailed answer as to why something isn't performing as expected.

It can be opened by navigating to **Settings > Update & Security > Troubleshooting**

There are many types of issues a computer can have and using the relevant troubleshooting option.



Each of these troubleshooting tools launches a window relevant to the issue and searches for all possible issues you could be having with the feature, and often applies fixes automatically if specified within the settings. Otherwise, you can manually trigger fixes for certain issues as the trouble-shooter displays the ones discovered. The following video is an example of me using the internet connections Trouble-shooter to fix my Ethernet connectivity.



As shown in the video, Windows troubleshooting is simple and quick to resolve issues.

Unit 5.2: Demonstrate compliance and organisational guidance

While working at Hive communications, we have organisational processes in place which I must comply with, we have these so we can maintain a continuous, efficient and productive workflow, when applying techniques per specific requirements, dependant on the work we need to do.

MORNING & CLOSING ROUTINE (COMPLAINCE)

In the morning at Hive communications, when I begin our working day, I have a set routine which I follow so I can check all possible aspects of notifications for updates, which I then need to delegate and action appropriately. The table below is a copy of our routine tasks for the week, this document was composed by myself and my colleagues Connor and Christoph:



Morning Routine -
Unit 1.5.2 Evidence.

As you can see from the table shown, I have a comprehensive structured priority list which I comply with to ensure work is appropriately ordered, detailed, actioned and not missed. In addition to the daily procedure and meetings I have weekly meetings on a Monday, this is expanded on in the following heading.

WEEKLY MEETING (ORGANISATIONAL GUIDANCE)

The weekly meeting takes part once a week on a Monday morning, this is because it is the start of the working week after the weekend off. Occasionally there may be issues that develop over the weekend which require attention, these reported issues (if they arise) are taken into consideration in the meeting and are prioritised accordingly depending on the level of urgency they pose.

Evidence of this is provided by my colleague which details the process of me completing a morning meeting process as per the table shown previously.

Witnesses statement – Aspect 1.5.2

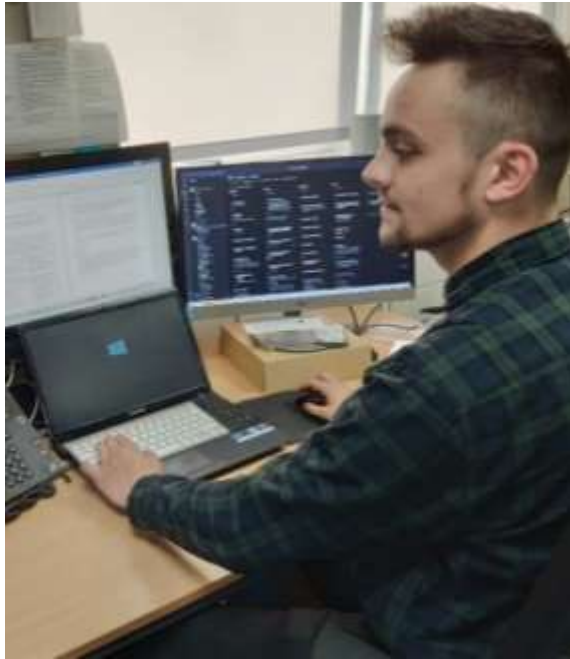


Witness%

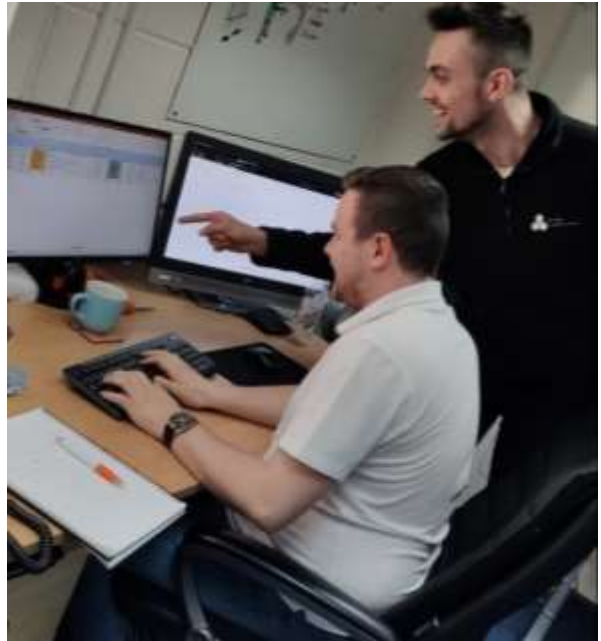
UNIFORM GUIDELINES

It is specified in our employee handbook we are to wear Hive Communications branded clothing on dates where we are going to be representing the company publicly, whether this be an expo, or an on-site visit to meet or assist a client. On a day where I am in the office, wearing a smart shirt, black trousers and smart shoes is appropriate as it is still a professional environment. Below is a photo of me helping a client on site in my work uniform representing the company, and another photo of me working at my desk.

At work (Smart casual)



With a client (Uniform on)



Unit 5.3: Demonstrate processes and practices for obtaining logistical support

Internally we have multiple methods of obtaining support when it comes to troubleshooting an issue or finding a resolution for an issue. A positive result can be achieved by following the appropriate channels for the right type of support.

PARTNER SUPPORT

Our partners play a key part in providing us with direct support for the issues I need to resolve, they are the Original Equipment Manufacturer [OEM]/Service Provider, so they have the appropriate information, diagnostic tools and methods to resolve problems efficiently and correctly.

Microsoft: Office 365 Partner Support

With every Office 365 tenancy I manage, there is support communication which can be established via a support request, there are multiple methods in which I can request this. Using the Global Administrator account, I am greeted with the following option on every page for when I require assistance:



Upon clicking the **Need help?** button, I am shown the following screen shown to the right.

After the user has detailed their issue briefly, they are provided with possible solutions in the form of links to manuals or forum posts, following this they can click the headset icon to open the 'Contact Support' menu.

Here they are greeted with a short form to fill in and depending on the issue, the options which the user is given to request support are adjusted, in this case I can have support call me within the shown time frame, all I need to do is detail the contact information and some more information describing my fault, and then a Microsoft representative will open a ticket and call me to assist with resolving my issue. When they call a remote support session is often established where they can direct us on methods to resolve an issue. When the issue is resolved, the support ticket is closed. I then store that on the affected client's tickets page on the CRM.

 A screenshot of the 'Contact support' form. The form includes fields for 'Title' (with 'Office' entered), 'Description' (with 'Office admin portal not loading properly (Access admin centers (Office, Exchange, Security, etc.))' entered), 'Confirm your number' (with '+44' and '1722777999' entered), and 'Confirm your email' (with 'office@hivecommunications.co.uk' entered). There is a 'Preferred contact method' section with 'Phone (Response within 16 minutes)' selected. At the bottom, there is a 'Contact me' button highlighted with a red arrow. The form also includes a 'Regional settings' dropdown and an 'Attachments' section.

DrayTek [SEG]: Partner Support

With DrayTek I can call them for support with issues that we have with DrayTek hardware, or configuration problems on routers that are affecting performance. There are not many instances in which I call them, however when I do, they usually begin by verifying our account over the phone, followed by enquiring with us what our problem is, after a brief description of the problem, they usually establish a remote desktop session onto our machine which I am remotely accessing the router or access point on.

Once they have resolved the issue the call is usually done, and the support agent will email us confirmation of the work completed as notes.

If the issue is something which requires further inspection, then a ticket is opened and allows us to communicate with the agent via email.

We open a ticket by navigating to <https://www.draytek.co.uk/information/draytek-dealer-portal/#technical-help>. We have Dealer Portal support access as we are partners with SEG. This allows us to get more direct support for DrayTek hardware, straight from the manufacturer.

Below is an example email I opened to resolve an issue I had with a client's DDNS service on their Vigor router.

From: SEG Support <tech@seg.co.uk>
Sent: 08 January 2020 10:06
To: Hive Communications <office@hivecommunications.co.uk>
Subject: Re: Re: DrayDNS/MyVigor issue [#TS541-]

--- Please do not reply below this line ---

Dear Reece,

Thank you kindly for your patience and understanding

Following our call:

- Configure DDNS in myVigor
- Configure DDNS on DrayTek router
- Force Update DDNS
- TEST OK

Feel free to contact us whenever you have any DrayTek related queries, and we'll be happy to assist.

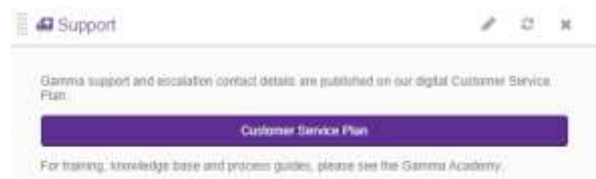
Regards,

Vlad

**** SEG Technical Support ****
Tel : (020) 8381 5500
DrayTek Support Index : <http://www.draytek.co.uk/support>

Gamma: Channel Partner Support

As our primary channel partner for majority of the services Hive provide, it is imperative we can contact the relevant support department as soon as possible in the event of requiring assistance. On the Gamma homepage I can navigate straight to the 'Customer Service Plan' which takes us to the following menu where I can select the department which best suits our requirement for support.



The 3-step dropdown support team flow tree consists of the following options:

For this example, I want to call Broadband Faults, Billing, and Horizon Provisioning.

Now I have selected the appropriate options I am presented with the primary IVR paths to use to get to the correct department quickly, I am also presented with emails to contact in the event the phone lines are busy. Furthermore, I can immediately call or email one of four escalation contacts, in the event I need a matter risen to attention much quicker than a standard issue, I would use the escalation contacts.

Because Billing is its own department, it is based at the start of the support flow tree. It has one dedicated line with multiple people who handle billing queries.

The screenshot shows the 'Enquiry Details' section of the Gamma support portal. A dropdown menu is set to 'Billing'. Below this, the 'Billing' department header is visible. The 'Billing Desk' section includes opening hours (Monday - Friday, 09:00 - 17:30), a contact number (01635 681200), and an email address (billing-centra@gamma.co.uk). The 'Escalation Contacts' section lists a '(Billing Manager)' with a contact number and email address.

Finally, Horizon Faults department is where I would need to call to report an issue with the VoIP platform.

The screenshot shows the 'Enquiry Details' section of the Gamma support portal. Three dropdown menus are highlighted with numbered red circles: 'Faults' (1), 'Channel' (2), and 'Horizon' (3). Below this, the 'Horizon Faults' department header is visible. The 'Gamma Service Desk 24hrs' section includes a contact number (0800 173000), IVR paths for Horizon Faults (Option 6 == Option 1 == Option 2), and an email address (horizfaults@gamma.co.uk). The 'Escalation Contacts' section lists four contacts: '(Team Supervisor)', '(Channel Support Manager)', '(Head of Operations)', and '(Customer Operations Director)', each with a contact number and email address.

As you can see from the examples provided of how I would obtain support, the process in which you achieve contacting the correct department is made simple with the presence of the flow diagram which guides the support agent to the appropriate person.

Escalation

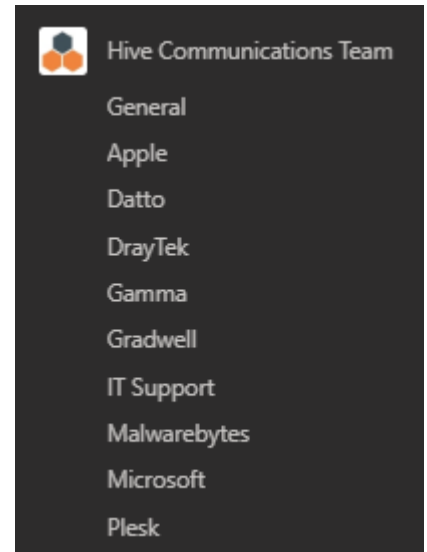
Additionally, to the right from the highlighted number, the escalation contacts are present for us to call if I need to raise a case with Gamma above the first line support, these escalation contacts do not have a queue system and I usually get straight through to the associated contact.

In summary, all the support options I have at my disposal allow me to request support from the appropriate parties with haste to prevent unnecessary prolonged disruptions to the end user.

INTERNAL MANUALS / WIKI

Internal manuals and wiki entries allow us to go back and review solutions and processes myself and Hive have created in the past, these can be amended, improved or just referred to. The purpose of possessing these manuals and wiki entries is to assist us with a task or process and to teach new staff of the methods in which to carry out a specific task.

When I resolve an issue that I haven't yet come across and believe could be an issue I come across again, I make a note on the relevant wiki pages or internal manuals. Each process is categorised by their relevant supplier or department in the following Microsoft Team 'Hive Communications Team'. Inside each channel of the team is a file folder which stores the relevant data for that folder. E.g. IT Support will have manuals and templates for processes which cover the IT Support work I perform for clients. Apple will contain a wiki on known shortcuts, issues and commands on Apple devices. More on this is explained below.



Teams organised manuals

On our 'Hive Communications Team' Microsoft Teams channel, we have multiple suppliers and departments, each with their own Manuals folder within their channel, this helps us organise manuals into what area they belong to as they will be purposed for one area of the work we do.

For example, if I have a process which involves upgrading a computer's HDD to an SSD, the manual would be in the IT Support manuals folder, on the other hand if it was a manual explaining the process on how to open a Horizon company, the manual would be in the Gamma Manuals folder. To navigate to the manuals folders in the respective channels, I can use one of two methods.

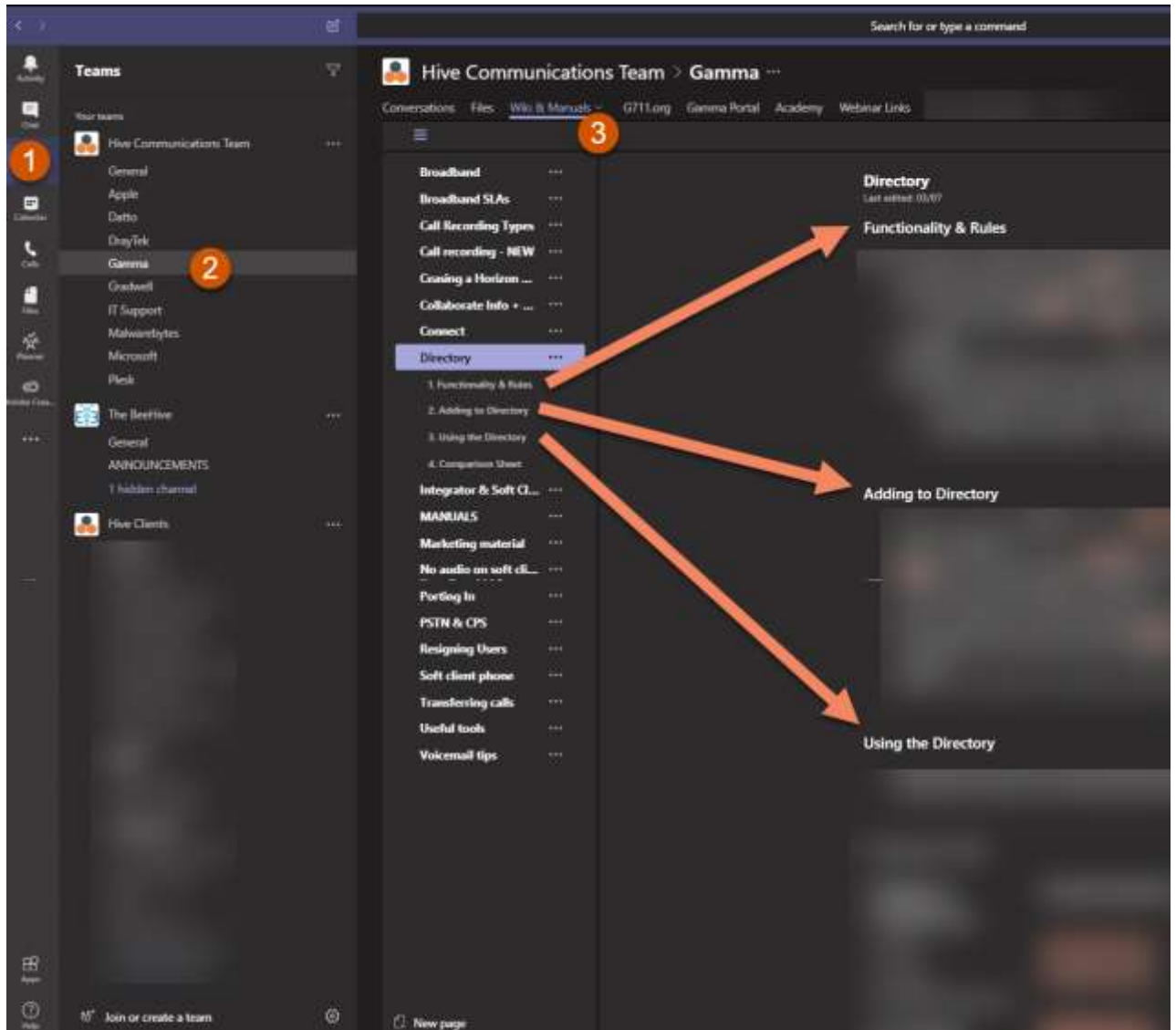
Either going to: **Windows Explorer > Hive Communications Team > Channel > Manuals**

or **Microsoft Teams > Team Channel > Files > Manuals**

will allow us to navigate to the Manuals I require. This format helps us reduce time in searching for a guide on a process because it is organised from the get-go.

Wiki on teams

Like the manuals accessible for assistance, the Wiki feature has one main difference, the wikis are embedded within the Microsoft Teams channel. The content of a Wiki is not saved as a file. However, despite this limitation, I am still able to saturate the wiki tabs for the relevant supplier/department with key quick review facts and guides that may assist us with work I need to perform.



As you can see from the attached photo there are multiple pages to this wiki allowing us to fill it in with a lot of info and go to the categories I need very quickly.

Unit 6.1: Demonstrate the ability prioritise workflow and manage allocated tasks

This module overlaps the module 1.5.2.

As previously elaborated and verified by the provided witness statement, my ability to prioritise workflow is confirmed in the reattached witness statement here:



Witness%

MORNING MEETING

This aspect has been covered before in the form of the witness statement. Please refer to the link above for more.

OSTICKET TICKETING SYSTEM

When a new ticket comes into our ticketing platform, it begins as an unassigned ticket. Depending on the nature of the work required based on the description given by the customer in the ticket, the ticket will be assigned to the appropriate worker who is the primary responder for that category of work. The categories are often shared between me and Connor, However, we both have our individual responsibilities as shown by the following document. It is colour coded to highlight who has primary responsibility for the roles.



Evidence

So, when the department is decided after reviewing the ticket, it is either claimed by the agent reading it if it is meant for them, or another agent reviewing it will assign it to the appropriate persons queue.

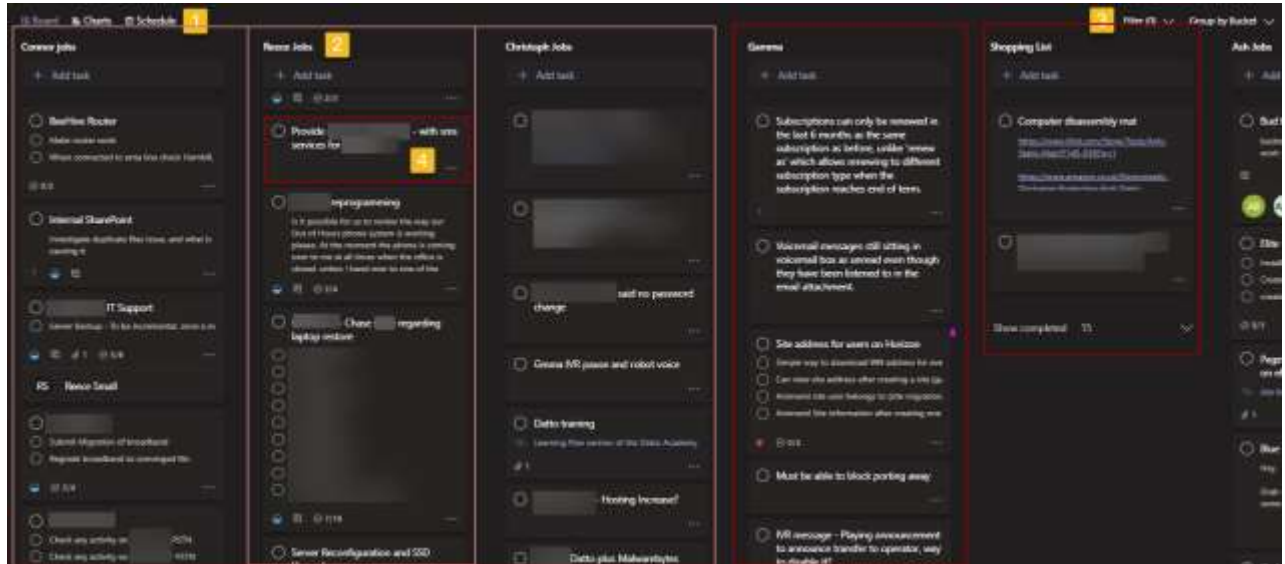
TIME SHEET ENTRIES

Workflow at Hive is managed in 15-minute increments, this means when it comes to entering it onto a time sheet, the numeric value of 1.0 is equal to 1 hour, so 15 minutes is represented as 0.25.

FILTERS AND SEARCHES: Company: <input type="text"/> From Date: <input type="text"/> To Date: <input type="text"/> Category: <input type="text"/> Employee: <input type="text"/> CLEAR FILTERS: PROCESS TIMESHEETS									
ID	Date	Employee	Company	Notes For Client	Notes For Internal Use	Duration (Hrs)	Category 1	Category 2	Category
12136	07/11/2019	Reece Small	Hive Communications	Emails, Tickets, Calls	Throughout Day	0.5	Client Admin	Not chargeable	
12138	07/11/2019	Reece Small	Hive Communications	Write up of f Mac Issue	Hive Team > Apple > Wiki	0.25	Internal admin	Not chargeable	
12137	07/11/2019	Reece Small	Hive Communications	Morning Meeting		0.25	Internal Meetings	Not chargeable	
12134	07/11/2019	Reece Small	Hive Communications	Reinstalling All Mailwarebytes Products		0.75	IT Support	Retainer	
12141	07/11/2019	Reece Small	Hive Communications	24789 - Changing License type for User no longer Business essent		0.25	IT Support	Retainer	
12155	07/11/2019	Reece Small	Hive Communications	Reinstalling Windows Updates + Invert. Setup and tested VPN, collect		2	IT Support	Retainer	
12153	07/11/2019	Reece Small	Hive Communications	Performing internal testing to replicate Tested reported issue for #		0.75	VoIP	Retainer	
12139	07/11/2019	Reece Small	Hive Communications	Chasing Results of Calls for	Opened Gamma Ticket -125489	0.25	VoIP	Retainer	
(New)		Reece Small	Hive Communications						
TOTAL (Hrs):						5			

MICROSOFT PLANNER

This online SAAS (Software as a service) is our primary tool for task list organisation, any job which requires to be done is noted on this platform to allow us to prioritise our outstanding work and complete it in a set order. Our Planner tasks are structured in the following format to aid us with our workflow:



The following screenshot is a view of our internal tasks which we individually enter our jobs on:

- 1) Jobs can be organised by 3 formats; however, I use the default 'Board' format as it structures our columns freely for us to manoeuvre.
- 2) Buckets: These are columns in which we have our own individual tasks, organisable in a vertical order, these tasks can even be shifted from bucket to bucket, allowing us to move a job to another user if required, freely and easily.
- 3) The filter tool allows us to filter certain tasks by the following:
 - a. **Keywords:** Words in a task or task description
 - b. **Due date:** When the task is due to be completed by
 - c. **Task priority:** What priority level the task is; Urgent, Important, Medium, Low
 - d. **Labels:** 6 coloured labels with individual categories which help us isolate jobs by their department
 - e. **Bucket:** Who's bucket the job is currently in
 - f. **Assignment:** The user(s) assigned to the task.

On top of this ability to filter, tasks can also be grouped by their Bucket, due date, label, priority, progress, and who the task is assigned to.

- 4) These are the individual tasks we add for the work we are performing, each with their own title, tick boxes to complete, attachments, comments, progress, start and due date, and assigned worker(s).

[Below example is an internal task so it varies as to how I structure the work]

1). **Title:** This is the general name of the task or summary of the work which will be carried out.

2). **Assigned To:** This is whoever the task is assigned to, can be multiple users if a job is shared.

3). **Bucket:** This is the column on planner which the task belongs to.

4). **Progress:** State in which the job is in. Not started, in progress or completed.

5). **Priority:** Level of importance of the task.

6 / 7). **Start and Due Date.**

8). **Description:** In detail, information and background of the job which requires completion, can include instructions or client requirements quoted from an email.

9). **Checklist:** Ordered to-do list which need to be completed to finish the task, this helps generate structure to the work.

10). **Attachments:** Documents, web links or photos which can be linked to a task for quick access or proof of job completion.

11). **Comments:** Notes made internally which help us keep track of progress, updates from clients and job completion.

In conclusion, Planner plays a key part in our workflow progression and completion. It is a highly structured tool which we manipulate to aid us with completing jobs efficiently, with tracked progress and details on the work that is done.

The screenshot shows a Microsoft Planner task card for 'Server Reconfiguration and SSD Upgrade'. The card is dark-themed and contains the following elements:

- Title:** 'Server Reconfiguration and SSD Upgrade' (labeled 1).
- Assign:** A button to assign the task (labeled 2).
- Bucket:** 'Reece Jobs' (labeled 3).
- Progress:** 'Not started' (labeled 4).
- Priority:** 'Medium' (labeled 5).
- Start date:** 'Start anytime' (labeled 6).
- Due date:** 'Due anytime' (labeled 7).
- Notes:** A section with a 'Show on card' toggle. The note reads: 'The server has got rather untidy with how it was initially configured and requires some changes to be in a suitable configuration'. Below this is a 'Server' section with 'Main work required:' and a list of tasks: '- Crucial data needs to be stored on a NON-OS drive in RAID', '- OS drive needs to be SSD not HDD', '- IIS needs to be on RAID Drive', and '- Windows updates broken' (labeled 8).
- Checklist:** A section with a 'Show on card' toggle. It contains 15 items, with the first three checked: 'Move Virtual Machines to Server Backup Drive', 'Repoint VM VHD's to D Drive - Copy to D', and 'Check Desktop/Development folder (smaller size) with Luke' (labeled 9).
- Attachments:** A section with an 'Add attachment' button (labeled 10).
- Comments:** A section with a 'Type your message here' text area and a 'Send' button (labeled 11).

Unit 6.2: Record tasks and comply with organisations quality processes

At Hive Communications we have processes which I follow to ensure jobs are completed, following a structure and standard, some of which have designed ourselves. The fact I had the primary input into how some of our processes function, how the tasks involved are carried out and who does the work, shows I have a good understanding of our internal organisational quality processes, below are some of the processes which I follow.

CRM TIMESHEETS & TICKET LOGGING

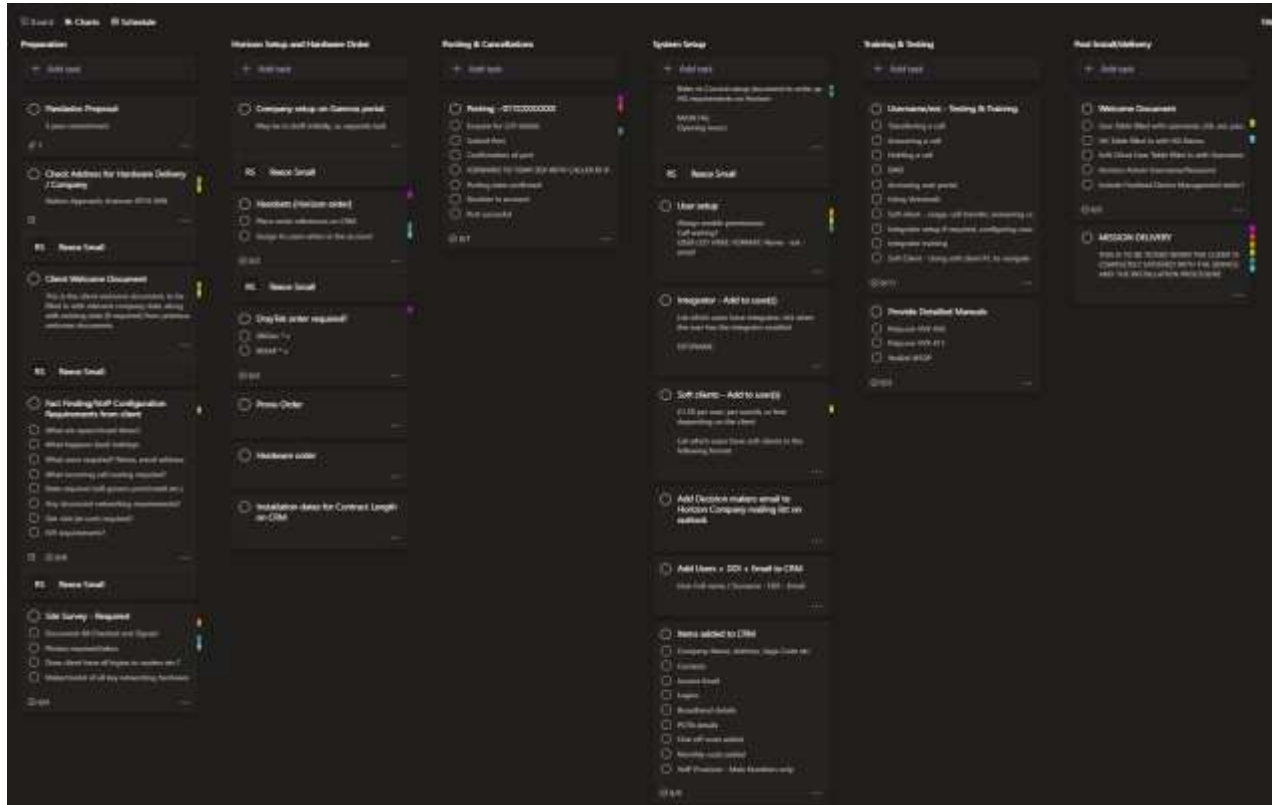
Our CRM is where I log our activity with clients via timesheets, our companies which I manage are on there, allowing us to calculate the time I spend on a job for a client. When I receive a ticket from a client requesting support, I initially add it to the client's tickets tab on their company. This includes the ticket number, summarised subject, the URL to the ticket and finally some internal comments which summarise the fix performed for the issue.

ID	Company	Ticket Date	Ticket Number	Ticket Subject	Ticket URL	Notes	Invoice	Date Added	Date Edited
123		05/04/2019	24000	N	https://helpdesk.hivecomm		<input type="checkbox"/>	05/04/2019 11:28	05/04/2019 11:28
119		28/03/2019	24003	N	https://helpdesk.hivecomm		<input type="checkbox"/>	27/02/2019 14:27	27/02/2019 14:30
113		09/04/2019	24003	B	https://helpdesk.hivecomm		<input type="checkbox"/>	09/04/2019 13:24	09/04/2019 13:28
114		09/04/2019	24008	N	https://helpdesk.hivecomm		<input type="checkbox"/>	09/04/2019 13:27	09/04/2019 13:30
115		09/04/2019	24014	A	https://helpdesk.hivecomm		<input type="checkbox"/>	09/04/2019 13:30	09/04/2019 13:33
116		09/04/2019	24064	T	https://helpdesk.hivecomm		<input type="checkbox"/>	09/04/2019 13:32	09/04/2019 13:43
118		12/02/2019	24063	N	https://helpdesk.hivecomm		<input type="checkbox"/>	27/02/2019 14:25	27/02/2019 14:26
119		12/02/2019	24063	N	https://helpdesk.hivecomm		<input type="checkbox"/>	27/02/2019 09:46	27/02/2019 09:46
117		09/04/2019	24108	Q	https://helpdesk.hivecomm		<input type="checkbox"/>	09/04/2019 11:34	09/04/2019 11:44
117		26/02/2019	24108	K	https://helpdesk.hivecomm		<input type="checkbox"/>	26/02/2019 12:55	26/02/2019 13:01

See more under [OSTicket Ticket Filtering & Referral](#)

MICROSOFT PLANNER TASKS

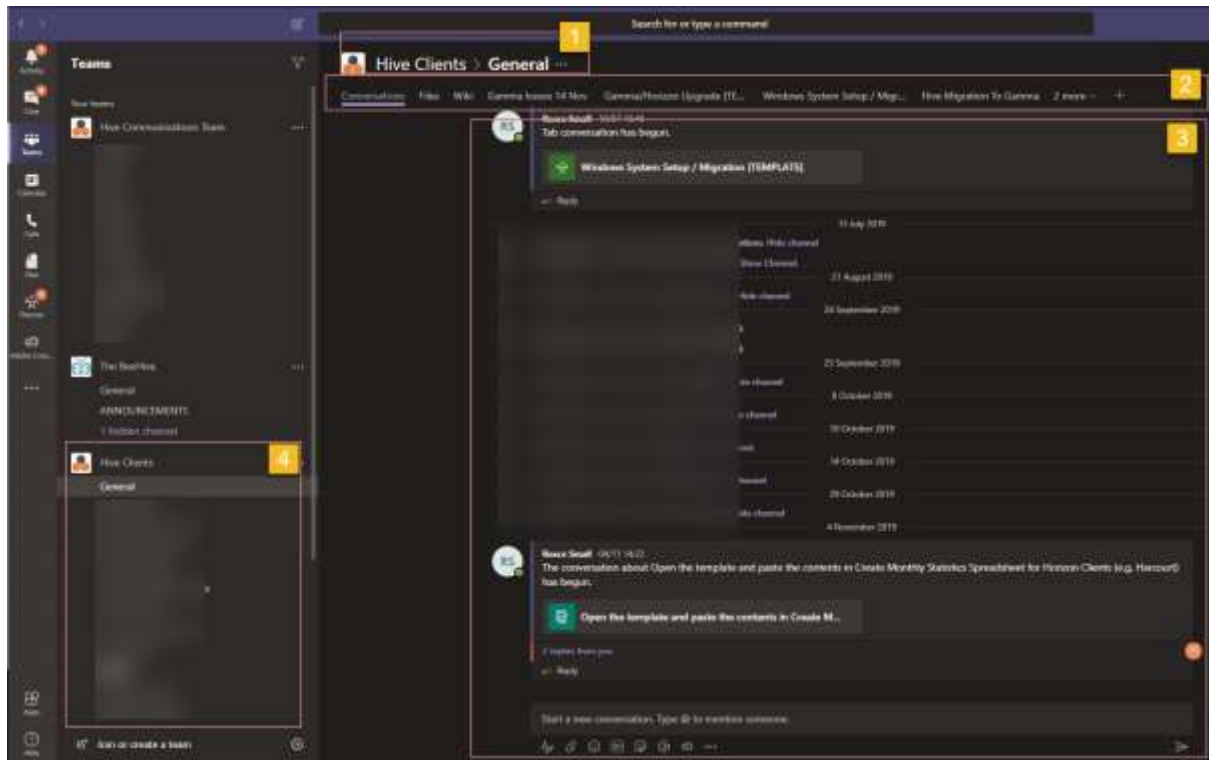
Some of our processes originate from Planner templates which I made to aid us with the generic process of migrating a client to Gamma whether it be for phones, broadband or both. This template was designed by me with the thought process of every possible migration step that could be required. By adding every possible requirement, when it comes to copying the template to use for a client, I can isolate which aspects I do not require and only copy the steps I need to make a bespoke plan for the client's requirements. The base template is below.



The reason why I have planner templates like this, is because then I can save time in the future when it comes to performing similar migrations for other clients.

MICROSOFT TEAMS CLIENT CHANNELS

I use the Microsoft Teams channels to record and store our client data in organised sections whereby the channel represents the client and inside the channel is the conversation data which we discuss the clients matters and work. The files section of the channel is equivalent to a folder on SharePoint in which the client's files are stored.



1. This section shows users which channel of the team they are viewing.
2. These tabs indicate which page the user is on inside the channel, on each channel there is a Conversation tab and file folder by default, these tabs can be added to with the likes of add-ins of software relevant to the work in progress. Common Microsoft services like Word, Excel documents can be pinned on the tabs to allow some information to be easily accessible, this can be the welcome document for the client, or other files.
3. This section is where the tabs show their view, in this example, I see the conversation feed of the channel.
4. The Hive Clients team has subchannels which include our client names, for privacy the names have been blurred.

It is our organisational process to input any client data in their respective Teams channel. With this comprehensive software I can add and remove data we store of the clients very simply; it allows us to quickly navigate to a client in seconds and find out their information.

Unit 7: Health & Safety

Interprets and follows IT legislation to securely and professional work productively in the work environment Understands and applies. Health & Safety policies to everyday work.

7.1: The apprentice must be able to demonstrate their interpretation and secure working practices in accordance with IT legislation.

7.2: The apprentice must demonstrate an understanding and Health & Safety policies to everyday work.

Part 1: H&S Questionnaire from Wiltshire College



Health & Safety In
IT.pdf

Part 2: Hive Communications/Blue Bee Solutions Floor Plan



Office Floor
Plan.png

Part 3: H&S Workbook: Office Health & Safety Questionnaire + Certificate



Be Safe
Workbook.pdf

Part 4: VDU Workstation Checklist



VDU Checklist -
ASH.pdf



VDU Checklist -
Christoph.pdf

Unit 8.1: Demonstrate how to configure a minimum of three pieces of hardware and configure three different types of software in line with business requirements.

Hardware and software become outdated over time and at some point, requires updating, upgrading, or replacing. In this segment I will show you 3 pieces of software which I made changes to, to improve overall performance, and 3 pieces of hardware which I also upgraded to get more performance from a system.

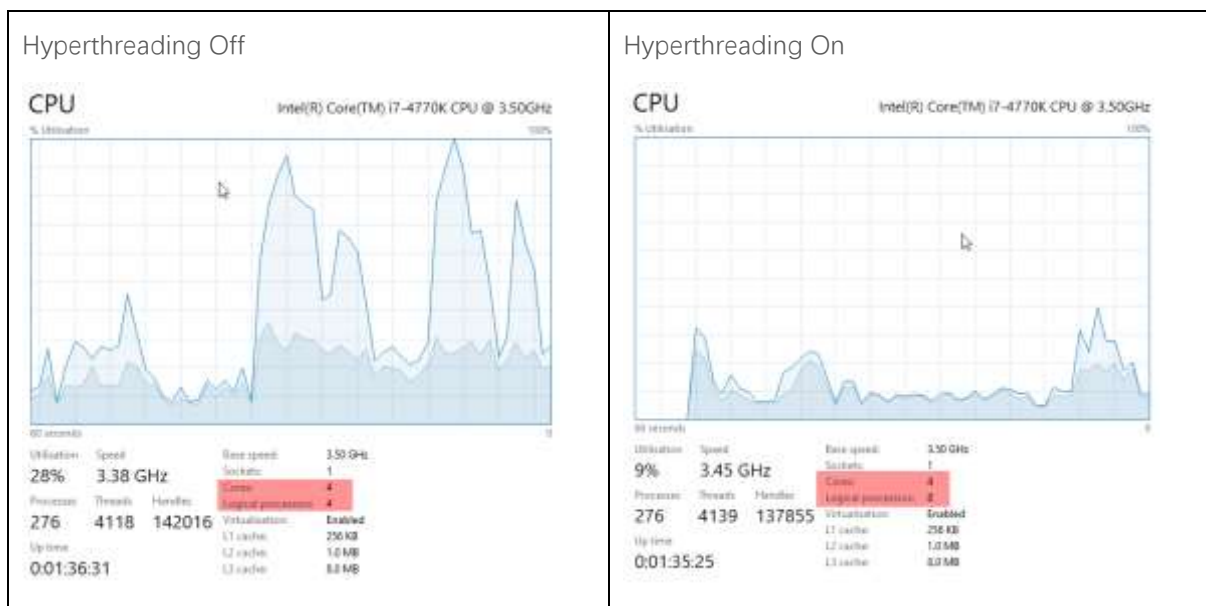
HARDWARE

BIOS reconfiguration

Simple tweaks to the BIOS can unlock certain features of a system which can greatly maximise the performance and functionality of a system. The below tweaks highlight the improvements applied to a system when they are enabled.

Hyperthreading

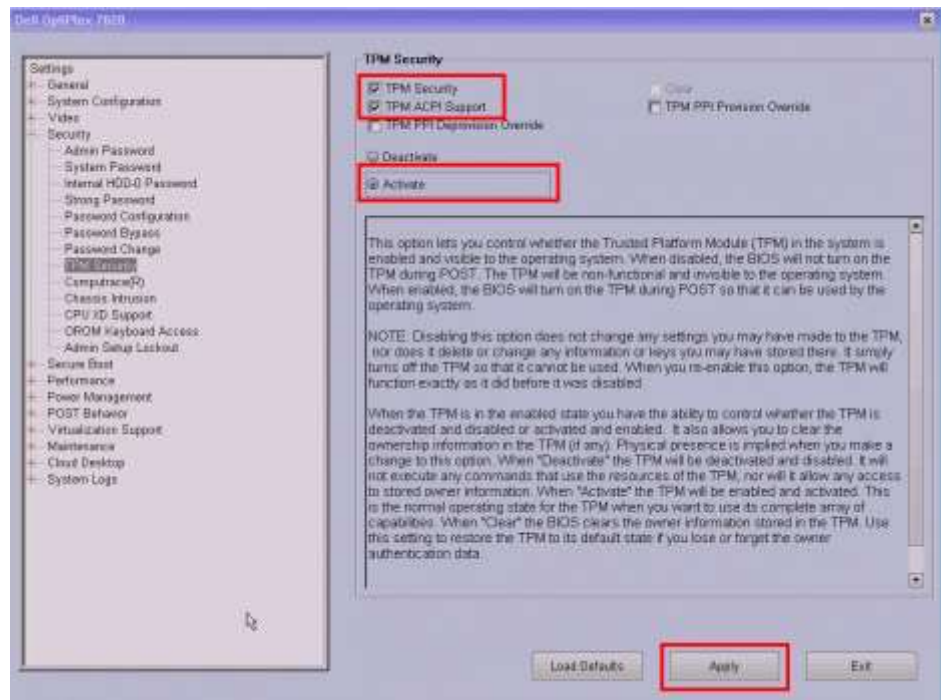
This processor feature utilizes the threads in your CPU to boost performance inside an OS, by presenting each individual thread as its own processor core. This greatly reduces load on a system by logically doubling the computing ability of a machine. More cores/threads equate to higher performance. When hyperthreading is on, logical processing cores (threads) are used instead of physical.



You can see from the graphs; the increased number of logical processors gives the system more headroom for processing power.

TPM (Trusted platform module)

This embedded microchip is a module on a motherboard which stores an encryption key used to hardware verify a storage drive either upon boot, or upon access of said drive. Windows BitLocker utilises the TPM on boot to make sure the stored encryption key corresponds to the key required on the storage drive. With this on, BitLocker authenticates the drive in the system before it can be accessed. This prevents data theft if the drive were to ever be used in another system as the third party would require the correct authentication to access the data. The picture attached shows the TPM being switched on.



SSD Upgrade – HDD to SSD

In the below images, I have upgraded a systems HDD to an SSD to improve performance and load times. To upgrade to an SSD I needed to use a cloning software to duplicate the old drives partitions and data to the new drive, so both are identical. When the cloning process is completed, I installed the SSD in place of the HDD, then turned the machine on.

The images below present the read and write speeds of the drives, the higher numbers indicate a performance increase.

HDD Speed test				SSD Speed test			
CrystalDiskMark 7.0.0 x64 (UWP)				CrystalDiskMark 7.0.0 x64 (UWP)			
File Settings Profile Theme Help Language				File Settings Profile Theme Help Language			
5 1GiB C: 54% (251/466GiB) MB/s				5 1GiB C: 54% (251/466GiB) MB/s			
Read [MB/s]		Write [MB/s]		Read [MB/s]		Write [MB/s]	
SEQ1M QBT1	11.32	76.55		540.56	506.20		
SEQ1M Q1T1	10.49	76.34		488.29	488.41		
RND4K Q32T16	0.15	0.75		400.18	289.83		
RND4K Q1T1	0.11	0.82		29.54	59.99		

The sequential read speeds are over 47x faster on the SSD than the HDD.

The sequential write speeds are over 6.6x faster on the SSD than the HDD.

RAM Upgrade – Add additional RAM

The process of upgrading RAM is different on every machine, laptops and All in one machine are not as easy to modify in comparison to most modern tower PC's. Upgrading RAM can greatly increase the performance of a machine by giving the system more space to run applications in the background and foreground. In this section I will be showing the steps I followed to upgrade RAM in this client's machine.

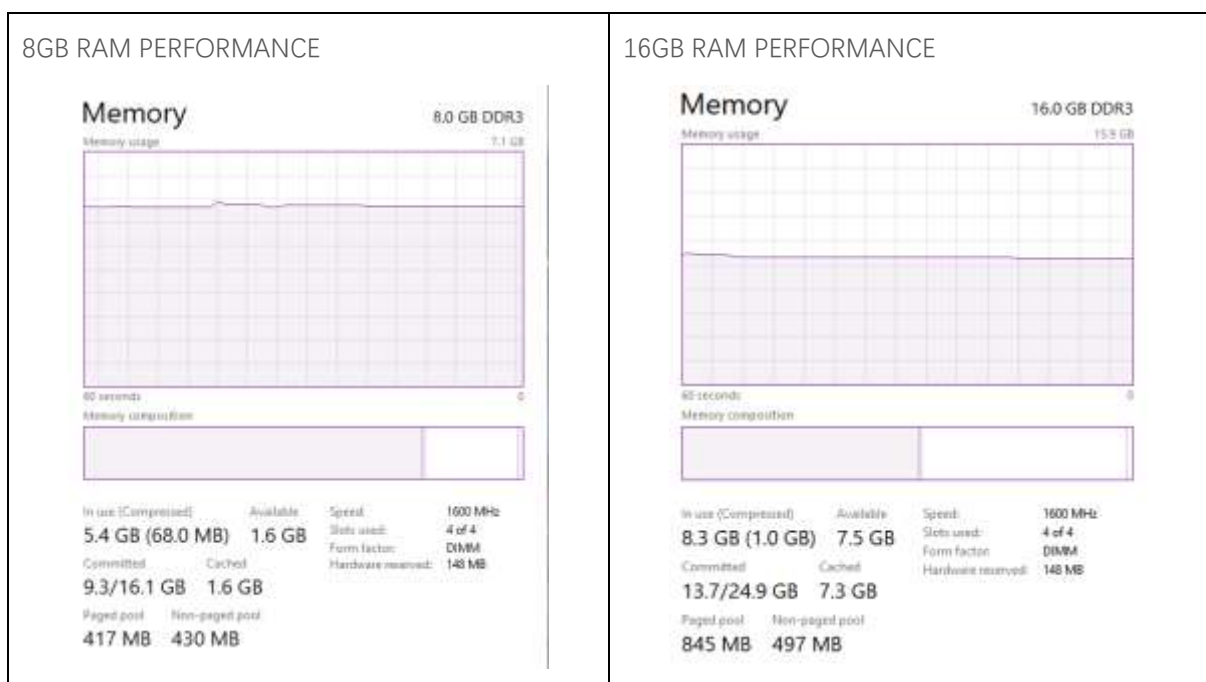
Step 1 - Collect system information and current RAM type: This can be done in two ways. Look up the system motherboard model number and associate the compatible RAM types with the board.

Alternatively, my preferred method is to extract RAM from the system motherboard to take its model number, so I can then research what additional or replacement RAM to buy for the system. When I have the RAM, I am ready to install.

Step 2 – Install acquired RAM: When the RAM is ready to install, the system needs preparing to have the RAM added to it. For this it is key to wear PPE such as an anti-static wristband to prevent damage to the motherboard or other components. I take apart the system and perform the RAM upgrade with anti-static wristband grounding me.

Motherboards have colour coded RAM slots when there is more than 2 on a board, as it indicates then that it must be installed in pairs. Once the RAM is clicked into place on the motherboard, I am ready to test if it works.

Step 3 – Turn on and test: Now the system has been reassembled and turned on, I can check for the additional RAM within the system to see how much I have available. As shown below, I can see the before and after of what Windows Task Manager reports RAM wise:



As you can see this shows the RAM upgrade was successful and the available RAM has increased, and the utilisation of the available system memory is less. This will improve performance of the system, allowing more applications to run in the background, or allow programs to have more breathing room to run if they need it.

SOFTWARE

Windows Tweaks & Improvements

Every Windows system has different specifications and hardware in which it runs on, some computers are faster than others and some systems require repairing if they either become too slow, unstable or run out of battery quickly. Below are some examples of tweaks I run to improve the performance of machines I manage, with what I do to make the performance and better for the user.

Disabling Start-up Apps / Decrease Boot Time

A lot of software on Windows when it is installed is pre-programmed to run on system boot, over time this can slow down a machine and even extend the time it takes for a system to get to the desktop and be ready to use. Below is evidence of me disabling programs on my work machine and improving the boot time by reducing it.

To reduce the quantity of launching applications, I go to **Task Manager > Startup** and then disable the applications shown below:

Boot time before disabling applications

18.5 seconds to boot up

After disabling start-up applications

5.1 seconds to boot up

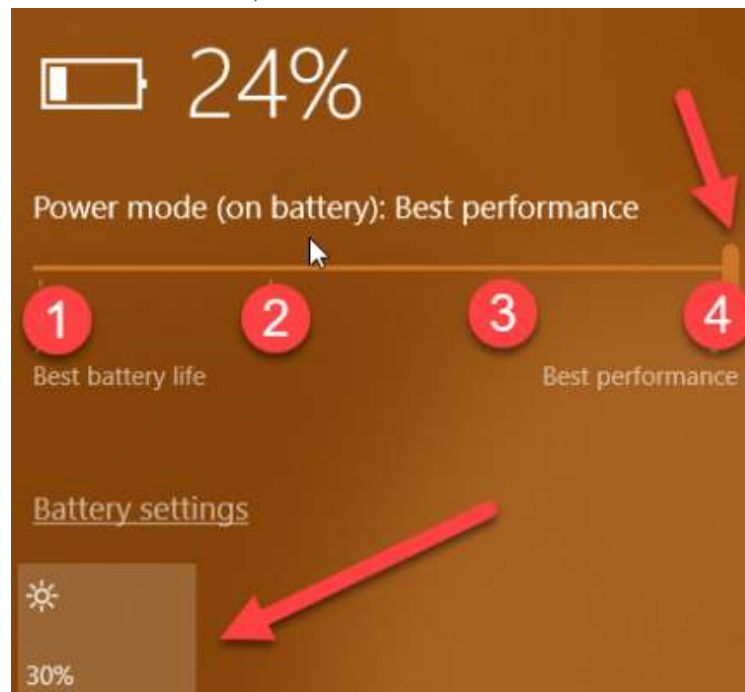
This falls in line with business requirements as it improves system performance by reducing the quantity of programs which start with the system, in turn this also reduces RAM, power and CPU usage as less programs are running. The programs which I disabled are non-essential for the business and can be manually started if I needed them.

Changing power plan

This tweak in the system settings can improve the performance and life of a machine with a battery, or it can favour performance over power usage to make the most of a systems core performance ability.

Below are the four available performance settings and which I enable based on varying scenarios.

- 1) **Best battery life** – this option conserves the most power on a system when the Windows 10 device isn't connected to a power source. When this option is selected, and the battery saver is enabled, some features of Windows are either not available, throttled, or behave in a different way. In this mode, screen brightness is also reduced drastically as this leads to lower energy consumption.
- 2) **Better battery** – This option offers longer battery life, but not as much as 'Best battery life', it does not lower the screen brightness. On some systems, users see this option be highlighted as 'Recommended'.
- 3) **Better performance** – This is the default option selected which slightly favours performance over power.
- 4) **Best performance** – This option favours performance over power usage. This mode is targeted at users who want the best performance possible for their applications. For users who want battery life, this is the least efficient option to use.



Most systems I install are desktops, so I tend to select 'Best Performance' on those machines to ensure the machines perform at their best, this is because they do not have a battery to be cautious about when it comes to performance. As for laptops, I recommend clients and staff to use the default option and then lower down to 'Better Battery' if they want to retain performance but extend their usage time for the period, they use a laptop.

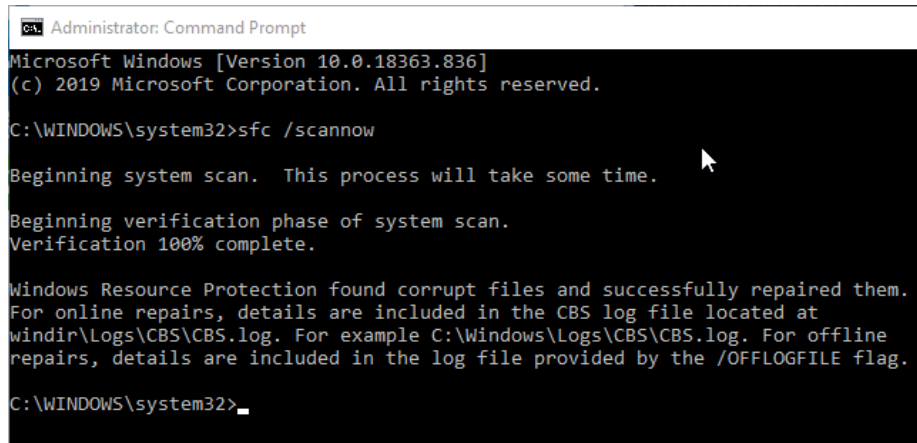
Overall, adjusting the battery optimisation options maximises the performance needs for the user as it allows the system to be adjusted according to the user's requirements and needs.

Repair Installation Files – DISM & SFC

In Windows there are two commands which can be ran to improve system performance, and to repair Windows if system files become corrupted. Those commands are:

sfc /scannow

An offline scanning tool to analyse system files to repair them if they are broken.



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.18363.836]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>sfc /scannow

Beginning system scan. This process will take some time.

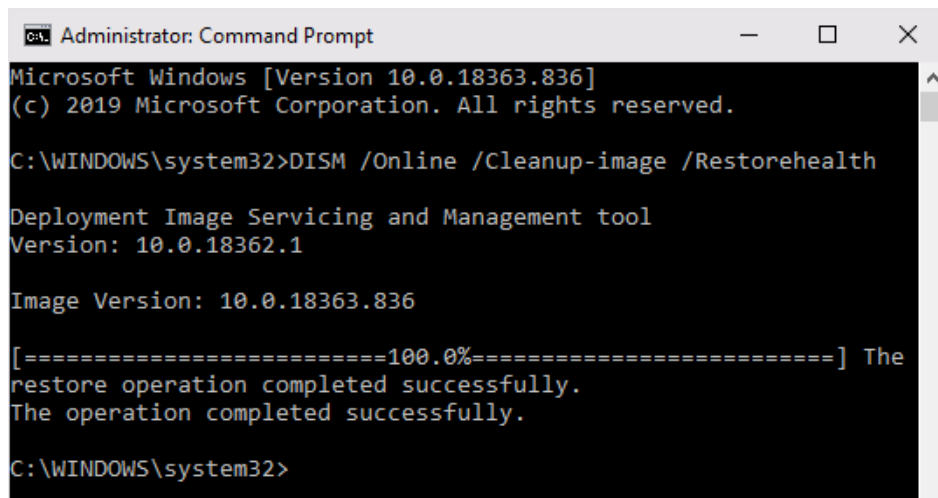
Beginning verification phase of system scan.
Verification 100% complete.

Windows Resource Protection found corrupt files and successfully repaired them.
For online repairs, details are included in the CBS log file located at
windir\Logs\CBS\CBS.log. For example C:\Windows\Logs\CBS\CBS.log. For offline
repairs, details are included in the log file provided by the /OFFLOGFILE flag.

C:\WINDOWS\system32>
```

DISM /Online /Cleanup-image /Restorehealth

Requires internet and downloads files from Windows Update to fix the system.



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.18363.836]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>DISM /Online /Cleanup-image /Restorehealth

Deployment Image Servicing and Management tool
Version: 10.0.18362.1

Image Version: 10.0.18363.836

[=====100.0%=====] The
restore operation completed successfully.
The operation completed successfully.

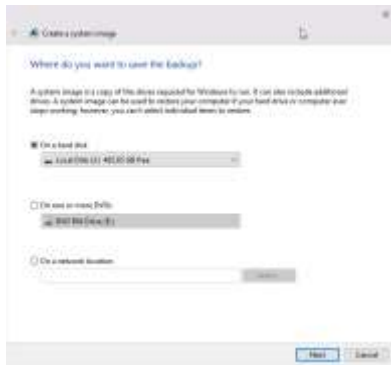
C:\WINDOWS\system32>
```

Both commands require administrator privileges to be executed.

These commands were both ran on my work PC and they ensured none of my system files were corrupted, and that my system would run smoothly. I run this command on many client machines, if their Windows installation is not functioning properly, both commands often remedy system stability issues after they are run, this keeps the machines in line with the business requirements as it keeps them working.

32-Bit to 64-Bit Upgrade

Windows cannot simply be updated from 32 to 64-bit, this process must be done in the form of completely re-installing Windows 64-bit from scratch on the target system. The reason people upgrade from 32-bit to 64-bit is because 32-bit operating systems have a maximum RAM limit of 4GB. This limitation bottlenecks the potential of machines with higher RAM capacity installed. A full backup of a 32-bit Windows system can be made which can be restored later in a 64-bit environment. The process is as follows.



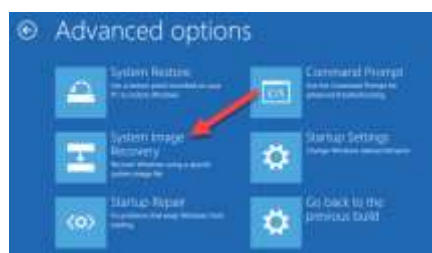
I navigate to **Control Panel\System and Security\Back up and Restore (Windows 7) > Create a system image**. I select the target hard drive to save the system image backup to and click next.



When the process is complete I restart the computer to the bootable USB 64-bit

Windows installer, I wipe the original drive I backed up from and install a clean version of Windows onto it. After that completes, I boot the computer into recovery mode by doing the following from the desktop.

Navigate to **Settings > Update & Security > Recovery > Advanced Start-up**



Following through this process restores the current install of Windows, with the same settings, files and preferences that were present in the backed-up system.

Once the recovery is done, you can see the before and after of available RAM and operating system type in the picture below. The improvements 64-bit brings to the table are the ability to utilise 64-bit applications as well as 32-bit, and also higher RAM capacity of up to 2TB. In the picture below, we can see the jump from 4GB RAM to 16GB.

Before: 4GB RAM / 32-bit	After: 16GB RAM / 64-bit
<p>View basic information about your computer</p> <p>Windows edition</p> <p>Windows 10 Pro</p> <p>© 2019 Microsoft Corporation. All rights reserved.</p> <p>System</p> <p>Processor: Intel(R) Core(TM) i7-4770K CPU @ 3.50GHz 3.50 GHz</p> <p>Installed memory (RAM): 4.00 GB (3.00 GB usable)</p> <p>System type: 32-bit Operating System, x64-based processor</p> <p>Pen and Touch: No Pen or Touch input is available for this Display</p>	<p>View basic information about your computer</p> <p>Windows edition</p> <p>Windows 10 Pro</p> <p>© 2019 Microsoft Corporation. All rights reserved.</p> <p>System</p> <p>Processor: Intel(R) Core(TM) i7-4770K CPU @ 3.50GHz 3.50 GHz</p> <p>Installed memory (RAM): 16.0 GB (15.9 GB usable)</p> <p>System type: 64-bit Operating System, x64-based processor</p> <p>Pen and Touch: No Pen or Touch input is available for this Display</p>

Unit 9.1: Explain how to comply when required with WEEE and the implications of data protection during disposal

OUR PROCESS – HOW I COMPLY

At Hive we take Waste Electrical and Electronic Equipment recycling (WEEE) very seriously. I deal with client hardware all the time, in the event a computer belonging to a client becomes broken and is unrepairable, we will collect it for a fee, then analyse what part had malfunctioned.

In the event the clients hard drive or solid-state drive can be recovered and placed into a new machine for the client to resume work, Hive offer that as a solution. This prevents wasting hardware that works, but also prevents us using a new drive when the old one is working perfectly. In instances like this I also analyse which other parts of a computer, laptop, or all in one can be recovered. This can include Wi-Fi cards, RAM, CPU's, and more.

These recovered components are then organised by part information and type in our part storage space, I then recondition these parts for compatible hardware internally to reduce electronic waste, I do this to allow us to prevent spending more money on new hardware also.

If the hardware is too old and has no use for modern hardware, it is still organised into its relevant product category and then packed compactly and neatly ready for disposal when Hive look to dispose of the hardware. More on that under the Disposal subheading.

Data cleansing

This plays a key part in recycling computer hardware as to be extra safe, it is key to ensure the data on a drive is completely gone even after a quick drive format. Sometimes, drives will retain data even after this process, so it is key to remove the data by any means necessary, these methods are detailed below.

Broken drives

Broken drives are a different case to working drives as it depends on which part of the drive is broken. If the drive refuses to mount to a computer at all, physical methods are used to erase/scramble the drives data. The one I use regularly includes dismantling the drive and wiping a magnet over the hard disk platters directly.

As silly as this method sounds, physical methods which are effective at destroying the data making the platters inside the drive not recoverable, are used frequently when drives refuse to load onto a working machine. This process is completed wearing protective equipment such as gloves and eye goggles.

When the drives are sufficiently scrambled by a magnet, the drives are then rebuilt depending on the cause of break in the drive, then added to the disposal list ready for export.

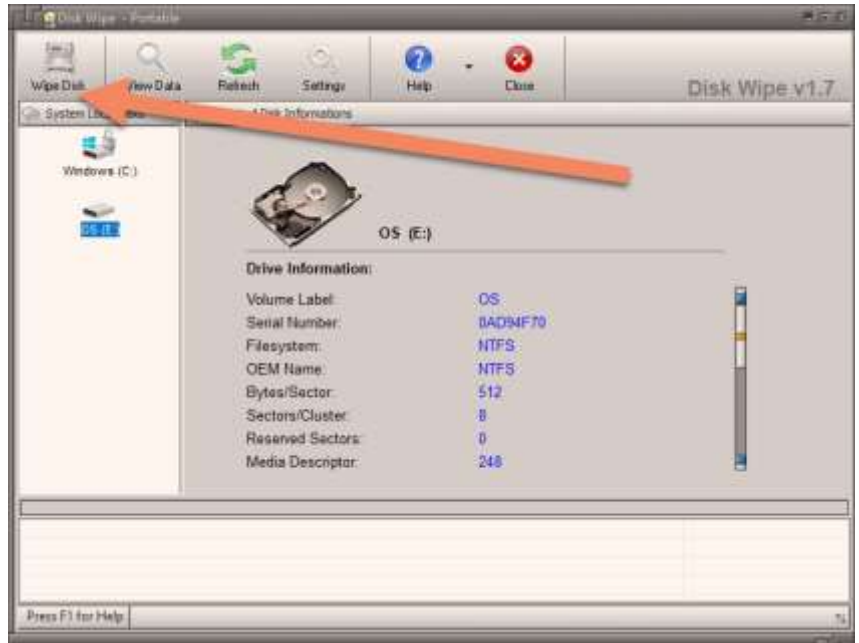
Working drives

Working drives are much easier to dispose of as they can be mounted to a computer with specialised software which wipes the drives effectively to ensure any data stored on them previously is no longer accessible or recoverable.

To wipe drives I use a tool called Disk Wipe for Windows.

After mounting the drive and selecting it within Disk Wipe, I click **Wipe Disk**.

For best practise I use the British HMG IS5 standard to wipe the drive which does 3 passes to wipe the drive. When this process is complete, I can either recycle the drive or reuse it on other machines internally. Or I will dispose of it with the rest of the waste. This depends on the age and quality of the drive, and if I deem it reliable enough to work in our internal machines.



Disposal

When it comes to disposal of drives and electrical hardware, in our local area I have an electrical waste tip in which I pay a visit to with the hardware I wish to dispose of. We transport it in large plastic containers using a company vehicle with business insurance. The waste is then placed in the electrical waste zone, as witnessed by a worker at the waste disposal ground. They coordinate the disposal and check the product being disposed is permitted in that area.

Overall, that is our method in which we dispose of electrical waste at Hive.

Closing thoughts

In this portfolio I feel I have expressed my widespread knowledge and skillset in IT and how to appropriately use it in specific scenarios or circumstances, along with the correct understanding of what and where to use my skills, and how and who to use them with.

Knowledge Modules - MTA & City & Guilds: Exams & Certificates

Mobile and Operating Systems:

98-368: MTA: Mobility and Device Fundamentals



MTA Certificate -
Mobility and Device



MTA Result -
Mobility and Device

Networking and Architecture:

98-366: MTA: Network Fundamentals



MTA Certificate -
Networking Fundamentals



MTA Result -
Networking Fundamentals

Coding and Logic:

98-361: MTA: Software Development Fundamentals



MTA Certificate -
Software Development



MTA Result -
Software Development

Cloud Services:

98-369: MTA: Cloud Fundamentals



MTA Certificate -
Cloud Fundamentals



MTA Result -
Cloud Fundamentals

Business Processes:

9628-310: Business Processes



Reece Small - Exam
Breakdown - C&G - B



Business Processes
Certificate.jpg

Extra Certifications Obtained:

98-367: MTA: Security Fundamentals



MTA Certificate -
Security Fundamentals



MTA Result -
Security Fundamentals

98-349: MTA: Windows Operating System Fundamentals



MTA Certificate -
Windows Operating System



MTA Result -
Windows Operating System