

It unit 9.2

By Adam Chu



# Components Needed to connect to network

## NIC (Network Interface card)

The NIC is a hardware level device that is designed to act as the intermediary between the motherboard and other network components this allows for LAN protocols and IP protocols using a personalised (per NIC) address written in Hexadecimal. This is commonly used in a wired LAN as the data sent to each LAN from the internet uses the MAC addresses as a nodes reference point allowing for faster read & write speeds.

I am recommending using the motherboard enabled ethernet connector and NIC as the best and most common NIC’s that are made either by Killer and Intel respectively but these are similar to PCI-E based NIC’s anyway and are included in the motherboard. (recent ones will support 1GB networking)

## Switch

A switch is a smart networking tool which uses hardware addresses to boost (this helps to protect the data from EM interference) and sort the data coming into the switch for its desired targets using there MAC addresses. This is an improvement over a Hub / Repeater as they send all of the data to all of the computers, which is slower for download speed.

## RJ45 to Fibre Optic Converter

This allows the user to take an optic signal or an ethernet signal and convert them to the other standard this means that the length could reach across the car park without losing speed, and gaining a massive amount of interference.

## WAP (Wireless Access Point)

A WAP takes a wired connection that is supplied by a switch this can vary in signal strength and range based on its classification and bandwidth for instance 5GHz bandwidth is less commonly used due to its frequency and is ‘cleaner’.

## Patch Panel

This allows the collection of loose cables that are inside the walls this collects them and adds a new output for them this is not a switch as it just tidies incoming / outgoing cables.

## Socket Covers

These go inside a stud wall with the female for a RJ45 this allows the user to have a tidy cable exit this is useful in a business as it allows computers to be switched out without having to know where the nearest switch is.

## Operating System

The use of Windows Server 2019 which is the latest variant of the windows server products this allows corporate networking, databasing, messaging. And it includes features more important like a migration manager, storage replica and improved Windows Defender (this will not stop me recommending a hardware firewall). Also as its based on Windows 10 which is the most current and will be supported for a longer period of time than Windows 8 (or Windows Server 2012).

Also Windows Server 2019 can support a much larger maximum drive size at 4 PB (1 Petabyte = 1024 Terabytes) at a better software RAID (Their process is similar to mixing RAID-1 and RAID-6).

# 

# Part List

|  |  |  |  |
| --- | --- | --- | --- |
| Part | URL | | Image |
| 16 Port Switch | [TP Link 16 Port Switch](https://www.amazon.co.uk/TP-LINK-TL-SG1016-V12-16-Port-Ethernet/dp/B07CZ3FP5L/ref=sr_1_13?s=computers&ie=UTF8&qid=1545003923&sr=1-13&keywords=switch+rack+mount) | |  |
| The reasons why I chose a 16 port switch instead of a 24 or a 48 are that the number of ports needed per floor didn’t match up to those numbers. For example on the top floor . There are 27 ports needed.   * 1x To go Downstairs * 1x Between the two switches * 25x PC   If you would use a bigger switch you would have to use a 48 port switch which is bad as it could completely fill the 1st building which needs 39 ports which would leave you with 9 more but at double the cost for a similar one (speed and rackmountable). Also then you still need a 16 port switch for the second building.  I would rather have 4x 16 port switches compared to 1x48 and 1x16 port configuration as it also puts constraint on the distances between each node and the switch whilst also saving money on cabling & simplicity. | | | |
| Wireless Access Point | [Asus RT-AC51U 300Mbps, 5Ghz WAP](https://www.amazon.co.uk/ASUS-RT-AC51U-Dual-Band-Wireless-Multifunctional/dp/B00XUDWDZE/ref=pd_sbs_147_1?_encoding=UTF8&pd_rd_i=B00XUDWDZE&pd_rd_r=e820e220-0193-11e9-b2e4-3f90368f41c0&pd_rd_w=QkJOd&pd_rd_wg=tQxZv&pf_rd_p=18edf98b-139a-41ee-bb40-d725dd59d1d3&pf_rd_r=BY5GQEN806GX3836YFMF&psc=1&refRID=BY5GQEN806GX3836YFMF) |  | |
| I have chosen this WAP as it runs using the newest protocol, 802.11 ac at 5Ghz this allows a better experience whilst testing, for example this could be for the non-ethernet division (phones / notebooks). | | | |