# Analysis of Connection Point (7)

**What is connection point (7)?**

Connection point 7 handles the connection of all 3D printers to a network. The printer network is then linked to connection point 5 which will join to business network.

**Hardware Solutions**

* Possible
  + Wireless router
  + USB network Hub
  + Wireless network Hub
  + USB multiport switch - <http://www.staples.com/ConnectPRO-8-Port-KVM-Switch-With-USB-VGA/product_IM1TC5782>
  + Wired/Wireless repeater
  + Automatic printer switch
    - <https://www.iogear.com/usb-switch.htm>
    - <http://www.amazon.co.uk/s/?ie=UTF8&keywords=printers+cables&tag=mh0a9-21&index=electronics&hvadid=3174907226&hvqmt=p&hvbmt=bp&hvdev=c&ref=pd_sl_797tdv5nbk_p>
* Proposed
  + Solution 1
    - USB Network Hub
  + Solution 2
    - Automatic printer switch
  + All Solutions
    - No repeater. (repeaters used for cleansing and extending signal further than 100m) Warehouse is 50x50m.
    - Ethernet over USB - <https://en.wikipedia.org/wiki/Ethernet_over_USB>
* Ethernet Hub vs Network switch
  + <http://www.ebay.co.uk/gds/Ethernet-Hubs-Vs-Network-Switches-/10000000177629216/g.html>
* Wired vs Wireless:
  + <http://smallbusiness.chron.com/explanation-wireless-vs-wired-printers-58672.html>

**What is it connection point needed for?**

This point manages the connection and network of the 3D Printers to the business network.

**What features should the hardware have?**

* USB hub will need an independent power supply (self-powered) so that the number of downstream ports is not limited to just 4. <https://en.wikipedia.org/wiki/USB_hub>
  + Bus-powered
  + Self-powered
  + Dynamic powered

**Assumptions**

* Cat5 Ethernet cable will be used to link connection point 7 and 5.
* Printer network will access LAN only. No need for internet connection.

**Constraints**

* The majority of FDM and SLA printers that I viewed where USB and Wi-Fi connected. Printer network specific hubs and switches have been developed other the years although 3D printer networks are still fairly new and not as common yet.
* Traditional network switches use Ethernet connectivity. Standard Ethernet switches come with 18-24 ports. Standard USB hub comes with 4-7.
* The network hub will need to be self-powered i.e its own power source opposed to powering by USB. If the hub is powered by USB then the amount of ports available downstream is a maximum of 4 where as if the hub had its own power source it is not limited
* In order to achieve USB2.0 or 3.0 data rates all connections from the USB device (printer) to the computer must be of the same USB version.

**Thoughts:**

Original idea was that all printers would be connected via USB network hub - <http://www.maplin.co.uk/c/computing-and-office/pc-device-connectivity/usb-hubs-and-switches?page=1&sort=&productsPerPage>. After researching printer networks I have come across USB networking switches originally designed for printer networks - <http://content.webcollage.net/apps/cs/mini-site/iogear/module/iogear/wcpc/1342558353799?channel-product-id=GUB431&enable-reporting=true&report-once=retailer-direct-product-button-click&showtabs=&suppress-site-prefs=&wc-target=&from-pp> and high speed USB cable - <http://www.amazon.co.uk/s/?ie=UTF8&keywords=printers+cables&tag=mh0a9-21&index=electronics&hvadid=3174907226&hvqmt=p&hvbmt=bp&hvdev=c&ref=pd_sl_797tdv5nbk_p> . Still investigating the benefits of this hardware opposed to a standard USB hub, its compatibility with other components and potential for network development.