NETWORK HEALTH CHECK

Project: **XXXXX COLLEGE** (Name protected by NDA)
                     NETWORK HEALTH CHECK

For: **XXXX XXXXX** (Name protected by NDA)
                     XXXXX College
                     XXXXX
                     XXXXX
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                     XXXXX

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Contents

1. Initial Overview

Integral would like to thank xxxxxx College for the opportunity to conduct a network health check and witness testing at xxxxx College.

Integral is a dedicated communications services provider with many years experience and expertise in the design and installation of structured cabling solutions in existing and refurbished buildings, listed buildings, Greenfield sites and new office developments. Our client base includes major Insurance Companies, Finance Houses, blue-chip commercial organisations, Central Government, Local Government, Police, Health and Education services.

This document presents our overview on the current network design and infrastructure with recommendations to enhance any future installations within the college.

On arrival xxxx xxxxx gave a complete (to the best of his knowledge) overview on the network scheme at xxxxx College. Emphasis was placed on critical areas of concern to the College's current network.

These being:

- The main fibre back bone links
- Hubs and Switches that are currently in use
- Any other findings whilst checking the network

The main concern was with the fibre back bones as the previous installation company who installed the backbone cables had never provided any detail of where the fibre routes were or more importantly the test results for the installed fibres. It is assumed that the fibre were never tested or labelled and this has led to some confusion on site as to where the fibres actually go from and to and if they are capable of serving gigabit across the vertical backbone. Gigabit will not necessarily be required immediately but may be required at some time in the future.

There was also a main Planet chassis switch at the core which is currently under a maintenance contract with a third party.

Throughout this document, there are test results, schematics, assumed route topologies, other findings and eventually recommendations to allow the network to increase dramatically in speed and bandwidth to allow the College to add further devices in the future without putting further strain on the network.

2. Network Documentation

The college has never received any handover documentation from the previous installations on site.

Please find in the appendices section, documentation to future assist in administration of the network.

3. Hubs and Switches

The College has an array of Hubs and Switches, from different manufactures. Although these have probably been bough to suit over the years, a considerable amount of bandwidth can be achieved with some simple and cost effective changes. These changes can be found in the recommendations section towards the rear of this document.

Within the Main Communications Cabinet is the core chassis switch which is a budgetary switch which I would not expect to be at the core of the College's infrastructure. This switch commands control over all the fibre links that emanate from the Main Communications Room to Subsidiary Communications Cabinets across campus. Also the Servers are controlled via this chassis. Details of what would happen with the maintenance contract and speed of replacement was not discussed during the visit.

The remaining switches and hubs across campus within the cabinets that were investigated were also of a budgetary branding and older than envisaged.

Main Comms Room

1 x Netgear JGS524F Network Switch

1 x Netgear GS724T Network Switch

1 x Planet FGSW-008 Chassis Core Switch c/w fibre & copper modules

Cluster 1

1 x Planet DH2401 Network Hub c/w fibre module

1 x DHD801 Network Hub

Cluster 2

1 x Planet DH2401 Network Hub

1 x DH1601 Network Hub

1 x Netgear FS524 Network Switch

1 x Level 1 Media Convertor to Food 10/100

<u>DT</u>

1 x Netgear FS524 Network Switch

1 x Netgear GSm7224 Network Switch

Series of Media Convertors somehow connecting through to Art and Geography from the Main Communications Room – NOT RECOMMENDED

<u>ART</u>

1 x Level 1 FSW-2409 Network Switch

1 x Planet FT701B Media Convertor 100

<u>Geography</u>

1 x Level 1 FSW-2409 Network Switch

1 x Planet FT701B Media Convertor 100

4. Fibre and Voice Backbone

Voice Backbone not applicable.

The fibre backbone was the main concern of the health check for xxxxx and the following links were checked whilst on site:

- Main Comms Room to Cluster 1
- Main Comms Room to Cluster 2
- Main Comms Room to DT
- DT to Art
- DT to Geography

General Findings throughout

The installed fibre seems to be fine however this will not become apparent until the recommendations have been implemented and the fibre has been re-tested to industry standards.

Fibre Patch panels were of a fixed nature which makes future maintenance more difficult to achieve. Sliding drawer panels would be recommended.

Fibres not glanded at the rear of the panels – this is a crucial part of the installation to ensure that the fibre if pulled will not disconnect the connectors within the panels. We had to tape the fibre to the gland at the rear of the cabinet to allow the fibre panel to be removed for further inspection.

The fibre connectors within the panels were loose and could quite easily be moved around, these need to be fixed solid in position.

Fibre patch leads did not match the grade of the cable and whilst conducting some testing, when one of the leads was re-instated it stopped working, probably due to its age and the amount of times it had been mated or patched at the panels.

The dressing of the fibres at the cabinets was messy; no coils were made during the previous installation, just a loose length of fibre within the rear of the cabinet.

<u>Main Comms Room to Cluster 1</u>

Route

The assumed fibre route can be found at the appendices at the rear of this document.

Assumed measured length of fibre

70m

Type of fibre

OM1 62.5 / 125

Fibre Presentation

ST

Sample Testing

Fibre Test results for this link can be found at the appendices at the rear of this document.

4-Cores tested – 3 failed

Bandwidth Capabilities

Gigabit can be achieved once recommendations have been implemented.

Labelling

No formal labelling on the panels was found. This is where some of the confusion still exists on site as to what goes where. At present to check where a fibre goes from and to, the active equipment needs to be turned on and off until the fibre is found.

Main Comms Room to Cluster 2

Route

The assumed fibre route can be found at the appendices at the rear of this document.

Assumed measured length of fibre

110m

Type of fibre

OM1 62.5 / 125

Fibre Presentation

ST

Sample Testing

Fibre Test results for this link can be found at the appendices at the rear of this document.

2-Cores tested – 1 failed – 2 cores coiled in the panels

Bandwidth Capabilities

Gigabit can be achieved once recommendations have been implemented.

Labelling

No formal labelling on the panels was found. This is where some of the confusion still exists on site as to what goes where. At present to check where a fibre goes from and to, the active equipment needs to be turned on and off until the fibre is found.

Main Comms Room to DT

Route

The assumed fibre route can be found at the appendices at the rear of this document.

Assumed measured length of fibre

150m

Type of fibre

OM2 50 / 125

Fibre Presentation

ST

Sample Testing

Fibre Test results for this link can be found at the appendices at the rear of this document.

7-Cores tested – 7 failed – 1 core not found

Bandwidth Capabilities

Gigabit can be achieved once recommendations have been implemented.

Labelling

No formal labelling on the panels was found. This is where some of the confusion still exists on site as to what goes where. At present to check where a fibre goes from and to, the active equipment needs to be turned on and off until the fibre is found.

<u>DT to Art</u>

Route

The assumed fibre route can be found at the appendices at the rear of this document.

The fibre that runs to Art is an extension of the Fibre that runs from the Main Comms Room to DT.

Assumed measured length of fibre

50m

Type of fibre

OM2 50 / 125

Fibre Presentation

ST

Sample Testing

Fibre Test results for this link can be found at the appendices at the rear of this document.

4-Cores tested – 4 failed

Bandwidth Capabilities

Gigabit can be achieved once recommendations have been implemented.

Labelling

No formal labelling on the panels was found. This is where some of the confusion still exists on site as to what goes where. At present to check where a fibre goes from and to, the active equipment needs to be turned on and off until the fibre is found.

<u>DT to Geography</u>

Route

The assumed fibre route can be found at the appendices at the rear of this document.

The fibre that runs to Geography is an extension of the Fibre that runs from the Main Comms Room to DT.

Assumed measured length of fibre

70m

Type of fibre

OM2 50 / 125

Fibre Presentation

ST

Sample Testing

Fibre Test results for this link can be found at the appendices at the rear of this document.

4-Cores tested – 4 failed

Bandwidth Capabilities

Gigabit can be achieved once recommendations have been implemented.

Labelling

No formal labelling on the panels was found. This is where some of the confusion still exists on site as to what goes where. At present to check where a fibre goes from and to, the active equipment needs to be turned on and off until the fibre is found.

5. Communications Cabinets

Full Cabinet Schematics can be found at the rear of this document in the appendices highlighting active and passive equipment within each cabinet surveyed.

The cabinet within Cluster Room 2 was dangerous as it was hanging off the wall; we temporary fixed it by placing books under the cabinet. This would be an instant recommendation to re-fix the cabinet to the wall with appropriately sized cabinet bolts as this could cause harm to staff or equipment within the cabinet.

The remaining cabinets had a severe lack of cable management bars, these aid in keeping the loose patch leads within the cabinets neat and tidy and again aid with future maintenance.

6. Recommendations

The following recommendations will allow xxxxx College's network backbone to increase significantly in bandwidth, speed and throughput. The recommendations can also be implemented in one scheme or over a period of time to meet any budget constraints.

The fibre recommendations assume that the installed fibres have been installed to industry guidelines. This could not be determined on the health check due to the failures being assumed to be more prevalent at the patch panels and not on the installed fibres themselves.

<u>Main Comms Room</u>

Fibre.

Installation of horizontal Cable Management bars to allow neatness and tidiness of excess patch lead cables.

Re-termination of crucial fibres within the new patch panels.

Installation of new sliding drawer patch panels to allow ease of future maintenance and administration.

Replacement of all fibre patch leads.

Re-testing of fibre optic cables to achieve below db budgets.

Once the above has been conducted on the fibre components, Gigabit can be achieved over the backbone, however the active equipment would also need to be upgraded to support this.

Active Equipment – Switches and Hubs

Main Planet Chassis Switch to be swapped for a more branded switch. Recommendation would be to change to HP Core Chassis Switch with a series of 1000 copper and fibre ports. The switch should also allow for scalability to improve other fibre links that may need to go through the same process as above in the future. The benefit of an HP switch is that it comes with a lifetime next day warranty and the existing maintenance could be cancelled. This switch will pay for itself over a period of time depending on value of existing maintenance contracts.

The other network switches again could be swapped over a period of time for the same reasons as above. These would again be recommended to be HP with lifetime warranties. For now however these seem to be fine.

Cluster 1

Fibre.

Installation of horizontal Cable Management bars to allow neatness and tidiness of excess patch lead cables.

Re-termination of crucial fibres within the new patch panels.

Installation of new sliding drawer patch panels to allow ease of future maintenance and administration.

Replacement of all fibre patch leads.

Re-testing of fibre optic cables to achieve below db budgets.

Once the above has been conducted on the fibre components, Gigabit can be achieved over the backbone, however the active equipment would also need to be upgraded to support this.

Active Equipment – Switches and Hubs

The cabinet in Cluster 1 does not have switches at all and the recommendation would be to swap these for network switches. This will be a cost effective way to speed the horizontal cabling by approximately 1200%.

Hubs in general have either been replaced on most sites and below benchmark due to price of switch ports being extremely affordable.

The Switch should also allow for a GBIC fibre module for the Gigabit backbone.

Cluster 2

Fibre.

Installation of horizontal Cable Management bars to allow neatness and tidiness of excess patch lead cables.

Re-termination of crucial fibres within the new patch panels.

Installation of new sliding drawer patch panels to allow ease of future maintenance and administration.

Replacement of all fibre patch leads.

Re-testing of fibre optic cables to achieve below db budgets.

Once the above has been conducted on the fibre components, Gigabit can be achieved over the backbone, however the active equipment would also need to be upgraded to support this.

Active Equipment – Switches and Hubs

The cabinet in Cluster 1 has a mixture of switches and hubs, the hubs should be swapped as with Cluster 1.

The new Switch should also allow for a GBIC fibre module for the Gigabit backbone. At present this is working over a 100 Mbps media convertor.

Cluster 2 also feeds Food via a further fibre that emanates from Cluster 2 direct to food. Due to the fact that one or two devices feed off this fibre it is adequate for what it serves, however if in the future more and more devices are added in the food area's, a new fibre direct form the Main Comms Cabinet would be recommended.

Cabinet

It is recommended that the cabinet in Cluster 2 be re-fixed to the wall using more appropriate cabinet bolts as it is hanging off the wall at present.

DT

Fibre.

Installation of horizontal Cable Management bars to allow neatness and tidiness of excess patch lead cables.

Re-termination of crucial fibres within the new patch panels.

Installation of new sliding drawer patch panels to allow ease of future maintenance and administration.

Replacement of all fibre patch leads.

Re-testing of fibre optic cables to achieve below db budgets.

Once the above has been conducted on the fibre components, Gigabit can be achieved over the backbone, however the active equipment would also need to be upgraded to support this.

Active Equipment – Switches and Hubs

The cabinet in DT has a series of Netgear budgetary switches and again changing to HP would be recommended. There is a real need for a tidy up within this cabinet and the whole scheme is complicated and does not work well and also is not easy to administrate due to the amount of unnecessary connections and interfaces between the fibre links.

The fibre links to Art and Geography are interlinked in a bizarre fashion within DT, the fibre is presented in DT, then patches in to a media convertor, which patches in to a switch which patches in to a further media convertor, which patches on to the fibre's that feed Art and Geography. Luckily not many devices are situated in ART or Geography, but if future demands grow this will become a bad bottleneck within the network.

The new Switch should also allow for a GBIC fibre module for the Gigabit backbone. At present this is working over a 100 Mbps media convertor.

ART & Geography

Option 1 Fibre.

Installation of horizontal Cable Management bars to allow neatness and tidiness of excess patch lead cables.

Re-termination of crucial fibres within the new patch panels.

Installation of new sliding drawer patch panels to allow ease of future maintenance and administration.

Replacement of all fibre patch leads.

Re-testing of fibre optic cables to achieve below db budgets.

Once the above has been conducted on the fibre components, Gigabit can be achieved over the backbone, however the active equipment would also need to be upgraded to support this.

Active Equipment – Switches and Hubs

The cabinets in ART and Geography both house a Netgear budgetary switch and again changing to HP would be recommended.

The new Switch should also allow for a GBIC fibre module for the Gigabit backbone. At present this is working over a 100 Mbps media convertor.

If option 1 is preferred than the fibre runs to ART and Geography would stay in situ. DT would require a further 2 No GBIC modules to allow connection to the Main Comms Room through DT. This will eliminate the media convertors and tidy the cabinet and scheme up.

The main problem with this approach would be if the fibre between the Main Comms Room and DT was damaged, it would not only isolate DT from the network but also ART and Geography as they share the DT link.

Bandwidth would also be shared down the main fibre between DT, ART & Geography.

Also the more connector pairs within the fibre runs, the less chance of achieving Gigabit transmissions throughout the link.

Option 2 Fibre.

Re-installation of a new fibre optic cable from the Main Communications Room direct to Art and direct to Geography.

This will alleviate the problems mentioned above, but is however the more costly solution.

Active Equipment – Switches and Hubs

The cabinets in ART and Geography both house a Netgear budgetary switch and again changing to HP would be recommended.

The 2 No GBIC's that would have been required in DT would then need to be installed within the new Core Chassis Switch in the Main Comms Room to feed them directly.

I trust the above meets with your requirements. However should you have any queries or require any further clarification, please do not hesitate to contact me.

Yours sincerely

Paul Taylor

Integral Network Solutions Ltd

7. Appendices

Please find attached a list of appendices to compliment this document.

1. Fibre Routes (assumed)

2. Fibre (LPM) Light Power Meter – Test Results

3. Fibre Installation Test Sheets

4. Existing Active Equipment Data Sheets

5. Cabinet Schematics

6. Quote to allow for recommendations

   All of the appendixes are omitted from the on-line example – please call to see templates that would accompany this document.