

Position Statement Three - Network

IT Working Group, item 8

Committee: IT Working Group

Agenda Item

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Title: Position Statement Three - Network

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Summary

1. This report provides a summary of an independent assessment of the council computer network. Also included are details of changes made to date and planned future changes.

Background

2. The existing network was installed in 1997 and since that time has been added to in a piecemeal fashion as funding and user requirements determined. There has been no broad review of the performance in the period since the network was first installed. In the last 12 months it had become apparent that there were significant network performance issues starting to develop. In addition, with the council moving to a new telephone system utilising, in part, the data network a full scale review was required.
3. The sum of £40,000 was included in the 2006/07 Capital Programme for the review and any subsequent network upgrades.
4. A specification was drawn up consisting of six main areas:
 - a. Undertake a full review of the existing network to highlight problems
 - b. Establish a proposal of urgent remedial work to correct the highlighted problems
 - c. Establish a proposal to upgrade the existing network to a standard that will suffice for the councils needs for the foreseeable future.
 - d. Evaluate the existing wireless network and identify possible improvements to ensure access and system security
 - e. Install network monitoring equipment and train council staff in the use of the software.
 - f. Establish a network upgrade requirement list for the time when the council moves to a full telephony over data network environment.
5. In March 2006 Astro Communications Ltd and CK Communications Ltd, both of whom have undertaken network projects for the council in the past, were awarded the contract to undertake this piece of work.

Phase One - The findings, remedial and upgrade work

6. The major piece of work was the evaluation of the existing network. This process started in April 2006 and lasted for 3 months. Almost all corporate networks evolve in a piecemeal fashion as time passes from the initial

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installation date. As expected a significant number of potential problems were identified. These included:

- a. A partial loop on the network which meant that if one particular switch failed the whole network would crash.
 - b. A number of 'bottlenecks' which resulted in certain parts of the network reaching 100% usage and remaining so for in excess of 40 minutes on occasions. This would have had an effect on end users system performance.
 - c. Up to six switches from users to servers with no logical organisation.
 - d. Users and servers connected to the same switch which can be a problem in a multi-switch environment.
 - e. Changes to cabling standards mean that in certain areas the network no longer meets the required standard.
 - f. The network cabinets lacked structure and cable management.
 - g. The environment in which the server cabinet is located in room 116 is inappropriate. It lacks adequate ventilation or cooling and the use of the room for local office storage makes air conditioning for this room very difficult. The new standards require physical clearance on accessible sides of equipment cabinets of 1200mm. The only way this clearance and environmental control can be achieved is to install air conditioning and keep the room shut and locked.
7. A diagram of the network as first encountered is attached as Appendix One.
8. The two companies identified four possible ways forward to address the identified problems and to upgrade the existing network to a standard that will suffice for the councils needs for the foreseeable future. These options ranged from option one - 'patching' up the existing through to option four - a complete reworking to resolve all issues and to provide a reliable infrastructure. Given the original remit, the decision was made to choose option four which gives the biggest change and provides the most future proofing. This option involved:
- a. Provide and install wiring infrastructure within computer room. Arrange and plan downtime on the network (approximately 6 hours). Order equipment and upgrade software. Establish current driver versions for server network interfaces. Research drivers for server network interfaces to identify upgrade requirements. Plan switch and cable management layout.
 - b. Relocate switches within cabinets to make space for cable management. Upgrade existing HP4000 switch firmware to match new switch. Install Redundant PSU into existing HP4000. Install new 6 port GBIC module with 1000BaseSx GBICs. Install new 20 port 10/100/1000 module into existing switch. Install new 24 port HP2600 switch with 2 x GBIC modules in 116, 199 and the Lodge cabinets. Test HP switches and backbone connections. Test Spanning Tree Protocol failover with all options of backbone failures. Patch user switches into main switches in 116 and 119. Designate server

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and user switches from existing switches in computer room. Reorganise inter-switch patching to establish new hierarchy. Set server and associated switch port speed and duplex configuration. Re-patch all users served by the computer room into Core -1 user switches. Test access to all servers and central services.

- c. Monitor network and identify server and backbone bandwidth following changes. Identify servers that need to change status from Level 1 to Level 2 and vice versa. Identify and resolve any remaining bottlenecks. Poll end user customers to establish perceived improvements/problems.
9. This phase of the project commenced in May 2006 and completed in late July 2006. The cost of this piece of work, including hardware, was £18,290.
10. The first phase also identified that two key 3com switches were not performing as required and despite significant attempts to resolve the problems they need to be replaced. Quotations are currently being obtained but the cost is likely to be in the region of £4000.
11. A diagram of the revised network layout is attached as Appendix Two and includes the changes identified in point 10 above.

Phase Two –VLAN, wireless network, monitoring tools and training

12. With the initial work complete the next phase is due to start shortly, this involves:
 - a. Switches being organised into data and telephony virtual networks (VLANs) either on a per switch basis or on a per port basis.
 - b. Wireless survey and strategy report. Although the current wireless network has security in place, a couple of years ago, breaches of this type of security began to occur. The council needs to upgrade the system to ensure security is maintained.
 - c. Installation, set-up and training of network monitoring tools.
13. It is envisaged that this phase will take two months to complete at a cost of £6,800. Subject to the findings of the survey there will then be additional work (phase three) to implement a new wireless network.

Room 116

14. The problems identified with room 116 will be discussed with the building manager as a matter of urgency. It should be noted that if the cabinet in 116 did overheat and fail network availability would be lost in all floors of the new wing of the Saffron Walden offices.

The future

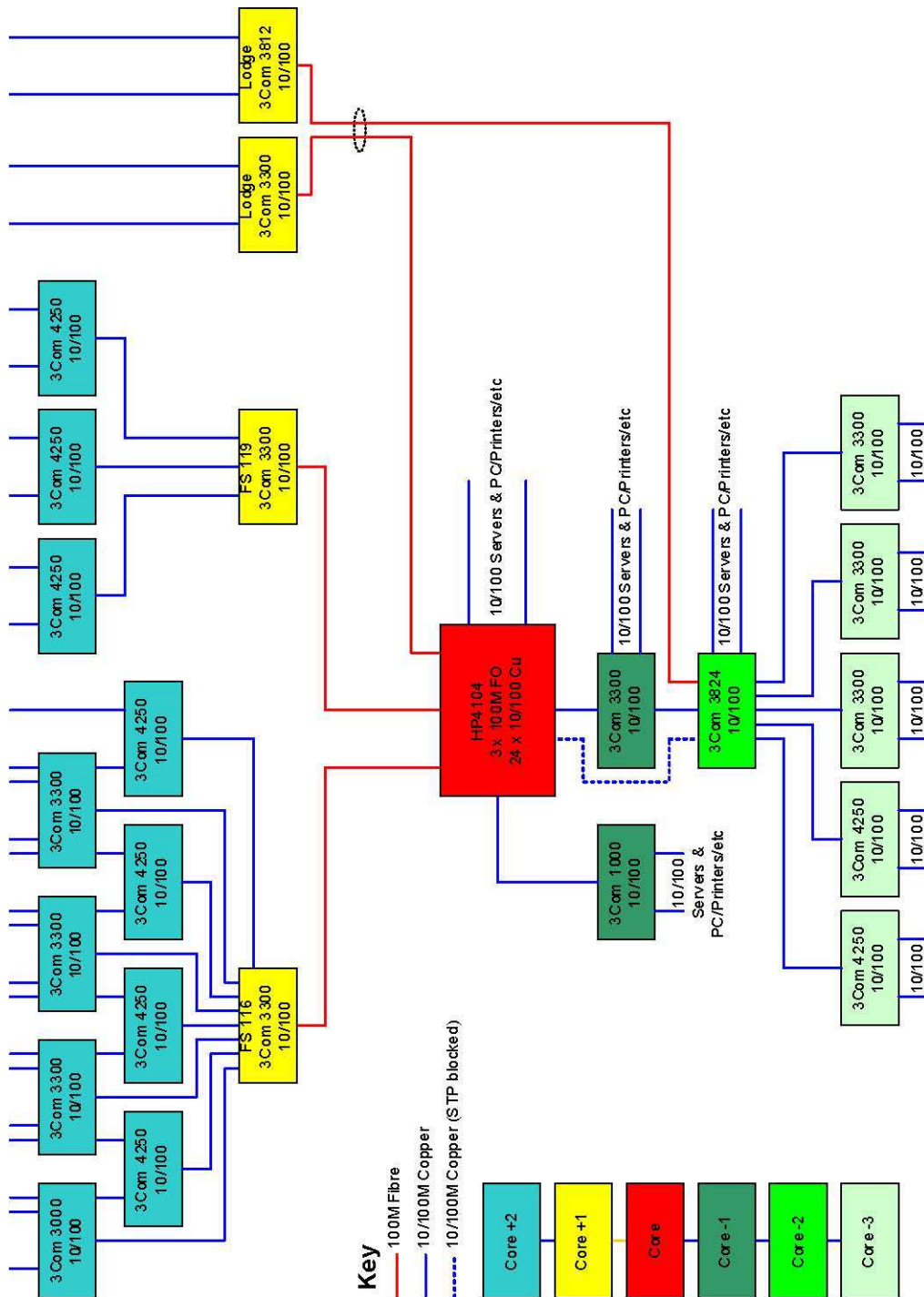
15. The consultants have provided details of additional network requirements for the time when the council moves to a full voice and data shared network. The requirements are mainly to ensure full network resilience as any loss of network will also result in a loss of telephony.

Background Papers - None

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Appendix One – Original Network Diagram



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Appendix Two – Revised Network Diagram

