SITE PREPARATION GUIDELINE

FOR

WebSAMS

IN

SCHOOL

VERSION 1.0

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1 INTRODUCTION

This document provides guideline on site preparation of WebSAMS network. In general, school is recommended to make use of school's network backbone infrastructure built under the provision of the IT in Education (ITEd) Project as far as possible. However, for data security reason, a sufficient security mechanism such as firewalls, screening routers, policy configuration…etc should be implemented if WebSAMS network is to be integrated with other networks in schools. Schools should follow the Network Integration Guideline for New School.

This document will focus on the requirements for the WebSAMS network which are of relatively small scale as compared with that for the ITEd Network. Normally the WebSAMS network is placed in the General Office, Staff Rooms, Principal Room and/or Server Room. If school ought to build or renovate a special room or equipment room for housing the WebSAMS network, schools should make reference to a more comprehensive Site Preparation Guideline for LAN under the ITEd Project as well as the relevant Administration Circular concerning change of room use as appropriate.
2 Reference

- Technical Support Services the IT in Education project – Acquisition Guidelines
- Site Preparation Guidelines under the IT in Education project
- Network Integration Guideline for New School
3 DEFINITIONS AND CONVENTIONS

DEFINITIONS

Nil

CONVENTIONS

The abbreviations in this guideline are used with the following meanings:

- “A/C” means Air-conditioning or Air-conditioner
- “Arch. S.D.” means Architectural Services Department
- “DDS” means Digital Data Storage
- “G.I. conduit” means Galvanized conduit
- “LAN” means Local Area Network
- “MCB” means Miniature Circuit Breaker
- “RCCB” means Residual Current-operated Circuit Breaker
- “SVGA” means Super Video Graphics Array
- “UPS” means Un-interruptible Power Supply
- “UTP” means Unshielded Twisted Pair
- “VGA” means Video Graphics Array
- “WS” means workstation of WebSAMS
4 SITE PREPARATION REQUIREMENTS

Before the site preparation is started, all information and requirements about the anticipated installation must be consolidated. Schools should determine and finalize their configuration requirements for the WebSAMS network.

For the sake of operations, management and security in LAN installations, it is always recommended to accommodate the essential equipment such as File Servers and Hubs, etc in lockable equipment cabinets in a networked Office not easily accessible by students, such as General Office, Staff Rooms, Principal Room and/or Server Room, etc. or a separate and well equipped Equipment Room, if possible.

When formulating the site preparation requirements for WebSAMS Network, School is advised to take the site preparation plan for school's teaching & learning network of IT in Education project into consideration so that the network backbone infrastructure such as cable trunking, conduits, equipment cabinets/room can be shareable as far as possible and minimizes the site preparation work for less disruption to school.

For data security reason, a sufficient security mechanism such as firewalls, screening routers, policy configuration...etc should be implemented if WebSAMS network is to be integrated with other networks in schools. Schools should follow the Network Integration Guideline for New School.

4.1 Space for Placing Equipment

The space must be sufficient, preferably with allowance for expansion, to accommodate all the above-mentioned essential equipment and mounting cabinets together with their required service clearances.

Sufficient spaces are also required for the installation of A/C plant, UPS, power conditioner and Fire Services system.

4.2 Air-Conditioning

Generally, most of the LAN equipment can be operated in normal Office environment. School has to consult the vendor about the cooling requirements of the equipment as to whether to adopt the existing provision or to install additional A/C system.

For non-stop networking services, a 24-hour A/C supply should be provided either by the existing provision or by a dedicated A/C system.

4.3 Safety and Security

The room for housing the equipment shall be of solid construction, e.g. brick or concrete, and it shall be located where there is no potential danger such as water intrusion, fires, smoke, dust or storm damage.

Some means of safety and security measures such as lockable steel door/gate and iron bar windows are highly recommended.

Portable fire extinguishers of the type to be advised by Fire Service Department are also
required in the room.

4.4 Power Supply
To avoid service interruptions caused by unanticipated power interference, it is highly recommended to provide a clean and dedicated power supply for all the essential equipment.

4.4.1 Power Supply Requirements
Work out the total power supply requirements with the input from equipment vendors to confirm whether the existing provision of power is enough. At least a spare capacity of 30% is required on top of the total requirements for future expansion.

4.4.2 Power Distribution and Equipment Earthing Requirements
This requirement is to be provided by the equipment vendor(s).

4.4.3 Power Point Requirements
i. Every type of power point to be installed must conform to relevant standards to be advised by Architectural Services Department (or Housing Department if the school premises is maintained by the Housing Department.)

ii. Most LAN equipment use normal 13A single-phase socket outlets with on/off switch as power points. The length of the standard power cord for the equipment is around 1.5M. Thus the power socket and the equipment should not exceed this distance.

iii. If possible, each piece of equipment is recommended to have its own power point. If not, power source for each workstation should not be extended to more than four power points. Nevertheless, independent power points are always required for central equipment such as Servers and Hubs.

iv. The quantity of four power points is based on the assumption that every workstation consists of a CPU, a monitor, a printer and an external modem.

v. Every final sub-circuit shall provide power points up to four workstations, i.e. not more than 16 power points, based on 4 power point per workstation. Each final sub-circuit will be connected to one set of MCB (Miniature Circuit Breaker) and RCCB (Residual Current Circuit Breaker) of appropriate rating.

vi. Conduits for power cable and data cable must be separated from each other by at least 150mm in order to protect the data cable from electro-magnetic interference. Otherwise, remedies like adding wire meshes to the signal cable
trunking/conduits is inevitable.

vii. The conduits for data cables must be well protected against the effects of electric current if a conduit for power cable has to be placed adjacent to it or cross over it. Power cable and signal cable should not be placed in the same conduit.

viii. Metallic conduit should be provided inside the meter room.

ix. The fuse for the new power sockets should be provided in the MCB inside the meter room and installation of a new MCB is required if there is no spare fuse in the existing MCB board.

x. All power sockets should be properly grounded.

xi. Conduits for power cables will not be embedded underground but run over floor, if it is necessary.

xii. The rated residual operating current of all RCCB’s shall be 30mA.

4.4.4 Quantity and Locations of Power Points

User has to specify on the floor layout the quantity and exact location of every type of power point

4.5 Un-interruptible Power Supply System

An UPS system with sufficient battery supporting time may be installed to provide interim power supply for closing down the network system tidily.

4.6 Signal Cable Trunking and Conduits

4.6.1 Signal cable

There will be two types of signal cables installed in schools. They are thin coaxial cable and UTP cable.

i. Thin coaxial Cable

This type of signal cable is a long cable with T joint connectors connecting all the workstations together and there is a terminator at the cable end. The number of T joint depends on the number of workstations to be installed along the thin coaxial of cable. The maximum terminator to terminator cable length is 185M. This type of signal cable is
recommended to use for the location which is far away from the server such as the staff room at the upper floors. However, thin coaxial cable is not recommended to connect File Servers. Even for workstation, at most two workstations can be connected to the hub using thin coaxial. If more than two workstations are installed at the upper floor, one additional hub with power point should also be installed at those two hubs that are to be connected by thin coaxial cable to form a backbone-cable.

ii. UTP Cable (Category 5)

This type of signal cable is the preferred cable to connect the workstations from the hub independently and the maximum length for each cable is 90M. The use of UTP cable is recommended for workstations located at the same floor and in proximity with the hub. UTP cable is usually applicable to workstations located in Principal Room and General Office.

4.6.2 Conduit for signal cable

i. Conduit should be used to protect the signal cable; and conduit fixture should be provided at the location of each meter.

ii. Metallic conduit is recommended for the signal cable in the exposed areas such as the corridor, classroom, staircase, computer room, library and the floor across the passage.

iii. Plastic conduit or trunking can be used within the areas which are less exposed to students such as the Principal Room, General Office and Staff Room.

iv. Junction box with cover should be provided at each junction of the conduit for easy maintenance and cabling.

v. In the networked Offices, conduits will connect the ceiling trunking to the workstation locations. Normally, a separate conduit is required for each workstation

4.6.3 Inter-floor Trunking

i. For inter-floor LAN configuration, LAN cables are run from floor to floor in vertical trunking of at least 100mm x 100mm inside the building’s Meter/Duct Room. The vertical trunking should have connections with the horizontal ceiling trunking of the networked floors.

ii. If space is available in the room, separate trunking systems for cables are highly recommended as they can eliminate interference, if any, being induced by other cables and facilitate subsequent cabling works.

iii. If the LAN cables have to be laid in existing trunking holding other types of data cables, ensure they do not interfere with each other.
iv. The trunking has to be built away from any power fixtures. If this is unavoidable, they need to be protected against electro-magnetic interference.

v. If there is no Meter/Duct Room, vertical trunking can be erected by boring holes at designated spots on the floor slaps of every networked floor. The spot should be as close to the Servers/Routers as possible.

vi. In rare cases, the vertical trunking can also be built along the stairwell and connected to the ceiling trunking through the core walls.

4. 7 Data Nodes

Computers or printers are connected to LAN by using UTP drop cable to connect data nodes nearby. Each data node is installed in a single hole faceplate with shutter.

Data nodes should be located at bench level or low level, and it should be as close to the networked devices as possible. It should be placed alongside the power point or somewhere nearby.

If the data node is at low level, it should be at least 4” (100mm) from the floor to avoid unnecessary water intrusion.

Each networked workstation/printer requires at least one data node. An UPS system with sufficient battery supporting time may be installed to provide interim power supply for closing down the network system tidily.
5 Site Preparation Work and Cabling Work

School is required to prepare proposed layouts showing the exact locations of servers, hubs, workstations, printers, modem, power points, routes for signal conduits and trunking, etc.

School should arrange the service vendor for signal cabling work to conduct a site survey for preparing a Network Requirement Report (NRR) to include equipment to be purchased and the cables required for the network.

The supply vendor for hardware and software (may be the same as the service vendor for signal cabling work) should provide equipment specifications such as power rating, dimensions, weight and heat dissipation of the equipment and cable cutout opening requirements on cable trunking.

Normally the site preparation work for WebSAMS network, if required, is of small scale. It mainly involves the installation of additional power points, power cables/wires, conduits or trunkings for protecting power cables/wires or signal cables. For new school premises, especially those built according to the Year 2000 design plan, site preparation may not be necessary as power points, data nodes and conduits may have already been built in the General Office, Staff Rooms, Principal Room and/or Server Room.

If site preparation is required, school must submit the NRR and the site preparation requirements to Architectural Services Department for vetting beforehand. New school should request the vetting authority to advise whether the proposed site preparation work may violate the maintenance warranty for the new school premises. (If the school premises is maintained by the Housing Department, the NRR and the site preparation requirements should be sent to Housing Department for vetting instead.)

If additional power points, trunking or conduits need to be built, the following requirements shall be followed where appropriate:

A. Electrical Wiring Works

i. All electrical works are to be carried out by Registered Electrical Workers in accordance with the current requirements stipulated under the Electricity Ordinance and the associated regulations, Code of Practice for the Electricity (Wiring) Regulations, and Supply Rules of the Power Company.

ii. All electric wirings supplying electricity to computers inside the computer room are to be run in G. I. conduit.

iii. A 30 mA sensitivity residual current device will be provided for each circuit supplying socket outlets

iv. All cables passing through false ceiling are to be enclosed by G. I. conduit.

v. A 25 mm diameter pvc sleeve with 150 mm length protruding above floor slab will be provided to accommodate the electric cables wherever they pass
through a floor slab.

vi. A Work Completion Certificate, Form WR1, will be issued upon completion of all the electrical works for a school by the vendor. A copy of the WR1 should be sent (may be through the school) to Architectural Services Department or Housing Department as appropriate.

vii. Similarly, a copy of As-fitted drawings and test reports will be submitted to Architectural Services Department or Housing Department by the vendor (may be through the school) as appropriate.

B. Builder’s Works

i. As the structure framing is basically beams/columns with intermediate shear walls to take the lateral wind forces, only small diameter holes (i.e. max. 32 mm large) through floor slab/wall will be drilled.

ii. Holes through beams and columns should be avoided unless approved by Architectural Services Department or Housing Department as appropriate.

iii. For core openings through floor slabs or walls, an accurate and sensitive rebar detector should be used to locate the existing rebars, so that no rebar is to be cut during the coring operation. If this cannot be achieved on site, the respective authority, i.e. Architectural Services Department or Housing Department as appropriate, will be checked for further advice. Even if rebar is permitted to be cut subsequently, the exposed rebars should be painted with anti-corrosion coating before filling up the case holes.

iv. All holes through floor slab or wall for the installation of cable/conduit should not exceed 32 mm diameter with a clear distance four times the diameter of hole. After the installation work, void around the formed opening in r.c. slab/wall should be sealed up by the appropriate polymer modified mortar to prevent ingress of water.

v. Adequate clearance should be left between the computer cable/conduit/trunking and other services pipe to facilitate future maintenance.

When the site is ready, school has to arrange for the service vendor (may be the same vendor or site preparation and/or supply of hardware/software) to carry out signal cabling work.