

University Wireless Standards for Institutional Networks

These minimum standards have been endorsed by the Joint Infrastructure Group and will be reviewed on an annual basis. Any queries should be addressed to the Wireless Team at wireless-infrastructure@cam.ac.uk.

Why do we need standards?

The University Wireless Service has set minimum standards for network connectivity to wireless access points that are hosted on institutional networks. Adopting these standards will help facilitate high quality services and a greater degree of standardisation across the Collegiate University. Institutions' inability to meet these standards may cause degraded performance of wireless equipment. This will result in reduced support provision from the Wireless Service.

We recognise that adopting these standards will need time to implement and we do not expect institutions to adopt these standards immediately. However, when considering equipment replacement as part of a sensible product lifecycle or building refurbishments, these standards should be implemented for full Wireless Service support.

What are the standards?

Minimum network requirements

The following requirements are the minimum supported standards for University Wireless to operate on institutional networks that are not operated by Information Services.

Switch edge ports are 1Gb/s

Switch port connections to Wireless Service access points at the edge should have a minimum speed of 1 Gbps.

Support 802.3at / POE+ switch power

Switches should be able to provide minimum 802.3at / POE+ to access points to facilitate full functionality of the access point.

Support LLDP-MED for enhanced power management

Link Layer Discovery Protocol - Media Endpoint Discovery should be enabled to facilitate access points to negotiate the correct power allocation from the switch.

Appropriately sized switch backhaul to the UDN connection

Where the connection to the UDN is 10Gbps or greater, we recommend 10Gbps uplinks from edge switches to the network for greater wireless traffic throughput.

Network configured for Spanning Tree Protocol

Configuration of Spanning Tree is required to facilitate loop detection and avoid any mistakes in cabling and configuration and it can also detect loops through multiple switches. Rapid-PVST+ Spanning Tree is used by the UDN, and it (or the equivalent) is strongly recommended for institutions which have a layer 2 connection with the UDN (such as through a PoP switch), to allow loops involving both networks to be detected. It also provides the best supporting configuration for wireless access points.

Regardless of the protocol, it should be configured according to best practice, with suitable edge port configuration for access points and a stable topology.

General network configuration

Network configuration for wireless access points must be configured in line with the guidance published on the Access point support networking pages at:

<https://help.uis.cam.ac.uk/service/wifi/it-staff/wireless-technical-implementation/access-point-support-networking>

New cabling installations to support access points

Minimum Cat6a cabling

Cat6a should be the minimum used when installing new cabling. As most of any new cabling installation cost is the labour charge, it is recommended a 'more than is needed' approach is taken during installation. This will facilitate future flexibility and reduce unforeseen expenditure at a later date. The current trend for wireless deployments is for a greater density of access points. This is due to the increasing use of higher frequencies that do not propagate as well. This will also result increased cabling requirements.

Two network points per access point

Two ethernet connections should be installed per access point location to support LACP for high-capacity access point throughput requirements or network redundancy or both. High-capacity access points should have 2 ethernet connections for higher power requirements, unless using Smart Rate or mGig connections. Higher capacity access points can exceed 1Gbps throughput. They also require 802.11at (POE+) power on 2 connections or 802.1bz (POE++) power on a single connection.

Further recommendations for hosting access points

Below are additional recommendations when hosting for Wireless Service access points. It should be noted at some point in the future these recommendations will also become the minimum requirements for University Wireless.

Switch edge ports are 802.3bz compliant. For example, Aruba Smart Rate or Cisco mGig switch edge ports.

Support 802.3bt/POE++ switch power for high-capacity access points.

10Gbps uplinks from edge switches.

10Gbps connection to the UDN.

Version History

Date	Version	Change	Author
July 2022	1.0	Publication following review by JNMC	Alexander Cox
17/04/2023	1.1	Draft revision for consideration by Joint Infrastructure Group	Alexander Cox
08/06/2023	1.2	Revised draft incorporating feedback from Joint Infrastructure Group	Alexander Cox
19/06/2023	2.0	Publication following approval by circulation	Alexander Cox