Appendix - Network Communications Design Overview

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Date	Section	Description of Change

This document is intended to provide a high level overview of the requirements of network communications to be followed during the design process of any building renovation or new construction project.

It should be noted that the University of Oregon provides its own network systems engineering and design services through its Information Services department. This design work shall be coordinated with the design team on any project. All design work will be approved by Information Services.

Network communications in this context is broadly defined as virtually any communications technology in use at the University of Oregon. For the purpose of this document, we will focus on telephone and computer networking, both wired and wireless.

There are four major areas that must be accommodated in the design of a facility: space, pathway, cabling, and network communications equipment.

SPACE

Main Distribution Frame (MDF): This is a centralized, environmentally conditioned facility that houses networking equipment that is common to the building as a whole. There will only be one MDF per building. The MDF houses centralized building service equipment such as telephone system modules, local area networking equipment, specialized network services, Distributed Antenna System (DAS) and other building- level networking equipment. This space will house the fiber and copper backbone cabling from the main campus distribution. The MDF shall be a minimum of 12' x 10'. If the MDF will house the buildings DAS, the size of the MDF will need to be 16' x 10' to accommodate this additional equipment.

Intermediate Distribution Frame (IDF): IDF's are similar to the MDF's described above, but provide a much more limited function. The equipment in an IDF will provide service only to a floor or part of a floor of a building. The IDF shall be centrally located to minimize cabling length to station outlets. In some instances, it will be acceptable to combine multiple floors or multiple parts of floors into one IDF. An IDF will be a minimum of 10'x 8'. However, an IDF that combines multiple floors will be a minimum of 10' x 12'. Information Services will make the final determination of IDF size based on the density of equipment and infrastructure required in the space.

The MDF and IDF require that HVAC be provided on a 24-hour-a-day, 7-day-a-week basis with standby power. The environmental limits of these rooms are 70 to 80 degrees Fahrenheit (74 degree set point) and 30 to 55 percent relative humidity. Water, sewer, or

steam lines are not allowed to pass through either the MDF or IDF. Electrical power to MDF and IDF rooms shall be provided with standby power. 30 AMP L6-30 circuits will be made available at each equipment rack. 20 AMP convenience outlets will be located along the walls. Walls will be lined with ¾ inch fire-rated plywood. These rooms must be lit with a minimum illumination of 50 foot candles with fixtures coordinated with network communications equipment to ensure good lighting throughout the rooms. If these rooms are located below grade, they must be equipped with a sump pump system powered from the standby power source. These rooms should not be located under locations that would introduce water (kitchens, restrooms, etc.). The doorway should be one outward opening, lockable 36 inch by 80 inch door. Locks on doors will be the UO standard mechanical space lock system.

PATHWAYS

The building MDF shall be equipped with at least two 4" conduits stubbed to the campus steam tunnel system for provision of campus network services to the building. These conduits shall be RMC/IMC conduit. In certain instances, additional 4" conduits may be requested by Information Services.

Building pathways shall consist of cable tray in hallways or other common and direct path through the building. Conduits from station locations shall stub to the cable tray or accessible ceiling that has unobstructed pathway to the cable tray. The cable tray or large conduits from the cable tray shall stub into the serving MDF or IDF. There shall be at least two 4" conduits running from each IDF to the MDF.

Conduits sized 2" or larger shall have no more than 180 degrees of bend or 100 feet between pull points. However, it may be determined that certain conduit runs require less than 180 degrees of bend. Conduits smaller than 2" shall have no more than 270 degrees of bend or 100 feet between pull points. Pull points shall be appropriate sized junction boxes. Conduit bodies are not allowed.

Individual station outlets will be served by at least a 1" conduit run from the nearby cable tray to station location that will be equipped with a 4" deep square box with a single gang mud ring.

Additional pathway requirements will be outlined during the detailed design process.

CABLING

The University of Oregon Information Services department will provide detailed specifications for cabling installed on any University of Oregon project. As of this writing, the University of Oregon horizontal cabling standard is four (4) Category 6 cables to each station outlet. Augmented Category 6 (Cat6a) cabling will be specified and installed for some applications. Cable TV is supported via RG6 with at least 66% braid. Backbone cabling includes single mode fiber optic cable, multi-pair telephone cable, and .500 rigid cable TV cable (if applicable).

NETWORK COMMUNICATIONS EQUIPMENT

Equipment Installation and Services: All network communications equipment necessary to provide network services (wired and wireless) and voice services will be provided by Information Services. Vendors and other U of O groups will not be allowed to provide equipment to distribute these services. This includes but is not limited to the installation of routers, hubs, switches, phones and wireless access points (WAP) on the U of O network. All network design work will be performed by Information

Services.

Building Systems: All building systems that depend on connectivity to the U of O network will be required to receive approval from Information Services. These systems include, but are not limited to, building automation systems (BAS), electrical metering, audio/video, and access control/security. Each vendor or U of O group that intends to connect a system to the U of O network will need to provide detailed network specifications for each system. These specifications will be reviewed for approval by Information Services. Once a particular system is approved, it will be added to a master list of approved systems.

Below is a list of required specifications, recommended specifications, and unsupported features to consider when proposing a new system. This list may not be all-inclusive, but is intended to serve as a starting point.

Requirements:

- Must have an RJ45 Ethernet port
- Must support a star based cabling topology
- Must support 100-Base-T Ethernet or greater
- Must support IPV4 networking
- Must support unicast
- Must support Dynamic Host Configuration Protocol (DHCP)

Recommended:

- Supports IPv6 networking
- Supports multicast
- Supports Role Based Access Control (RBAC)
- Supports 802.1x
- Supports Access Control Lists (IP Filtering)
- Supports Stateless Auto Configuration (SLAAC)
- Supports Power Over Ethernet (PoE)
- Supports Link Aggregation Control Protocol (LACP)

Features not supported on the UO Network:

- Wireless only devices
- Broadcast only systems
- Quality of Service (QoS)
- Serial connected devices
- Fiber only devices
- Daisy-chained or ring cabling topology