

University of Oxford IT Services Infrastructure Specification Project

ISP-00-001: Infrastructure Specification Project: Overview

1 INTRODUCTION

1.1 Scope

This project delivers a series of documents, and supports the evolution of that series, to improve the management of the provision for, and implementation of, the infrastructures for, and supported by, University of Oxford IT Services.

The documents produced have the following objectives:

- a) to specify the equipment that is used to terminate University of Oxford IT Services external cabling and provide an external network test interface (ENTI) at the entrance to buildings;
- b) to specify the accommodation required by University of Oxford IT Services to house that equipment at the entrance to buildings (University of Oxford IT Services EF);
- c) to specify the University of Oxford IT Services intermediate cabling installed between the University of Oxford IT Services EF and the distributors for telecommunications, IT, BMS and PMC applications - providing internal network test interfaces (INTI) for University of Oxford IT Services;
- d) to specify the accommodation required by University of Oxford IT Services to house the intermediate cabling;
- e) to provide recommendations for the cabling, and its accommodation, distributed from the telecommunications and IT distributors to the remainder of the premises (this work may be extended to cover BMS and PMC applications).

The requirements in documents addressing items b) and d) constitute the set of minimum requirements that enable University of Oxford IT Services to accept responsibility for the services provided to the customers' premises. Deviations from these requirements are prohibited without the express authority of the Network Operations Manager.

An overarching objective of this series of documents is to ensure that University of Oxford IT Services, the customer (defined as the college or University, as appropriate) together with those organisations delegated with design and planning responsibilities have discharged the obligations of "the owner of the premises" as specified in BS 6701 and by the other standards referenced normatively from BS 6701; specifically but not exclusively BS 7671, BS EN 50174-1, BS EN 50174-2 and BS EN 50310.

1.2 Responsibilities

University of Oxford IT Services is a privately-owned branch system linking most colleges and University premises in Oxford via its own duct network. It operates under a Telecommunications Services Licence (TSL) that allows the University and its allied institutions to operate a private branch system.

All exchange equipment together with the external cabling infrastructure and external pathway systems (typically underground ducts) are the property of University of Oxford IT Services. Access to, or connection through, this equipment is prohibited without the express authority of the Network Operations Manager.

Once the external cabling enters the customers' premises the responsibilities for the design, and accommodation, of the distribution of the telecommunication and related services become more complex.

Figure 1 shows a schematic of the elements used to create the University of Oxford IT Services EF and how they relate to the other cabling-related functional elements within the premises served. Figure 1 uses the definitions and abbreviations of clause 1.3.

While the elements of the University of Oxford IT Services Entrance Facilities are the property of University of Oxford IT Services they are accommodated within the premises served and the ownership of that accommodation lies with the customer.

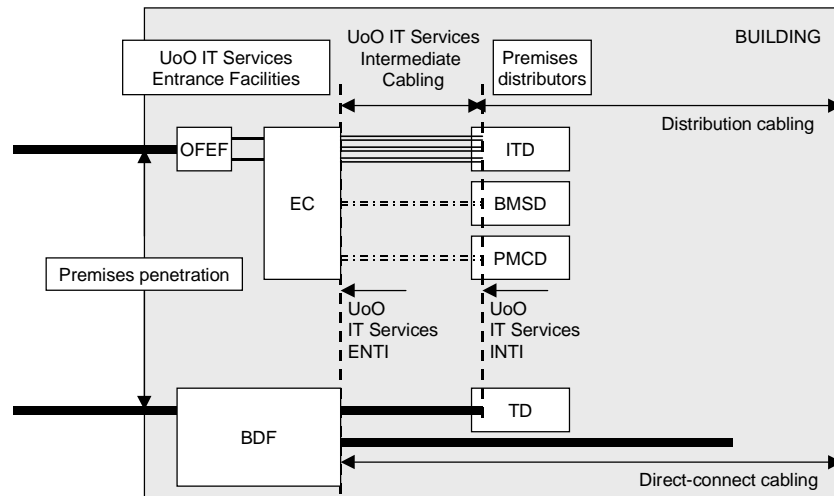


Figure 1 - Schematic of premises infrastructure served by University of Oxford IT Services

1.3 Definitions and abbreviations

1.3.1 Definitions

For the purposes of this series of documents, the following definitions apply.

- 1.3.1.1 **Building distribution frame**
The cabinet or frame containing the connecting hardware upon which the incoming University of Oxford IT Services balanced cables are terminated. It is the property of University of Oxford IT Services and houses the balanced cabling ENT1(s).
- 1.3.1.2 **BMSD panel**
A panel terminating an intermediate cable at the building management services distributor.
- 1.3.1.3 **Building management services distributor (see Note 1)**
The functional element providing onward distribution of building management services throughout the customers' premises, typically via structured cabling components. It is the property of the customer but accommodates the closure(s) housing the University of Oxford IT Services INT1(s).
- 1.3.1.4 **Consolidation point (CP)**
A connection point between a TO and a horizontal cabling distribution panel. It is the property of the customer.
- 1.3.1.5 **Customer**
A college or the University, as appropriate, responsible for the premises served by the University of Oxford IT Services.
- 1.3.1.6 **Direct-connect cabling**
Cabling providing services from the building distribution frame to service outlets within the premises either direct or via distribution points. It is the property of the customer.
- 1.3.1.7 **Distribution cabling**
Cabling providing services from the various distributors to the service outlets within the customers' premises. The distribution cabling for different services may use different structures and or components.
- 1.3.1.8 **Distribution panel**
A panel terminating generic distribution cables in a customers cabinet. It is the property of the customer.
- 1.3.1.9 **Equipment cabinet**
The cabinet containing the connecting hardware upon which the incoming University of Oxford IT Services optical fibre cables are terminated. It is the property of University of Oxford IT Services and houses the optical fibre cabling ENT1(s).

- 1.3.1.10 *External network test interface*
The test point used to ensure satisfactory performance of the external cabling infrastructure. It is the property of University of Oxford IT Services.
- 1.3.1.11 *Internal network test interface*
The test point used to ensure satisfactory performance of the external cabling infrastructure in conjunction with the intermediate cabling. It is the property of University of Oxford IT Services.
- 1.3.1.12 *IT distributor (see Note 1)*
The functional element providing onward distribution of IT services throughout the customers' premises, typically via structured cabling components. It is the property of the college or University but accommodates the ITD panel(s) housing the University of Oxford IT Services INTI(s).
- 1.3.1.13 *ITD panel*
A panel terminating intermediate cables at the IT distributor. It is the property of University of Oxford IT Services.
- 1.3.1.14 *Line Jack Unit (LJU)*
A service outlet within direct-connect distribution cabling
- 1.3.1.15 *Optical fibre entrance facility (OFEF)*
The cabinet containing the joint between the external optical fibre cables and the OFEF-EC link cables. It is the property of University of Oxford IT Services.
- 1.3.1.16 *Pathway*
A defined route for cables between termination points.
- 1.3.1.17 *Pathway system*
An area or volume defined by markings or a specific cable management system including those specified in the EN 50085 and EN 50086 series of standards.
- 1.3.1.18 *PMCD panel*
A panel terminating an intermediate cable at the process monitoring and control distributor.
- 1.3.1.19 *Process monitoring and control distributor (see Note 1)*
The functional element providing onward distribution of process monitoring and control services throughout the customers' premises, typically via structured cabling components. It is the property of the college or University but accommodates the closure(s) housing the University of Oxford IT Services INTI(s).
- 1.3.1.20 *TD line*
The service provision at an interface to the TD panel. This may be presented using one or two pairs within an Intermediate BDF Cable.
- 1.3.1.21 *TD panel*
A panel terminating an intermediate cable at the telecommunications distributor.
- 1.3.1.22 *Telecommunications distributor (see Note 1)*
The functional element providing onward distribution of telecommunications services throughout the customers' premises, typically via structured cabling components. It is the property of the college or University but accommodates the TD panel(s) housing the University of Oxford IT Services INTI(s).
- 1.3.1.23 *Telecommunications outlet (TO)*
A service outlet within generic, "structured", distribution cabling
- NOTE 1:
A distributor is not a physical element such as a cabinet. It is a "space" and can be co-located with other distributors (for example the TD and ITD may be housed in the same cabinet).

1.3.2 Abbreviations

For the purposes of this series of documents, the following abbreviations apply.

| | |
|------|--|
| BDF | Building distribution frame |
| BMSD | Building management services distributor |
| CP | Consolidation point |
| EC | Equipment cabinet |
| ENTI | External network test interface |
| ITD | IT distributor |
| INTI | Internal network test interface |
| LJU | Line jack unit |
| OFEF | Optical fibre entrance facility |
| PMCD | Process monitoring and control distributor |

TD Telecommunications distributor
TO Telecommunications outlet

2 DESIGN AND IMPLEMENTATION OBJECTIVES

The process of equipping a building with a suitable telecommunications cabling infrastructure (whether a new build or refurbishment) requires detailed specification of the following processes:

- design;
- planning;
- installation;
- acceptance test and inspection.

The normative requirements of this series of documents represent minimum design and planning requirements that are required to allow the premises to be supported by University of Oxford IT Services. Additional aspects that shall be addressed are listed in clause 3. This list of topics is not exhaustive and may be added to cover applications not yet envisaged.

Where the aspects listed in clause 3 are covered by recommendations in this series of documents they are referenced appropriately.

The application of the University of Oxford IT Services ISP requirements and recommendations within each building to be served by the University of Oxford IT Services will involve a dialogue between the customer, representatives of Estates Directorate, Computing Services, University of Oxford IT Services, Security Services and the Mechanical and Electrical consultants appointed by the University to manage this aspect of the fitting out of the building.

The dialogue will be conducted within the framework of a series of planning meetings and the final specification agreed following this series of meetings shall be signed off before incorporation as a formal specification which will be appended to the Mechanical and Electrical tender specification for the building.

In all cases the specification shall require conformance to BS 6701 within which responsibilities are divided between the installer and “owner of the premises” (the “customer” as defined in this series of documents).

3 DESIGN AND IMPLEMENTATION ASPECTS

| Topic | OUT ISP Document |
|--|------------------|
| 3.1 Scope of the Project | |
| Intended use of the building/premises | |
| Organisational structure within the building - intended to identify division of IT management responsibility within the building that results in the connection of multiple LANs to the University Backbone Network. | |
| A list of the various applications requiring telecommunications within the building (minimum transmission speeds required to meet these applications) | |
| Direct-connect telephone outlets including specialised applications (e.g. lift and corridor telephones) | ISP-03-002 |
| Generic outlets for telephones, workstations, other network devices such as printers. | ISP-03-003 |
| Remote and/or locally monitored CCTV | ISP-03-004 |
| Remote and/or locally building services monitoring (door entry system, fire alarm, other alarm systems - intruder, refrigeration, etc) | ISP-03-004 |
| Server or computer room requirements (UPS equipment, air-conditioning, equipment racks) | ISP-03-003 |
| Wireless installation (Wi-Fi system within building) | ISP-03-003 |

| | Topic | OUT ISP Document |
|-----|---|--|
| 3.2 | Physical cabling Infrastructure | |
| | Size and structure of the building | |
| | External cable requirements - building entry requirements and location | ISP-01-001 |
| | Cable containment system - intermediate cabling | ISP-01-002 |
| | Cable containment system - direct-connect cabling (telecommunications) | ISP-03-002 |
| | Cable containment system - distribution cabling (IT) | ISP-03-003 |
| | Cabinets and frames (Entrance facilities) | ISP-01-001 |
| | Cabinets and frames (Telecommunications distributor) | ISP-02-002/ISP-03-003 |
| | Cabinets and frames (IT distributor) | ISP-02-002/ISP-03-003 |
| | Outlet and patch panel identification scheme | ISP-03-003 |
| | Spare capacity | ISP-01-001/ISP-03-003 |
| | Selection of cabling and cabling component performance standards | |
| | - direct-connect cabling (telecommunications) | ISP-03-002 |
| | - distribution cabling (telecommunications) | ISP-03-003 |
| | Flexibility and potential for expansion of the cabling infrastructure - options for amending requirements in the post-tender phase. | ISP-01-001 |
| 3.3 | Cabinets and frames | |
| | Layout of cabling within the cabinets and frames of telecommunications distributors - schematic including cable management | ISP-02-002 |
| | Layout of cabling and equipment within the cabinets and frames of IT distributors - schematic including cable management | ISP-02-002 |
| | Allocation of space within the enclosures for equipment to be attached to the cabling system | ISP-02-002 |
| | Allocation of appropriate floor/wall space for EF cabinets and frames | ISP-01-002 |
| | Allocation of appropriate floor/wall space for TD and ITD cabinets and frames | ISP-02-002 |
| | Environmental, aesthetic, security and operational conditions | |
| | Power supply - UPS equipment | |
| 3.4 | Equipment attached to the telecommunications cabling | |
| | Location, installation and operational requirements of equipment to be attached to the cabling system - (Ethernet switches, building services panel, CCTV cameras etc) | |
| | Power requirements for equipment attached to the telecommunications cabling | |
| | Patching schedules for the various applications (telephones, workstations etc) | |
| 3.5 | Records | |
| | The specification shall require the installer to present the as-installed drawings and information in a standardised form that can be incorporated in a building log. This will be held as an online record and a procedure will be set down to record changes and additions to the infrastructure. | (see clause 4) |
| | <ul style="list-style-type: none"> Schematic of cabling infrastructure External cabling connectivity <ul style="list-style-type: none"> External balanced cabling (BDF - MXDF) External optical fibre cabling (EC – fibre node) Intermediate cabling connectivity <ul style="list-style-type: none"> Intermediate balanced cabling (BDF - TD Panel) Intermediate balanced cabling (EC - ITD Panel) Intermediate balanced cabling (EC - BMSD Panel) Intermediate balanced cabling (EC - PMCD Panel) Schedule of outlets <ul style="list-style-type: none"> Direct-connect cabling (telecommunications) Distribution cabling (telecommunications and IT) Distribution cabling (building management services) Distribution cabling (process control and monitoring) Schematics and/or schedules for each application | ISP-01-001 ISP-01-001 ISP-02-001 ISP-02-001 ISP-03-002 ISP-03-003 ISP-03-004 ISP-03-004 |

4 ADMINISTRATION SYSTEMS

It is a strategic objective and a normative requirement of BS EN 50174-1 to apply an integrated administration system to the cabling infrastructures of, and supported by, the University of Oxford IT Services.

Although it is not necessary to define the specific administration tools in this document, the format of documentation containing the details of the fixed infrastructures is critical to future integration.

The data supplied by installers shall allow a full and proper completion of the fields applicable to the cabling sub-system.

Table 1 shows a common format for voice cabling implementations (including direct-connect distribution cabling)

Note: External joints are not supported in the fields contained in Table 1, but can be included if required.

Table 2 shows a common format for cabling implementations for University of Oxford IT Services information technology cabling.

NOTE: External joints are not supported in the fields contained in Table 1, but can be included if required.

A format for IT distribution cabling which can be integrated with those of Table 1 and Table 2 is described in document ISP-03-003.

A format for distributed building services cabling which can be integrated with those of Table 1 and Table 2 is described in document ISP-03-004.

This type of administration system allows an integrated record keeping system to be implemented as shown in Figure 2.

5 SERVICE DELIVERY

5.1 Telephone services

Should a fault develop on a telephone line, the college or the University must first try another telephone instrument in the room outlet to determine whether the original instrument is faulty.

If there is no dialling-tone at the outlet, the college or the University shall first then the line at the appropriate port on the TD panel.

This will determine whether the fault is the responsibility of University of Oxford IT Services or the college/University. If the fault is the responsibility of University of Oxford IT Services, it should be reported to the Faults Desk on 88888 quoting the line number, the room number and the identifier of the port on the TD panel.

6 OTHER DOCUMENTS IN THIS SERIES

IISS-00-001: Infrastructure Installation Specification Strategy: Overview

IISS-00-002: Infrastructure Installation Specification Strategy: Distributed building services

IISS-01-001: Assessment of balanced cabling test results

IISS-01-002: Installation and acceptance testing of singlemode optical fibre cabling

ISP-00-002: Access to University of Oxford IT Services facilities (later)

ISP-01-001: University of Oxford IT Services Entrance Facilities - Product and design specification

ISP-01-002: University of Oxford IT Services Entrance Facilities - Accommodation requirements

ISP-02-001: University of Oxford IT Services Intermediate cabling (INTI-ENTI) - Product and design specification

ISP-02-002: University of Oxford IT Services Intermediate cabling (INTI-ENTI) - Accommodation requirements

ISP-03-001: University of Oxford IT Services cabling - Recommendations: Overview

ISP-03-002: Direct-connect cabling - Recommendations: Telecommunications infrastructure

ISP-03-003: Distribution cabling - Recommendations: IT infrastructure

ISP-03-004: Distribution cabling - Recommendations: Distributed building services infrastructure

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Table 1 - Example of field listing for "voice" cabling infrastructures

| | University of Oxford IT Services External Voice | | University of Oxford IT Services Intermediate Voice | | University of Oxford IT Services Direct Connect Voice | |
|--------------------|---|---------------|---|---------------|---|---------------|
| Fields | Group | Example | Group | Example | Group | Example |
| Building | 1 | Walker Annex | 1 | Walker Annex | 1 | Walker Annex |
| Floor | | L | | L | | L |
| Closet | | | | | | |
| Cabinet | | | | | | |
| Closure Type | | Block | | Block | | Block |
| Block ID | | V-L-35-34 | | V-L-35-34 | | V-L-35-34 |
| Port Type | | Pair-Position | | Pair-Position | | Pair-Position |
| Pair-Position ID | | P1 | | P1 | | P1 |
| Cable Type | 2 | Cable-EV-100 | | | | |
| Cable-EV-100 ID | | CEV-265 | | | | |
| Cable Type | | | 2 | Cable-IV-100 | | |
| Cable-IV-100 ID | | | | CIV-8 | | |
| BDF-DP Cable | | | | | 2 | Cable-DPV-10 |
| Cable-DP-10 | | | | | | DPV-246 |
| Building | 3 | Main Exchange | | | | |
| Floor | | G | | | | |
| Closet | | | | | | |
| Cabinet | | | | | | |
| Closure Type | | Block | | | | |
| Block ID | | V-G-75-13 | | | | |
| Port Type | | Pair-Position | | | | |
| Pair-Position ID | | P1 | | | | |
| Building | | | 3 | Walker Annex | | |
| Floor | | | | L | | |
| Closet | | | | WA-CR | | |
| Cabinet | | | | WA-CR-2 | | |
| Closure Type | | | | TD Panel | | |
| TD Panel | | | | TDP-2-35 | | |
| Port Type | | | | RJ45 | | |
| RJ45 Port ID | | | | RJ45-20-1 | | |
| Building | | | | | 3 | Walker Annex |
| Floor | | | | | | G |
| Closet | | | | | | |
| Cabinet | | | | | | WA-DP-13 |
| Closure Type | | | | | | Block |
| Block ID | | | | | | 4 |
| Port Type | | | | | 4 | Pair-Position |
| Pair-Position ID | | | | | | P1 |
| Cable Type | | | | | 5 | Cable-LJU-2 |
| Cable- LJU-2 ID | | | | | | 27865 |
| Building | | | | | | Walker Annex |
| Floor | | | | | | 2 |
| Closet (Staircase) | | | | | | North |
| Cabinet (Room) | | | | | | N-201 |
| Closure Type | | | | | | LJU |
| LJU ID | | | | | | 27865 |
| Port Type | | | | | | Pair-Position |
| Pair-Position ID | | | | | | P1 |

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Table 2 - Example of field listing for OUT "IT" cabling infrastructures

| | University of Oxford IT Services External OF | | University of Oxford IT Services Intermediate EC Cabling | | | | | |
|-----------------|--|--------------|--|----------------|--------|--|--|--|
| Fields | Group | Example | Group | Example | | | | |
| Building | 1 | Walker Annex | 1 | Walker Annex | | | | |
| Floor | | L | | L | | | | |
| Closet | | | | | | | | |
| Cabinet | | WA-EC | | WA-EC | | | | |
| Closure Type | | SMF Panel | | Patch Panel | | | | |
| SMF Panel ID | | SMP-01 | | | | | | |
| Port Type | | OFC Port | | | | | | |
| OFC Port ID | | FC-02 | | | | | | |
| Patch Panel ID | | | | 1 | CMP-01 | | | |
| Port Type | | | RJ45 | | | | | |
| RJ45 Port ID | | | 21 | | | | | |
| Cable Type | 2 | Cable-SMF-08 | | | | | | |
| Cable-SMF-08 | | SMF-08-134 | | | | | | |
| Cable Type | | | 2 | Cable-Cat.5e-4 | | | | |
| Cable-Cat.5e-4 | | | | 23578 | | | | |
| Building | 3 | Walker Annex | | | | | | |
| Floor | | L | | | | | | |
| Closet | | | | | | | | |
| Cabinet | | WA-EFOF | | | | | | |
| Closure Type | | Splice Panel | | | | | | |
| Splice Panel ID | | WA-EFOF | | | | | | |
| Port Type | | SMF-Splice | | | | | | |
| SMF-Splice ID | | 02 | | | | | | |
| Cable Type | 4 | Cable-EF-8+8 | | | | | | |
| Cable-EF-8+8 ID | | EF-125 | | | | | | |
| Building | 5 | Main | | | | | | |
| Floor | | G | | | | | | |
| Closet | | | | | | | | |
| Cabinet | | WA-EC | | | | | | |
| Closure Type | | Splice Panel | | | | | | |
| Splice Panel ID | | MG-EFOF | | | | | | |
| Port Type | | SMF-Splice | | | | | | |
| SMF-Splice ID | | 02 | | | | | | |
| Cable Type | 6 | Cable-SMF-08 | | | | | | |
| Cable-SMF-08 ID | | SMF-08-192 | | | | | | |
| Building | 7 | Main | | | | | | |
| Floor | | G | | | | | | |
| Closet | | | | | | | | |
| Cabinet | | M-EC-34 | | | | | | |
| Closure Type | | Patch Panel | | | | | | |
| Patch Panel ID | | MG-EFOF | | | | | | |
| Port Type | | OFC Port | | | | | | |
| OFC Port ID | | FC-02 | | | | | | |
| Building | | | 3 | Walker Annex | | | | |
| Floor | | | | L | | | | |
| Closet | | | | WA-CR | | | | |
| Cabinet | | | | WA-CR-2 | | | | |
| Closure Type | | | | ITD Panel | | | | |
| ITD Panel ID | | | | CR-2-05 | | | | |
| Port Type | | | | RJ45 | | | | |
| Ri45 Port ID | | | | 16 | | | | |

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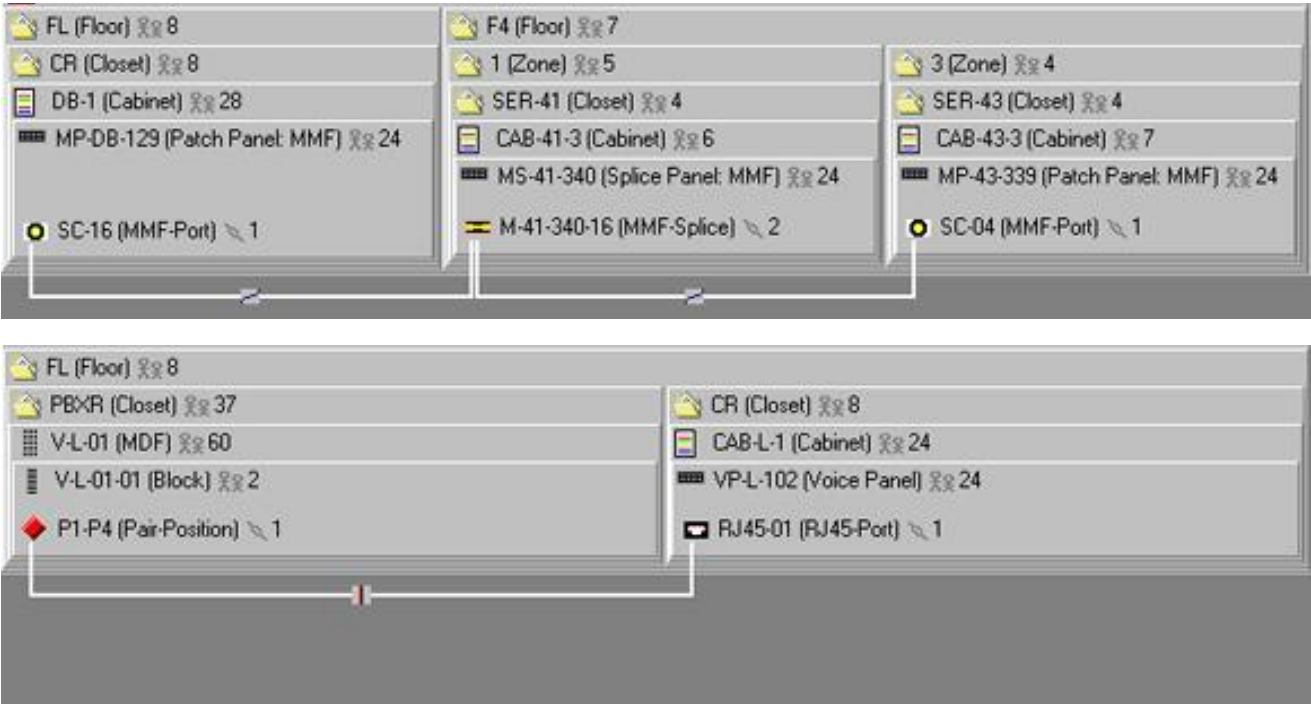


Figure 2 - Example of automated record administration system

171 **NORMATIVE REFERENCES**

172 The following documents shall be applied in a normative manner (i.e. mandated) by the users of this document.

173 BS 6701:2016 + Telecommunications equipment and telecommunications cabling - Specification for installation,
 Amendment 1:2017 operation and maintenance

174 **BIBLIOGRAPHY**

176 The following documents are considered useful reference sources for the users of this document.

177 BS 7671:2018 Requirements for electrical installations: IEE Wiring Regulations: 18th edition (from 1st July 2018)
 BS EN 50174-1:2018 Information technology - Cabling installation - Part 1: Installation specification and quality
 assurance
 BS EN 50174-2:2018 Information technology - Cabling installation - Part 2: Installation planning and practices inside
 buildings

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