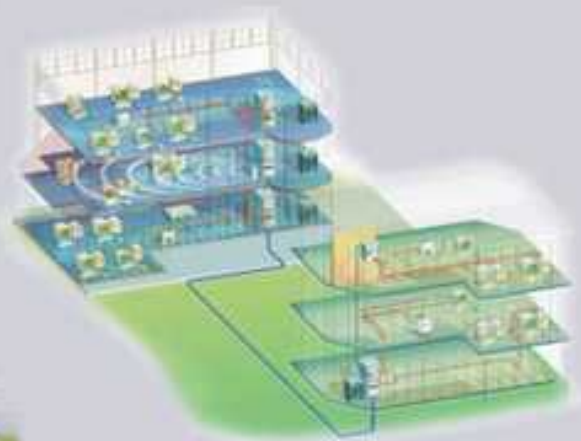




■ FORMATION RÉSEAU & CLIENTS -



Introduction

VDI : Voice Data Image

→ "Information Technology"

- Voice : phone network
- Data : ethernet network
- Image : video network

Introduction

Commercial buildings today

■ Considerable personnel change

Every 18 months

■ Change of computer workstations

Every 2-3 years

■ Evolution of computer networks

Every 4-5 years

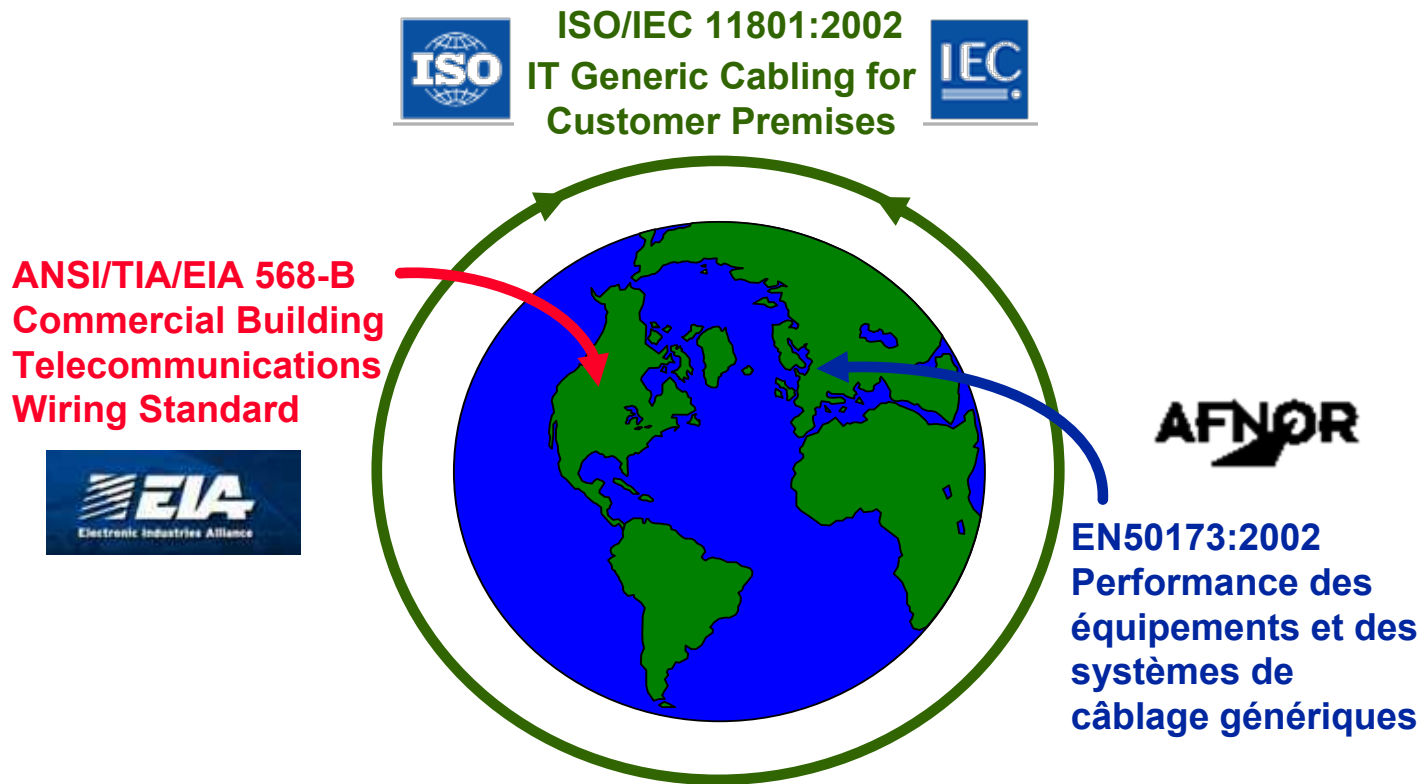
Introduction

The Structured Cabling System

- For all computing and telephone applications
- Independence from manufacturers
- Flexible and reconfigurable

Average lifetime of cabling system:
8-10 years

Standard's reminds



The standard

→ NF EN 50 173-1

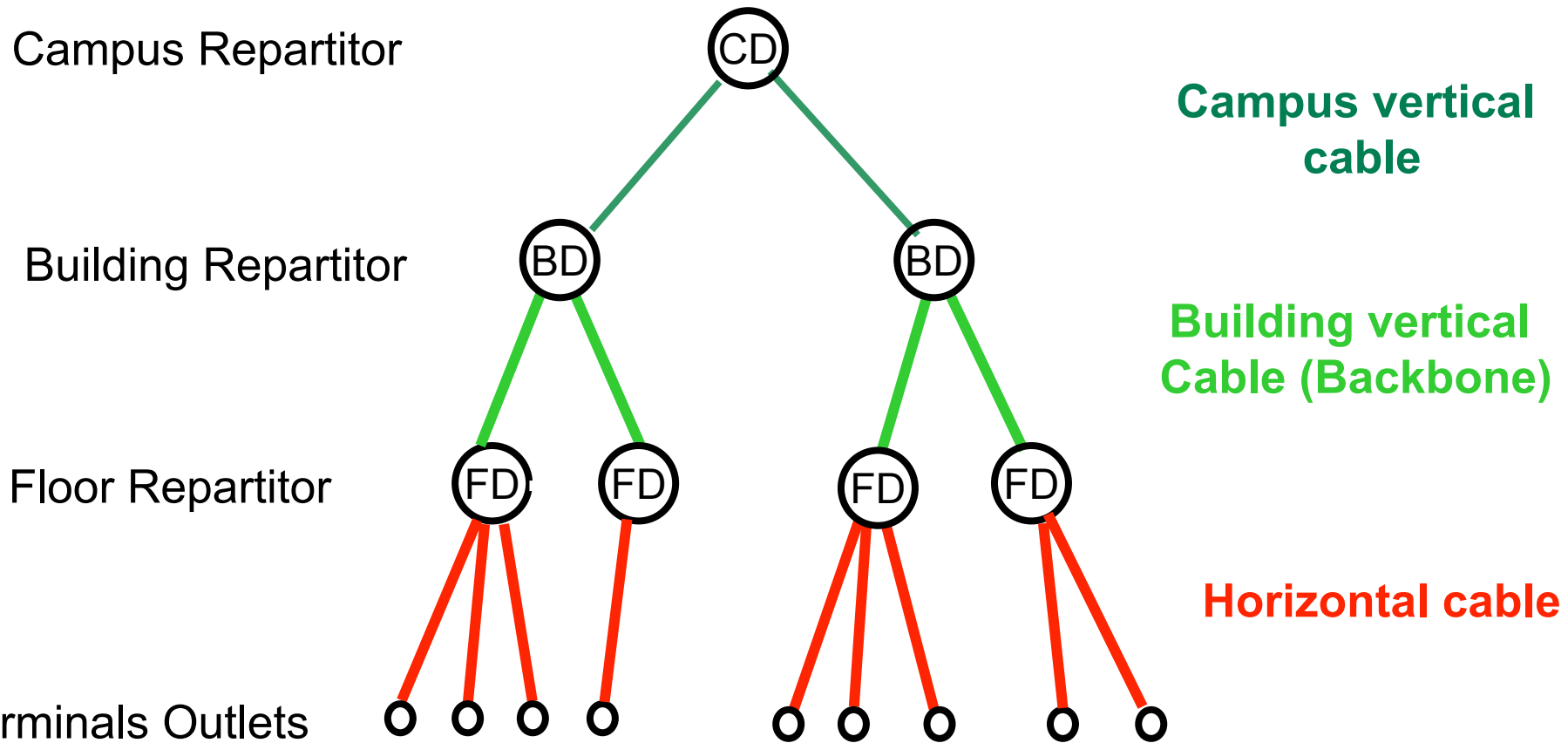
Last edition August 2003

→ ISO/IEC 11 801 : 2002

Last edition September 2002

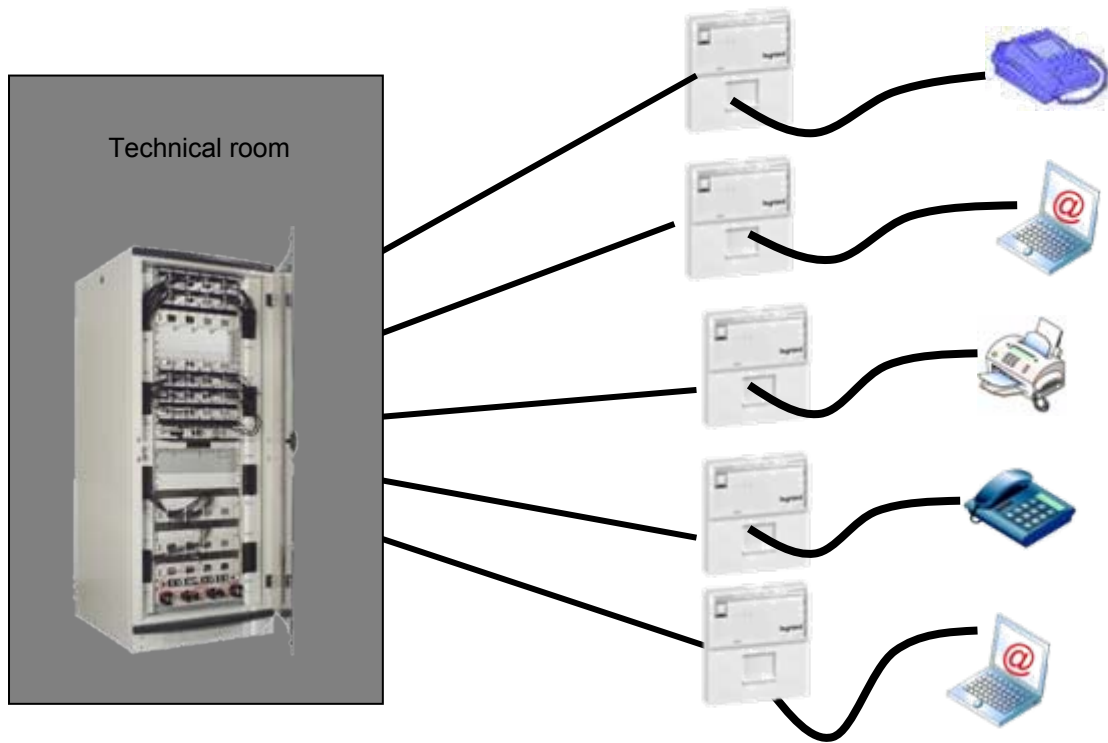
The standard : ISO/IEC 11 801

Architectures : Star with 3 levels



Horizontal cabling subsystem

What is the horizontal cabling ?



Star architecture

One 4 twisted pairs cable by socket

Universal Socket

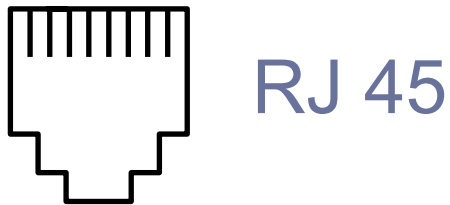
Socket not dedicated to an application

Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

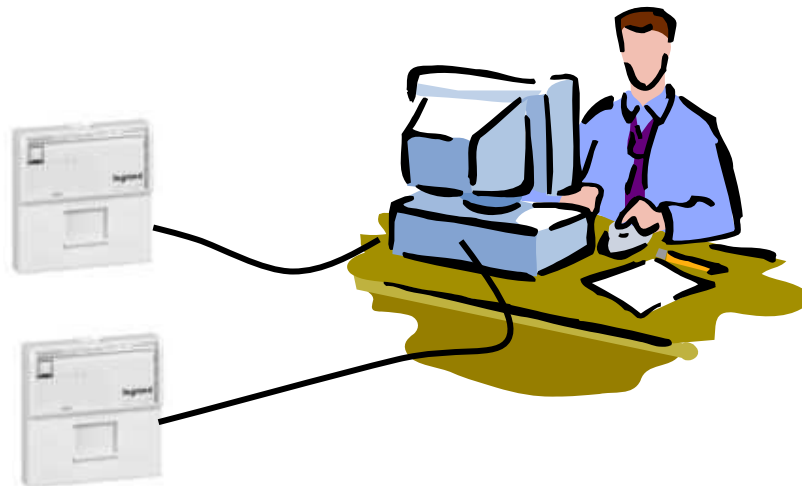
■ Connectic hardware

→ Generic outlets



→ The work area

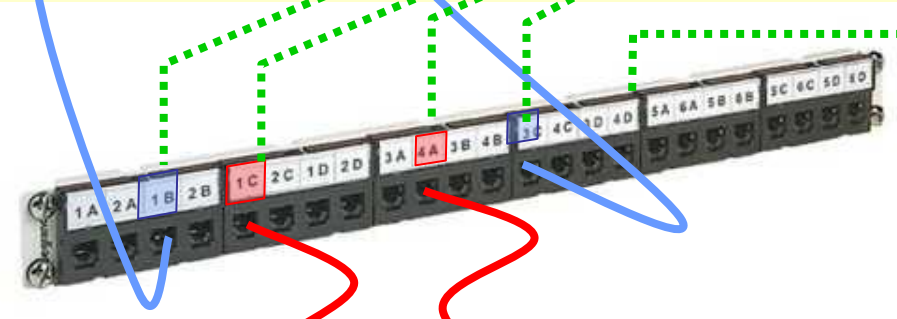
A minimum of
2 terminal outlets



Phone input

Phone Ressources

PABX



■ ■ ■ **Switch** ■ ■ ■

Data Ressources

90 m max.



Phone input

Phone Ressources

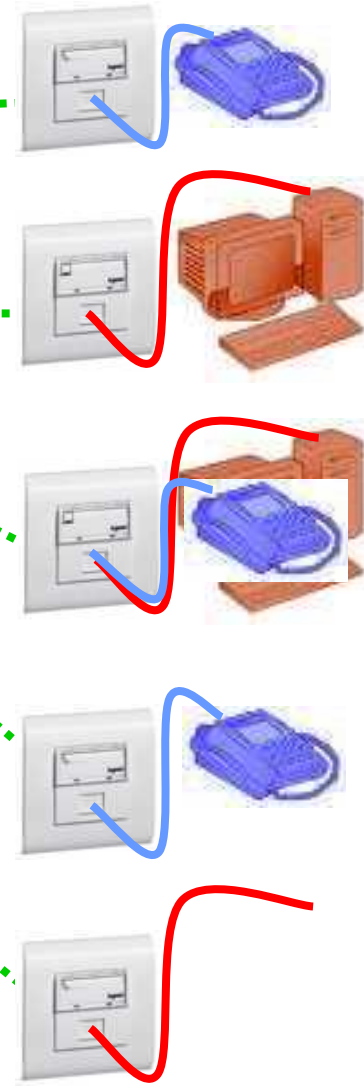
PABX



Switch

Data Ressources

90 m max.



Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

The 4 key points of class D and E

1. Performances: classes and categories
2. Cable length
3. Cables Structures
4. Cable laying

Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

■ Current Classes and categories

Catégorie	Class	Ethernet Rate	Fréquence
5e	D	$\leq 100\text{Mbit/s}^*$	100 MHz
6	E	$\leq 1\text{Gbit/s}$	250 MHz
7	F	$\leq 1\text{Gbit/s}$	600 MHz

* 1Gbit/s possible

Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

■ Classes and categories

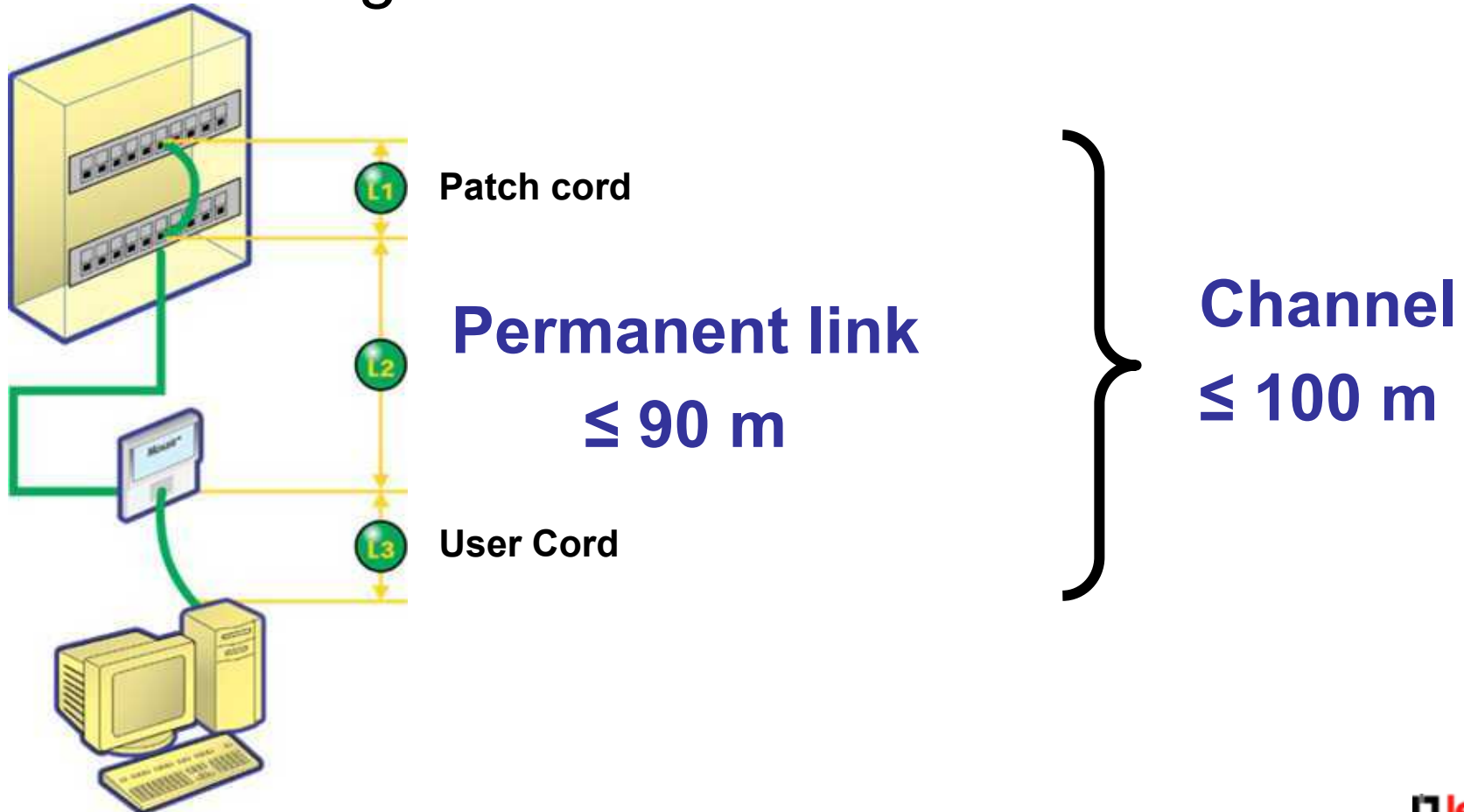
Category	Class	Rate	Frequency
5e	D	$\leq 100\text{Mbit/s}$	100 MHz
6	E	$\leq 1\text{Gbit/s}$	250 MHz
6a*	Ea	$\leq 10\text{Gbit/s}$	500 MHz
7	F	$\leq 10\text{Gbit/s}$	600 MHz
7a*	Fa	$\leq 10\text{Gbit/s}$	1000 MHz

* Channel specification

Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

■ Cable length



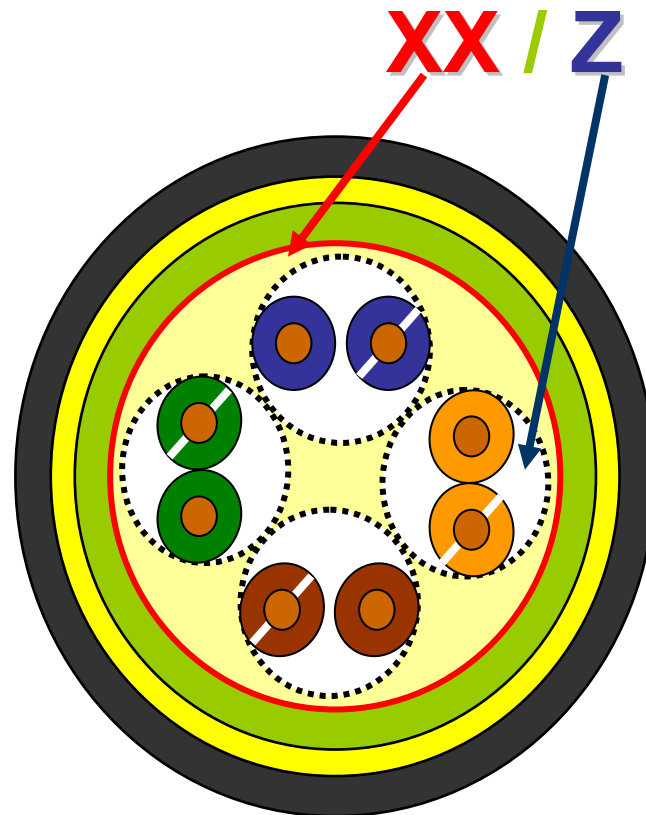
Horizontal cabling subsystem

The standard ISO 11 801

The cables : acronyms for balanced cabling

Overall screen :

- U** = unshielded
- F** = foiled screened (Alu/Polyester)
- S** = braid screened (cooper)
- SF** = both foil+braid



Individual screen :

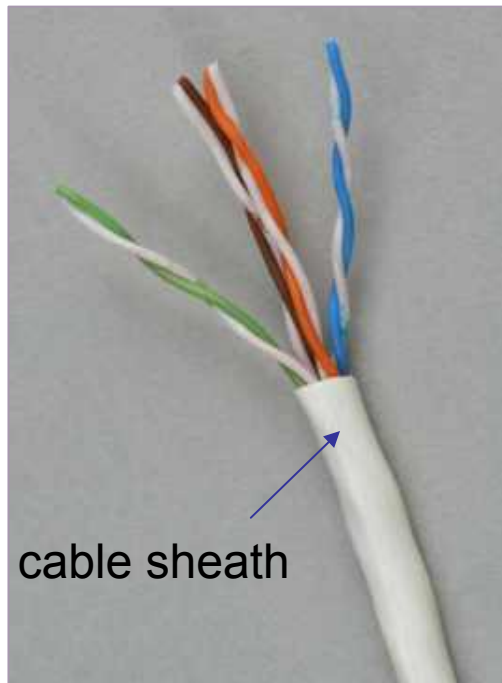
- U** = unshielded
- F** = foiled screened

U = Unshielded
F = Foiled
S = Shielded

Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

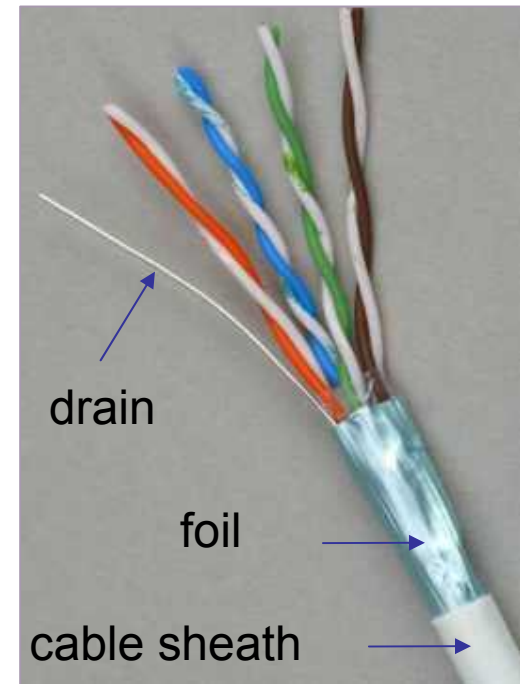
■ Cable structures



Impedance
100 ohms

"U/UTP" (UTP)

Unshielded / Unshielded Twisted Pairs



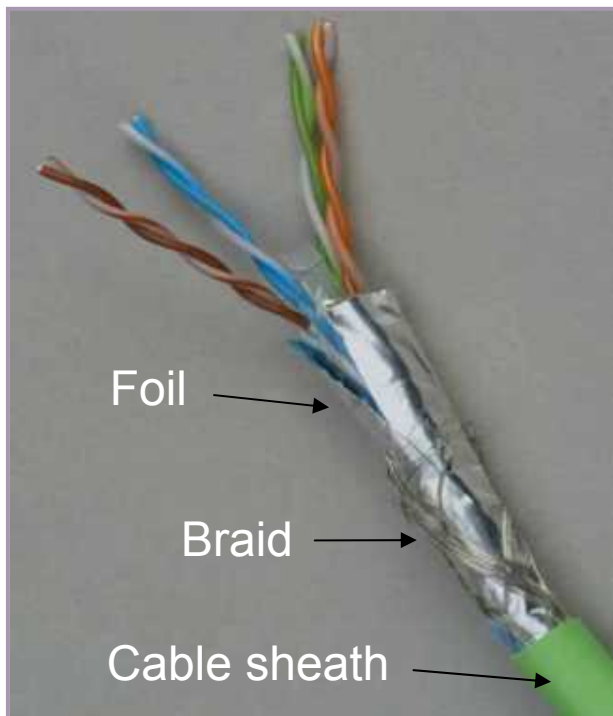
"F/UTP" (FTP)

Foiled / Unshielded Twisted Pairs

Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

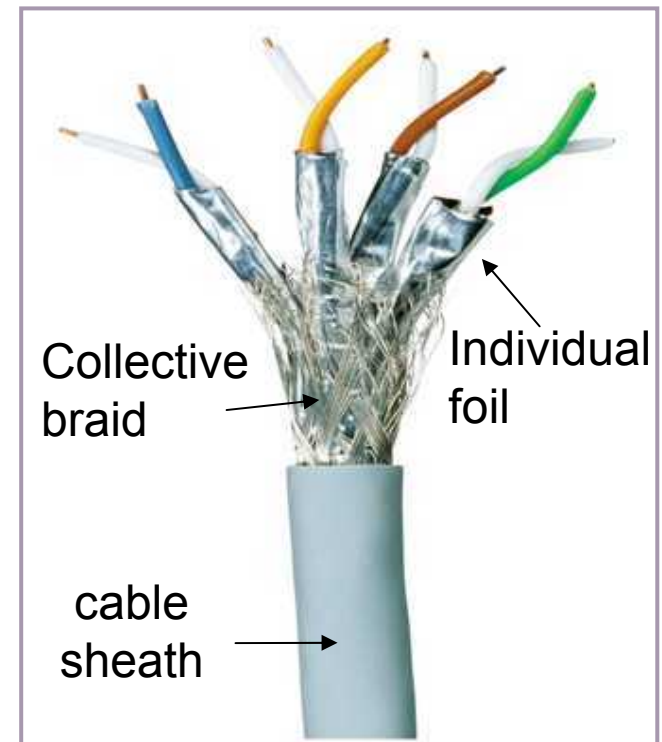
■ Cable structures



Impedance
100 ohms

"SF/UTP" (SFTP)

Shielded Foiled / Unshielded Twisted Pairs



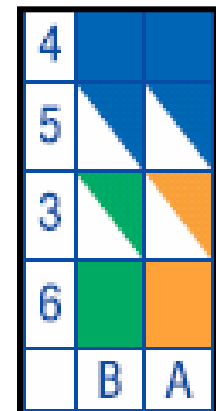
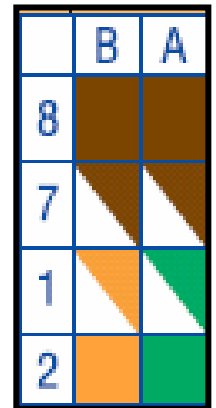
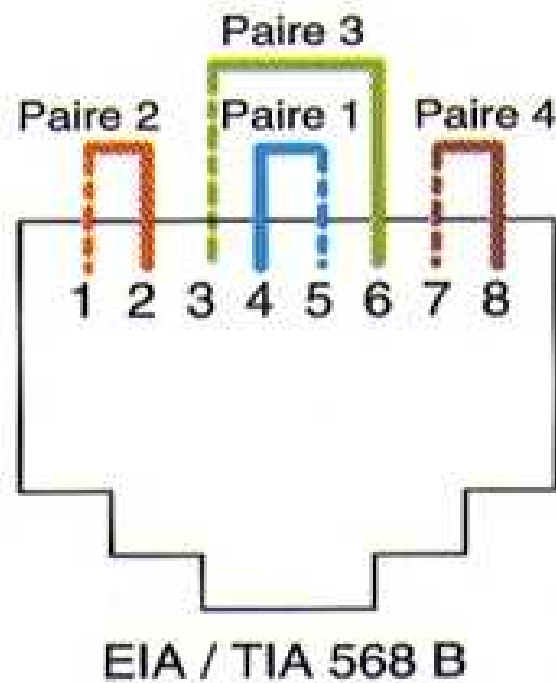
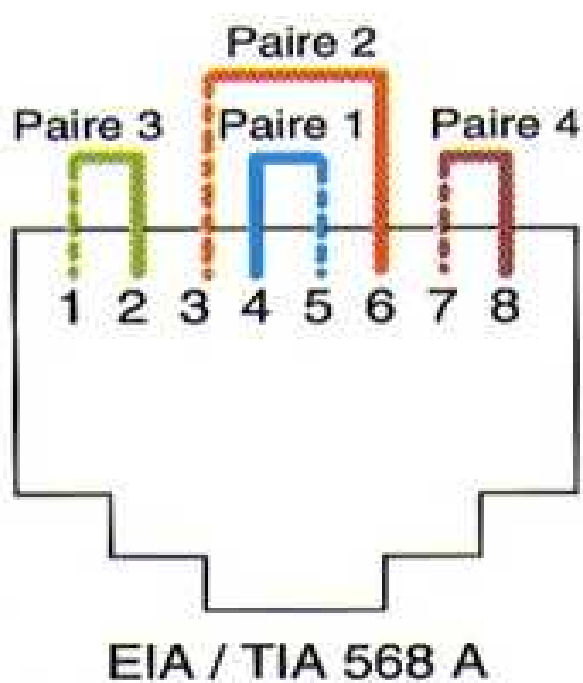
"S/FTP" (SSTP)

Shielded / foiled Twisted Pairs

Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

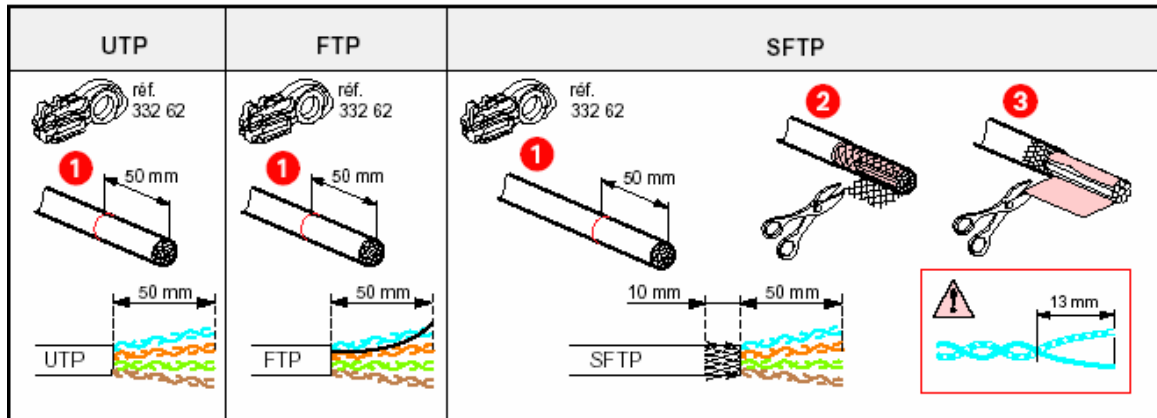
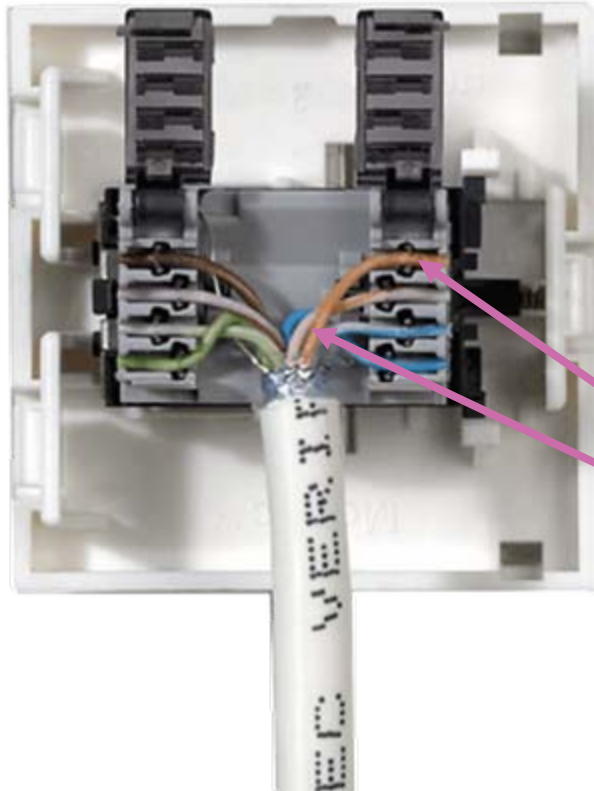
■ RJ45 connection diagram



Horizontal cabling subsystem

The NF EN 50 173-1 and ISO 11801 Standard

■ RJ45 Use



Untwisting
maxi 13 mm

Horizontal cabling subsystem

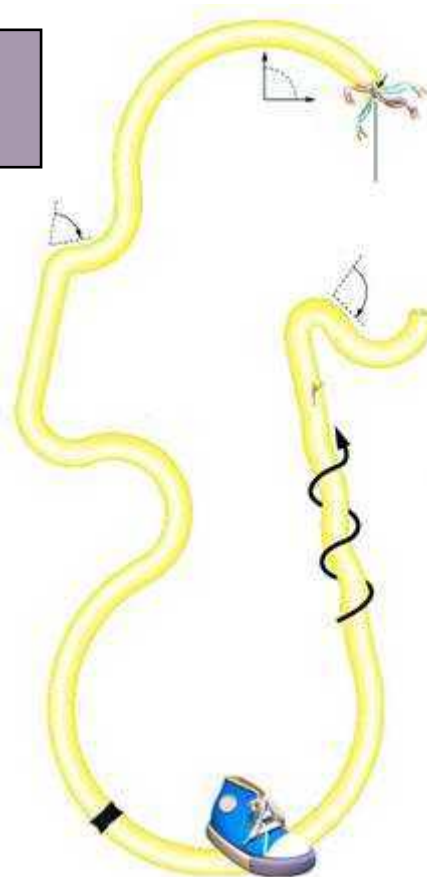
The NF EN 50 173-1 and ISO 11801 Standard

■ Cable laying

Don't pull cable ,
unwind it

Radius of curvature
at least 8 times
cable diameter

Don't crush the cable
with tight ties



don't notch copper

Avoid sharp angles

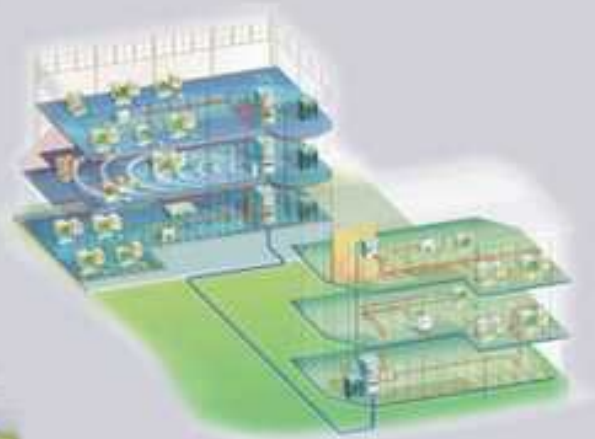
Don't tear cable

Avoid excessive cable torsion

Don't walk on cable

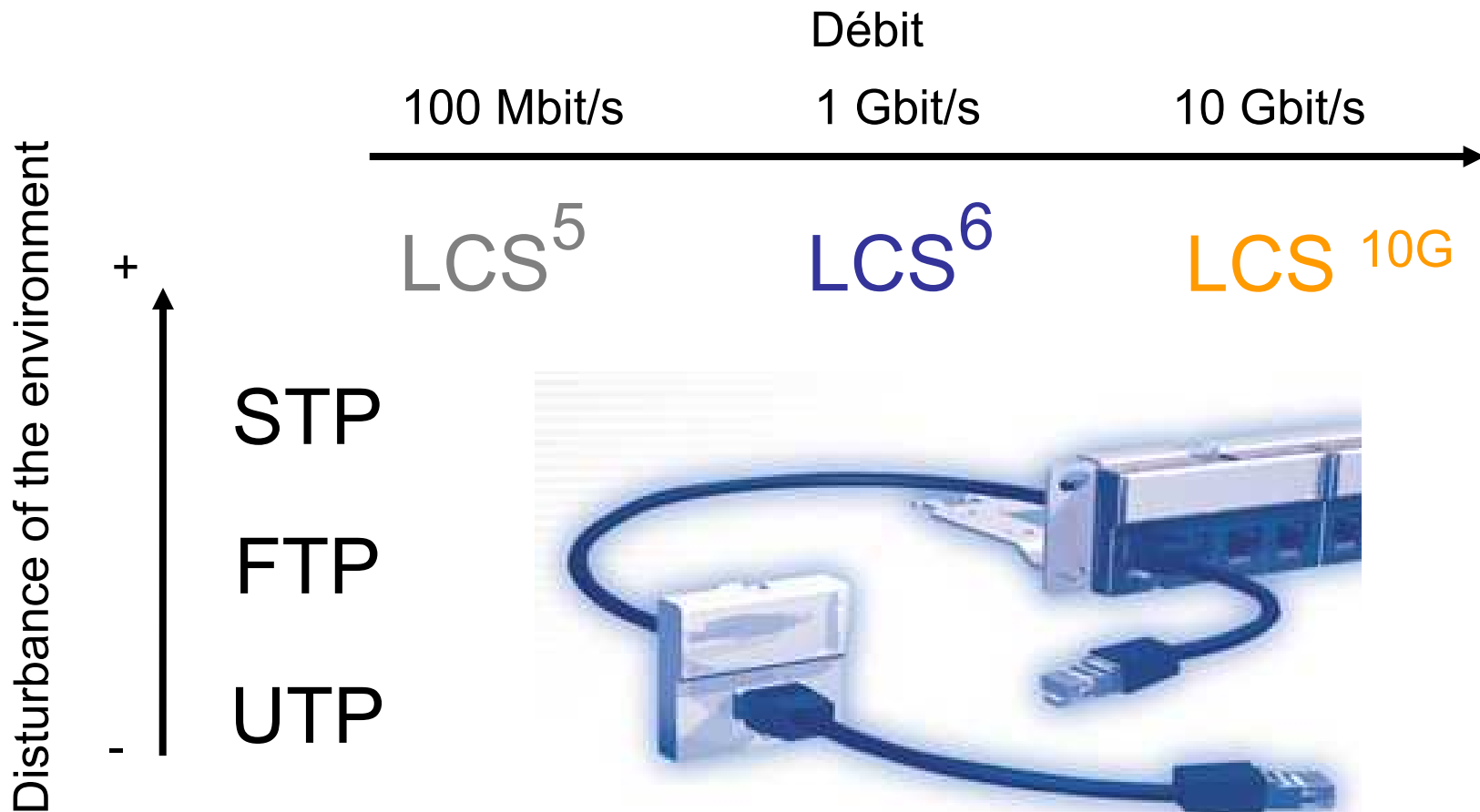
Legrand Cabling System LCS

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Legrand Cabling System

A Full system



Legrand Cabling System

LCS⁵ et LCS⁶

Attestation of Conformity

Unscreened Category 6
ISO/IEC, EN & TIA/EIA Connecting Hardware


Legrand Identification AL51
Category 6, Unscreened, Connection Module
Electrical Transmission Performance

Legrand
128 Avenue de Lattre de Tassigny
F-87045 Limoges Cedex, France

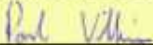
Attestation of Conformity No. 102207

This Unscreened ISO/IEC, EN & TIA/EIA Connection Module having board identification "AL 3902" has been tested by 3P Third Party Testing and complies with the Category 6 transmission requirements of 2nd edition ISO/IEC Generic Cabling Standard 11801, CENELEC Generic Cabling Standard EN 50173-1, ANSI/TIA/EIA Generic Cabling Standard 568-B.2-1 and IEC Draft Connecting Hardware Standard 60603-7-4. The stated pair requirements are passed using the complete specified de-embedded range of RJ 45 plugs. The Attestation of Conformity is valid for the actually tested connecting hardware sample and no verification of the running production is performed.

Hoersholm, 5 November 2002


Ole Lambertsen
Test Responsible

Hoersholm, 5 November 2002


Poul Villien
Coordinating Manager



LCS⁵

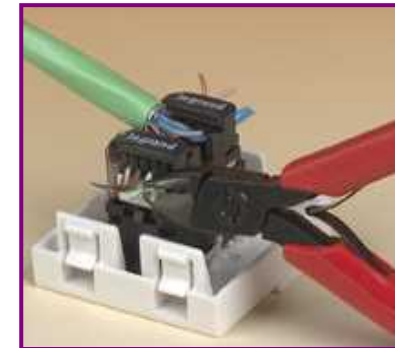
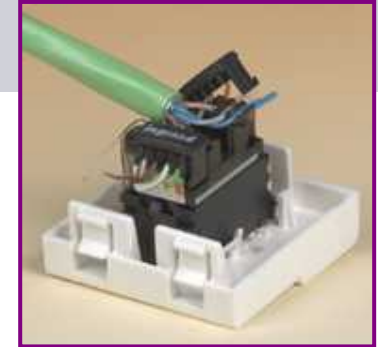
LCS⁶

STP
FTP
UTP

- Mix used allowed
- Down use compatibility
- Up to Gbit/s

LCS : Legrand Cabling system

One connector



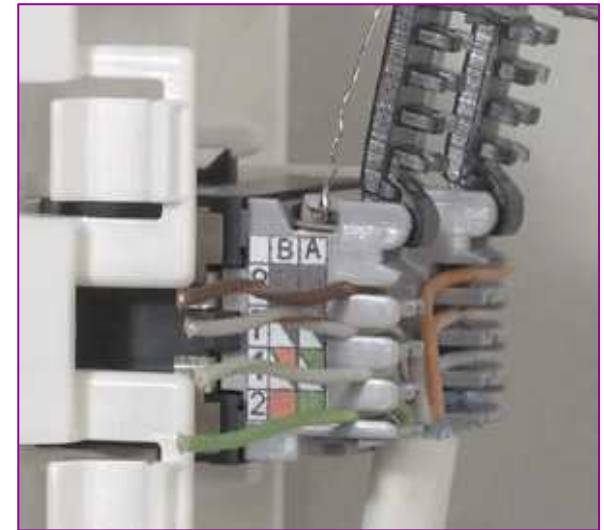
- **the same for all the range**
 - patch panels
 - RJ45 outlet
 - Area distribution box
 - WIFI access point
- tool less, simple, fast and safety connexion for all the categories 5e, 6 ou 10giga.
- perfect wiring devices integration.

Legrand Cabling System

The connection

■ Reliability and safety













- RJ45, RJ12 and RJ11 compatibility
- cable arrival from any direction
- Low depth
- re-connection possible (5 times)
- Installation of the shielding afterwards



Legrand Cabling System

Mosaic Terminal Outlet



UTP 	CAT 5e	X	X
	CAT 6	X 	X 
FTP 	CAT 5e	X	X
	CAT 6	X 	X 
STP   / 	CAT 6	X 	X  / 
	10 Giga	X	X

Legrand Cabling System

The LCS 10^{Giga} system



- Proprietary device
- Only STP
- 10 Gbits/s

Legrand Cabling System

Cables

Cat⁵ Cat⁶ Cat¹⁰giga

- Sheath PVC or LSOH (for public area)
- 2 x 4 pairs to safe time
- Optimum for EIA/TIA 568 A colour code
- NVP and measuring printed on the sheath
- U/UTP, F/UTP, SF/UTP, according to category
- Packaging in boxes (305 m) or reel (500 m)



Legrand Cabling System

100Ω

The patch cords

Cat 5 Cat 6 Cat 10giga

■ An essential part of the system

- Anti-traction sleeve to ensure a radius of curvature and behaviour tractions
- A precise positioning in the plug for an optimum connection
- Available in 1, 2, 3 or 5 m length



LCS : Legrand Cabling system

One 19" size in the repartitor

- **same for all the products**

- telephone blocks
- patch panel blocks
- PoE power supply block
- optical block, copper optical converter
- switch block, TV splitters

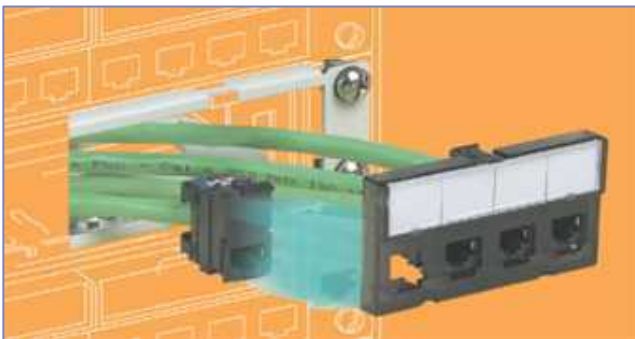


- allow modularity.
- Equipped or to be equipped offers
- Automatic grounding system.

Legrand Cabling System

The patch panel

■ Make use



Wiring

- on the front side
- on the back side



Supplied
with
screws

Legrand Cabling System

The equipped panels

- Telephone patch panel

48 inputs analogic or digital networks



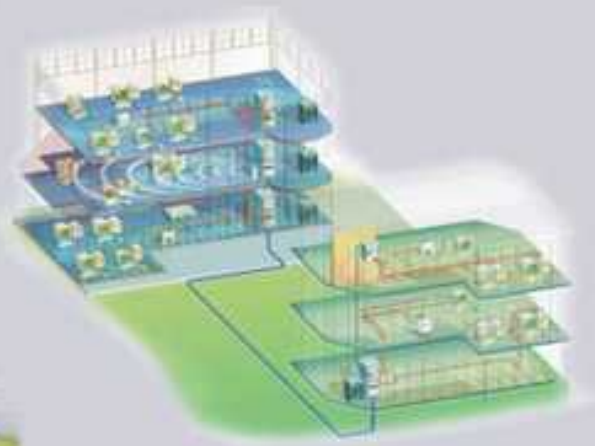
- Panel LCS⁵, LCS⁶, LCS¹⁰giga

24 connectors UTP, FTP, STP

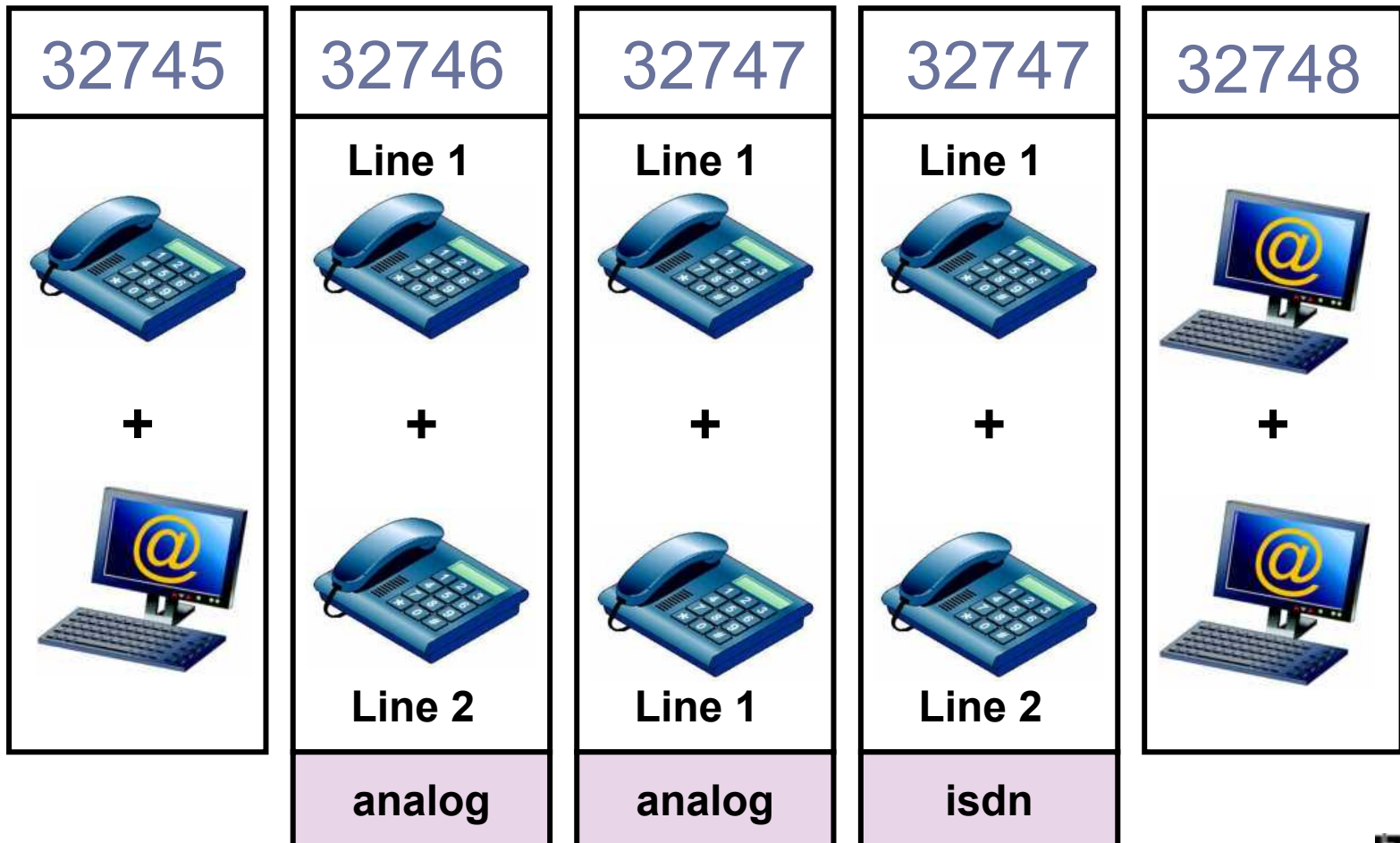


VDI Splitters

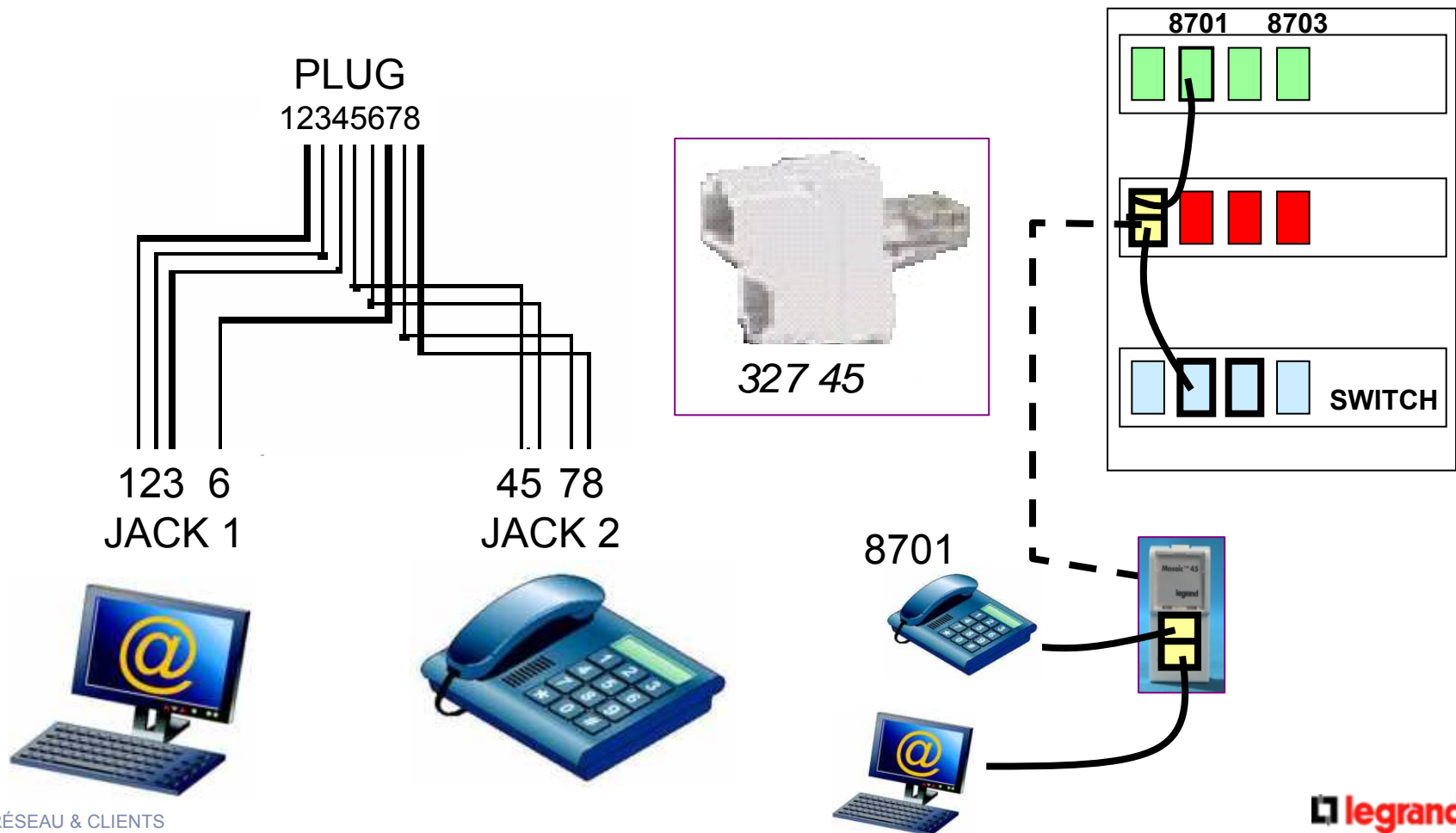
■ FORMATION RÉSEAU & CLIENTS -



The splitters



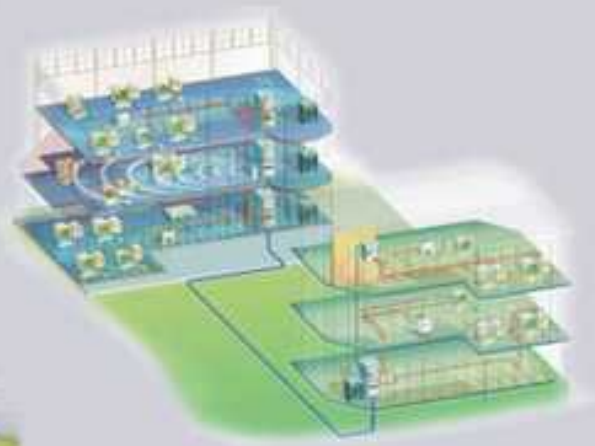
Splitters for Analog telephone and Ethernet



Legrand Cabling System

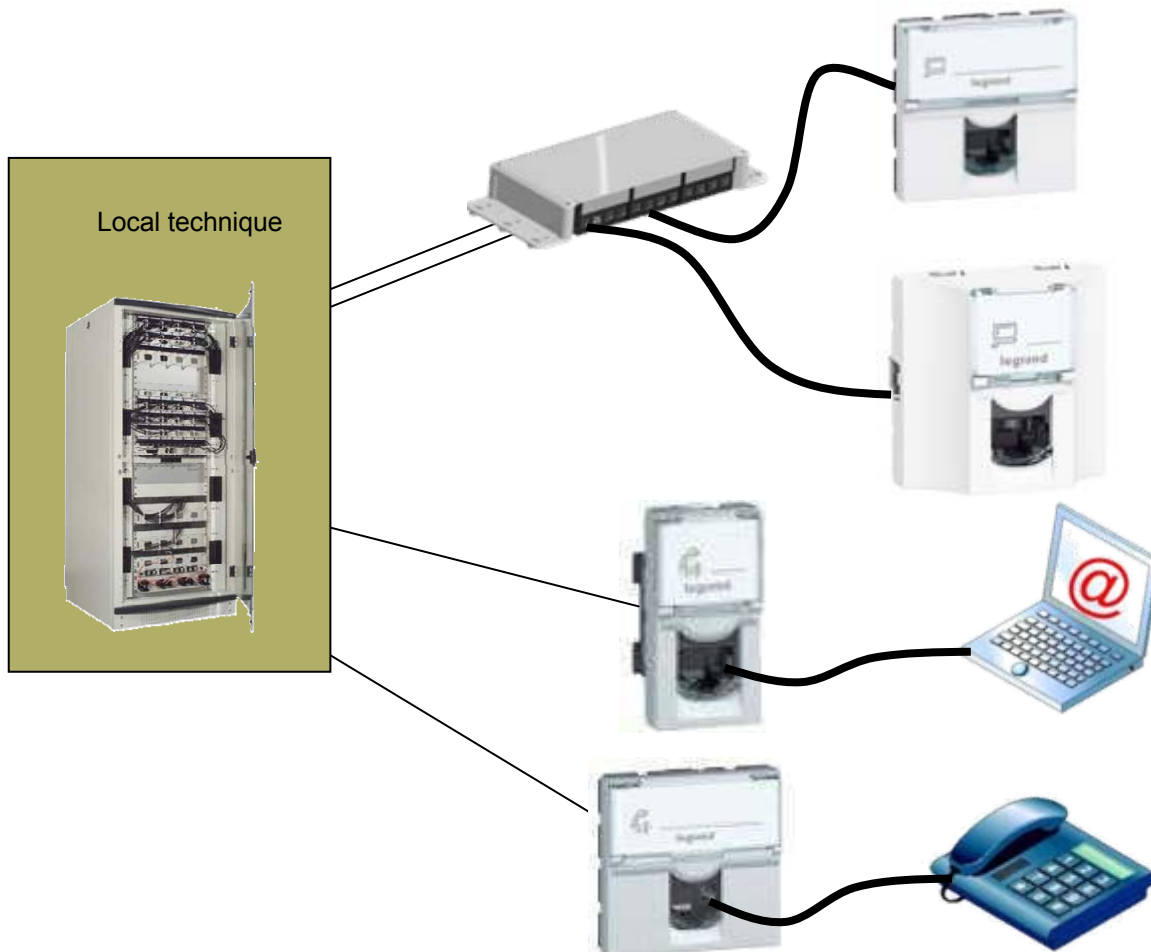
Area distribution box

■ FORMATION RÉSEAU & CLIENTS -



Horizontal wiring: flexibility / rentability

Similar to « consolidation point » of the NF EN 50173-1



2 solutions

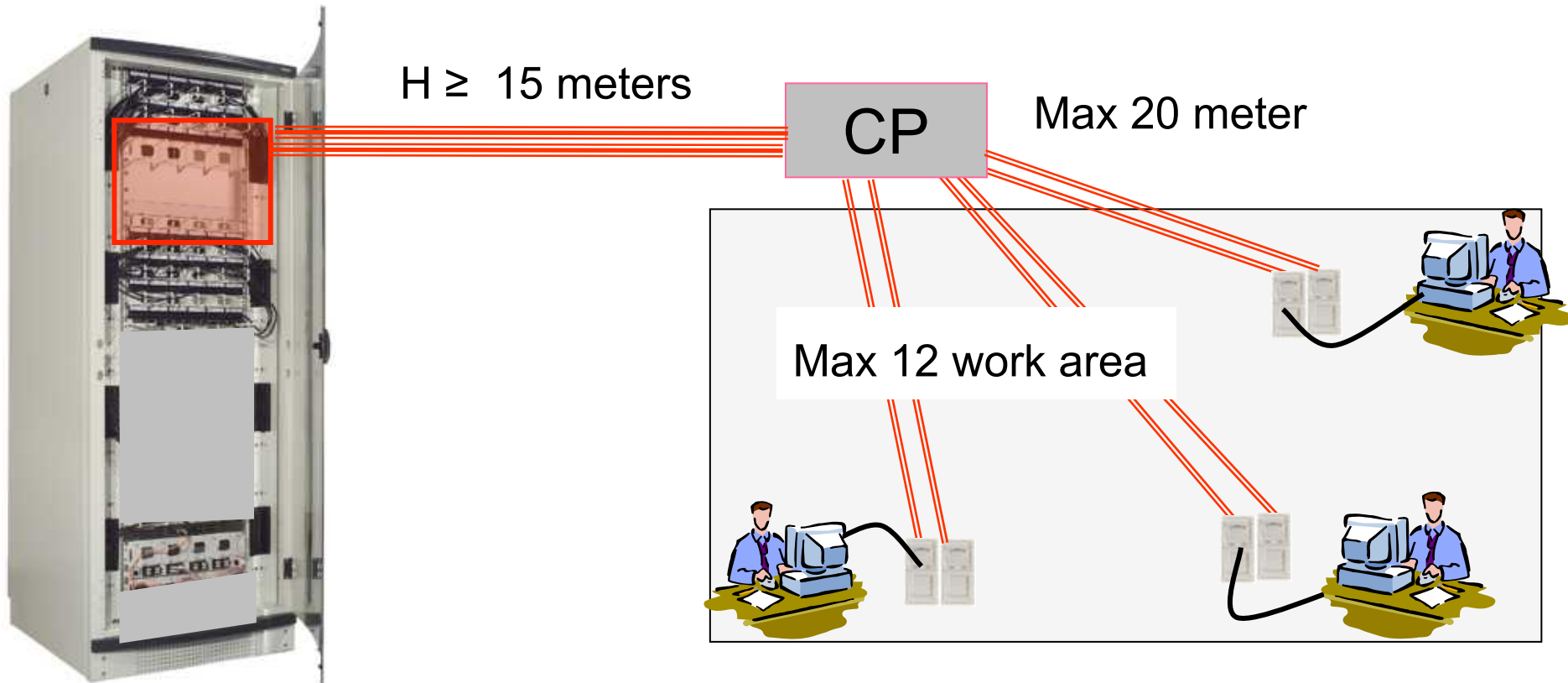
- Flexibility

Advantages

- Evolutivity
- Rapidity
- Simplicity
- Rentability

Legrand Cabling System

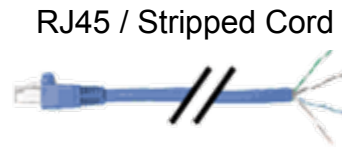
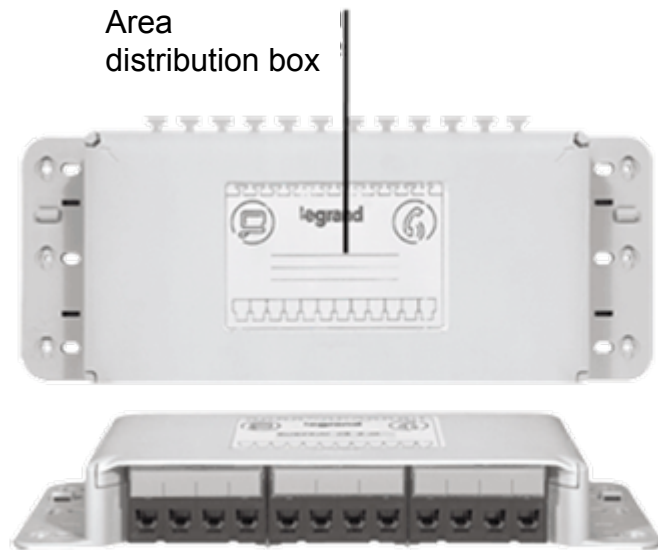
Area distribution box



Legrand Cabling System

Area distribution box

2 answers for Area distribution



20 meter max

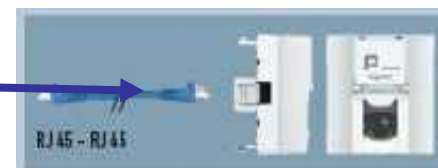


Legrand Cabling System

Area distribution box

With the new rear pluggable RJ45

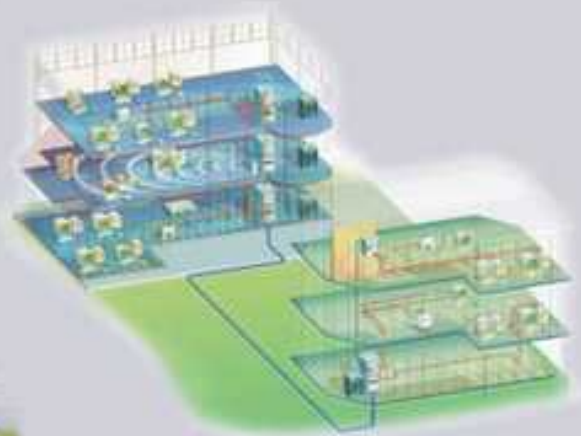
- Simple connexion with RJ45/RJ45 cords
- Rentability on installation time
- CAT5e , CAT6, UTP and FTP
- Performances on CAT5 and CAT6 with specific cords and specific permanent link length



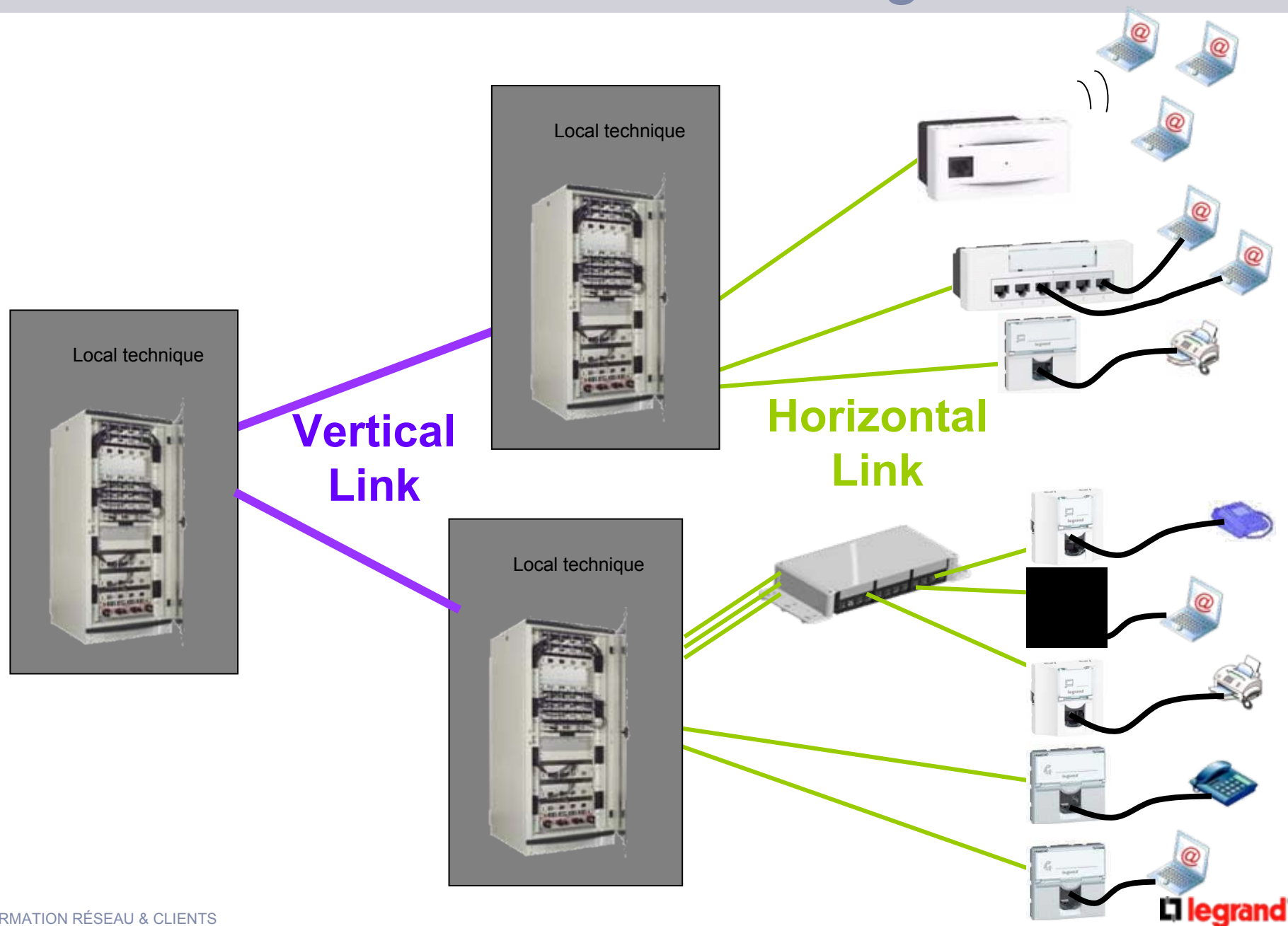
Wiring Architecture

The Vertical Link in the Building

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The Vertical Link in the Building

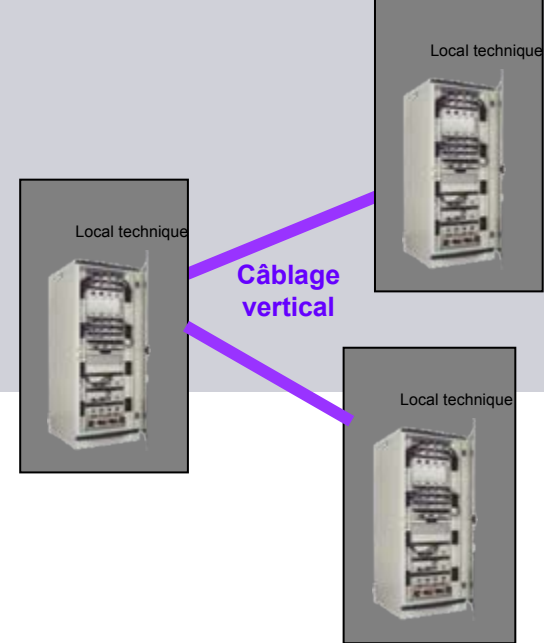


The Vertical Link

An alternative of cabling

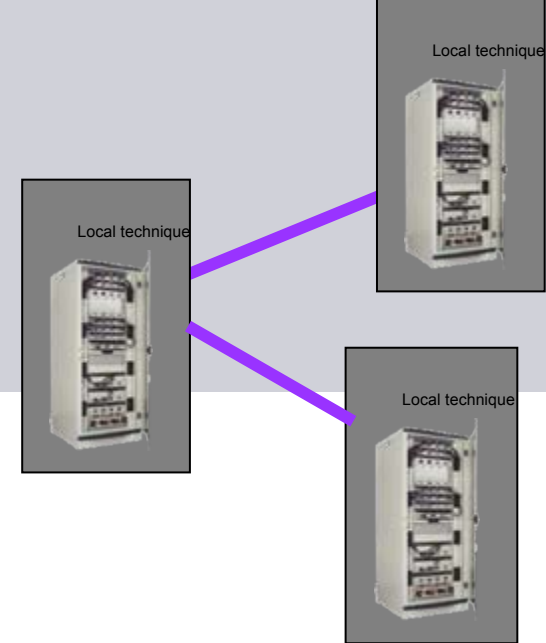
■ Copper backbone $\leq 90m$

➤ LCS 10^{giga} offer simple to operate

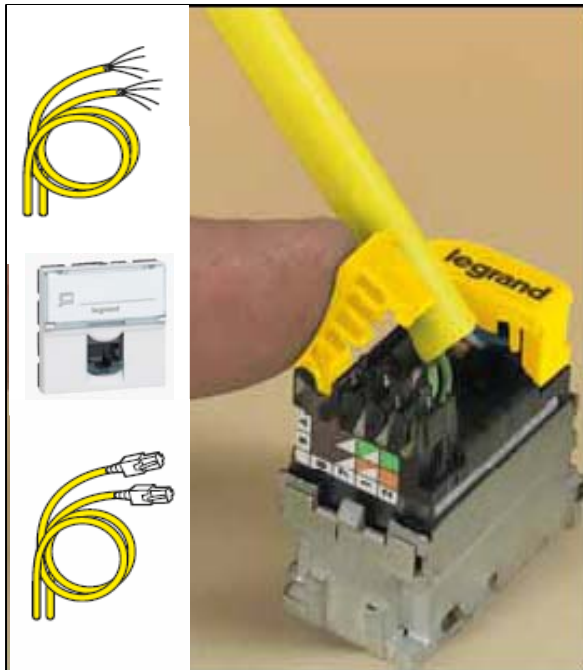


The Vertical Link

An alternative of cabling



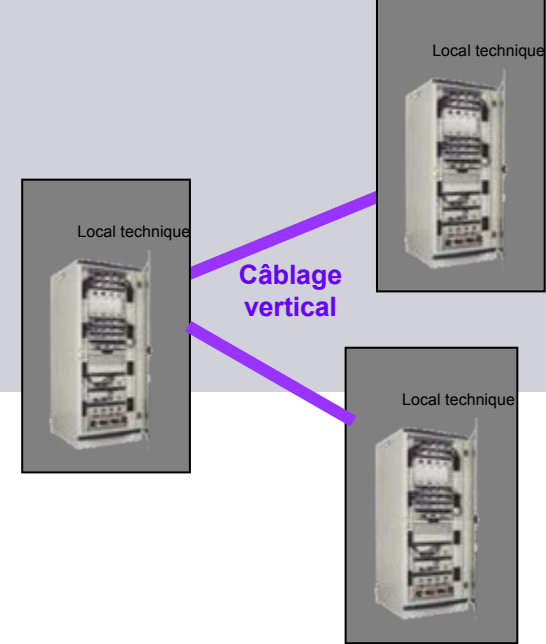
The LCS 10^{Giga} system



- Optimal performances
10 Gbit/s with the full
system Legrand
- Only STP

The Vertical Link

An alternative of cabling



■ Copper backbone $\leq 90m$

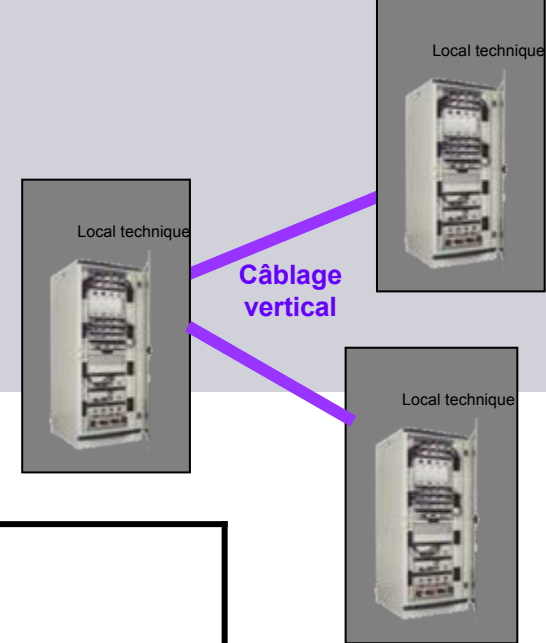
- LCS 10^{giga} offer simple to operate

■ Optical backbone

- Pre-fitted optic links (on demand)
- Fast crimping Connectors
- Epoxy Connectors

The Vertical Link

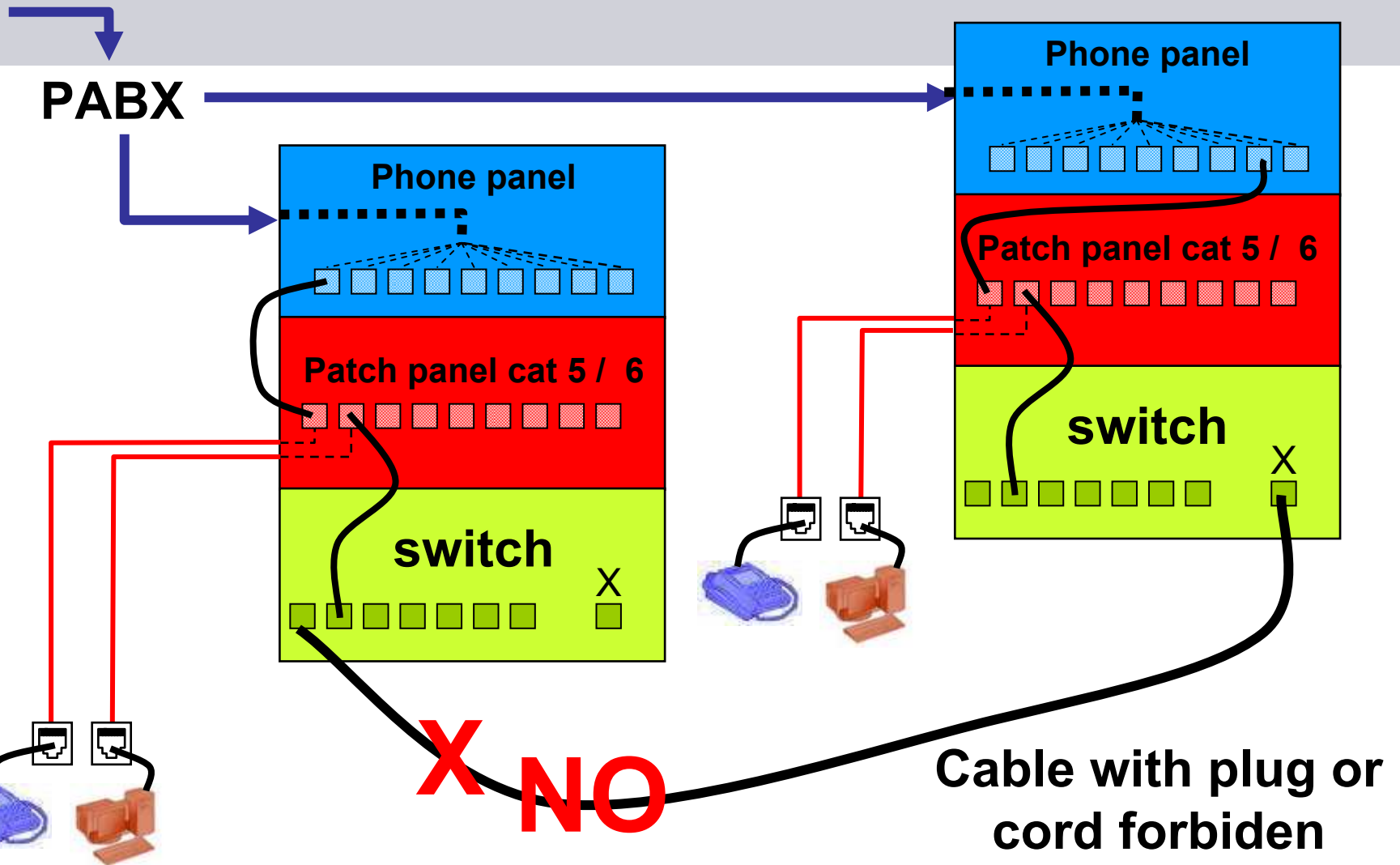
An alternative of cabling



Cooper offer LCS6 and LCS 10 Giga	Optic offer LCS Optical fiber
<p><u>Advantages:</u></p> <ul style="list-style-type: none">▪ The same way to be used for horizontal and vertical links.▪ full RJ 45 .▪ Same active devices.▪ More economic.	<p><u>Advantages:</u></p> <ul style="list-style-type: none">▪ Lenght > 90 meters.▪ Less perturbations. No earth connexion (a light signal instead of electrical signal in the fiber optic link).

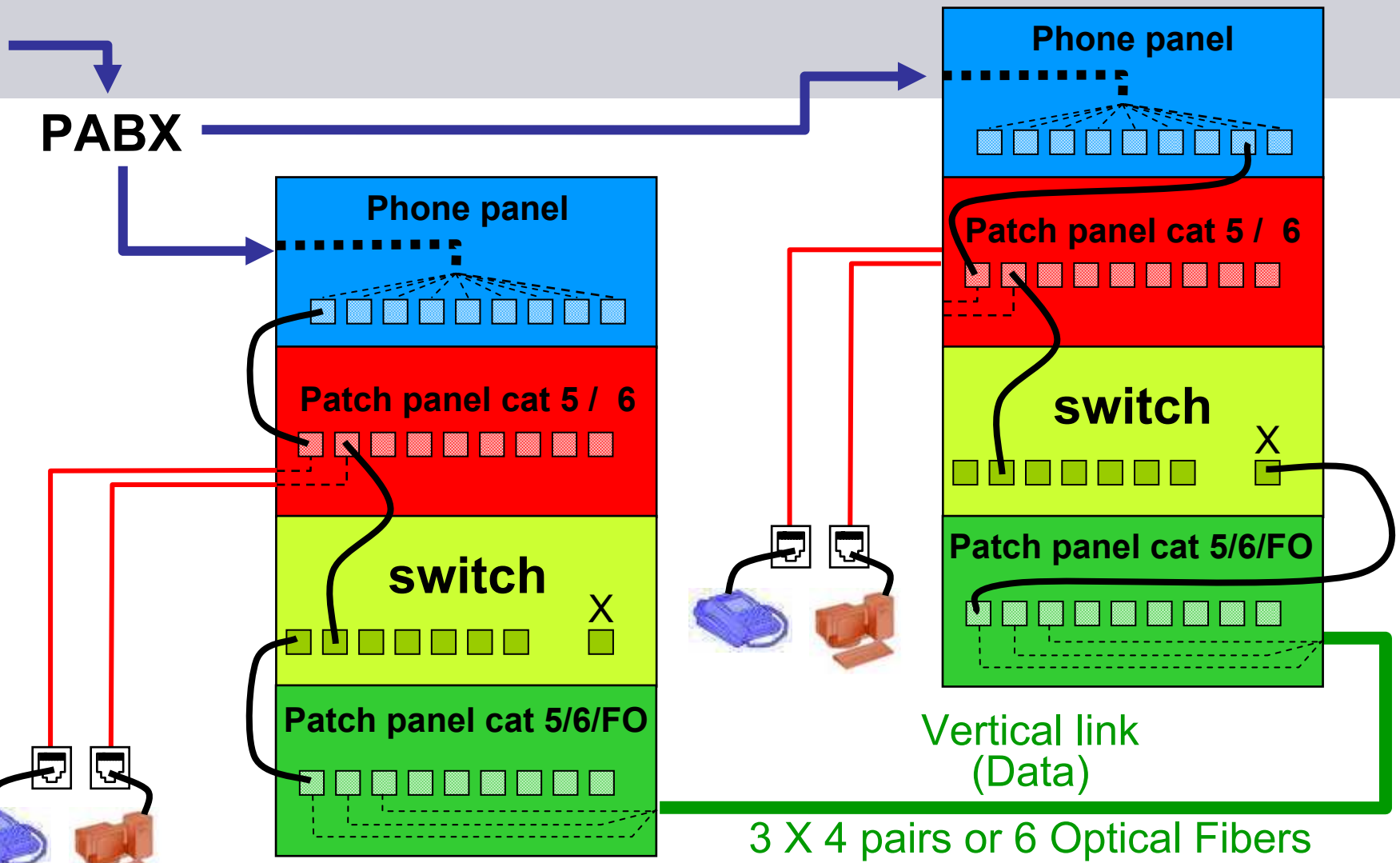
Wiring Architecture

The Wiring with Two Repartitors



Wiring Architecture

The Wiring with Two Repartitors

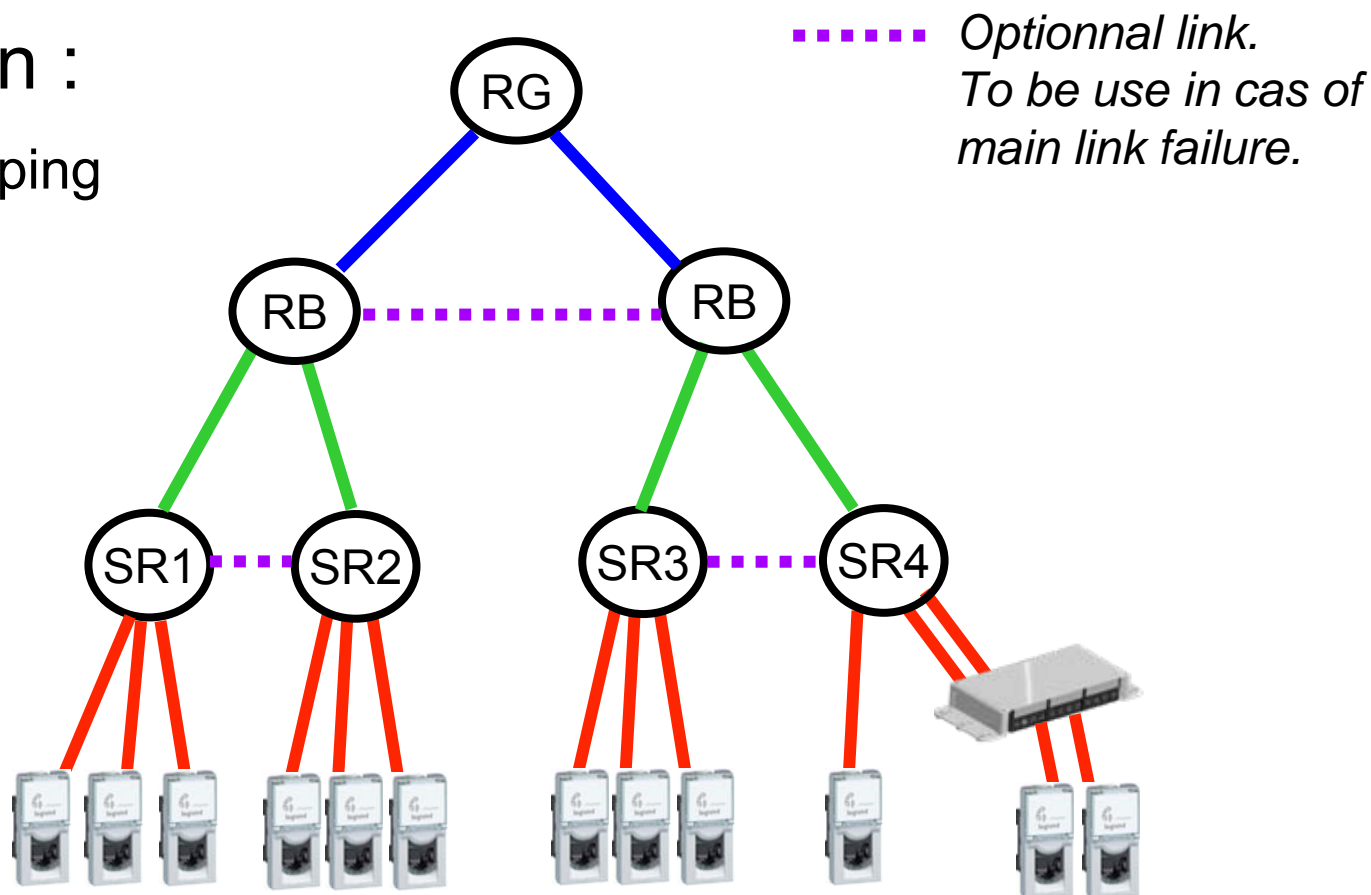


Wiring Architecture

Data security

→ First Solution :

- Repartitor looping

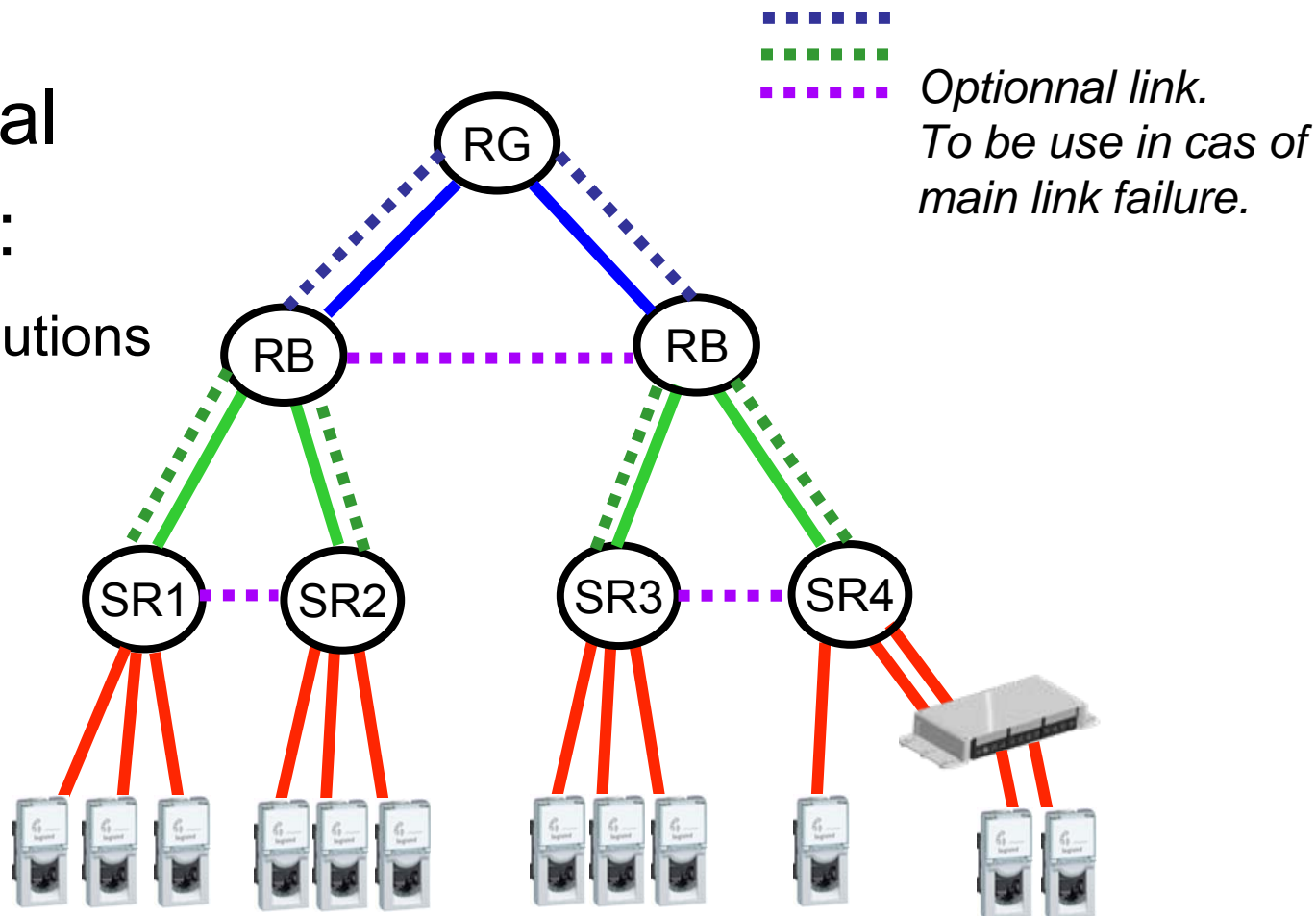


Wiring Architecture

Data security

→ Highly critical installations :

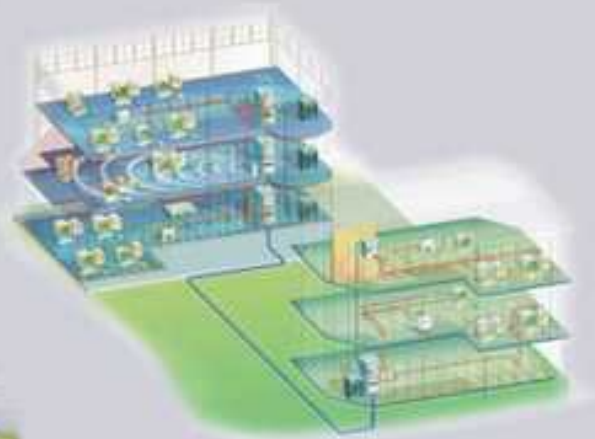
- Both 1 + 2 solutions



Optical Fiber

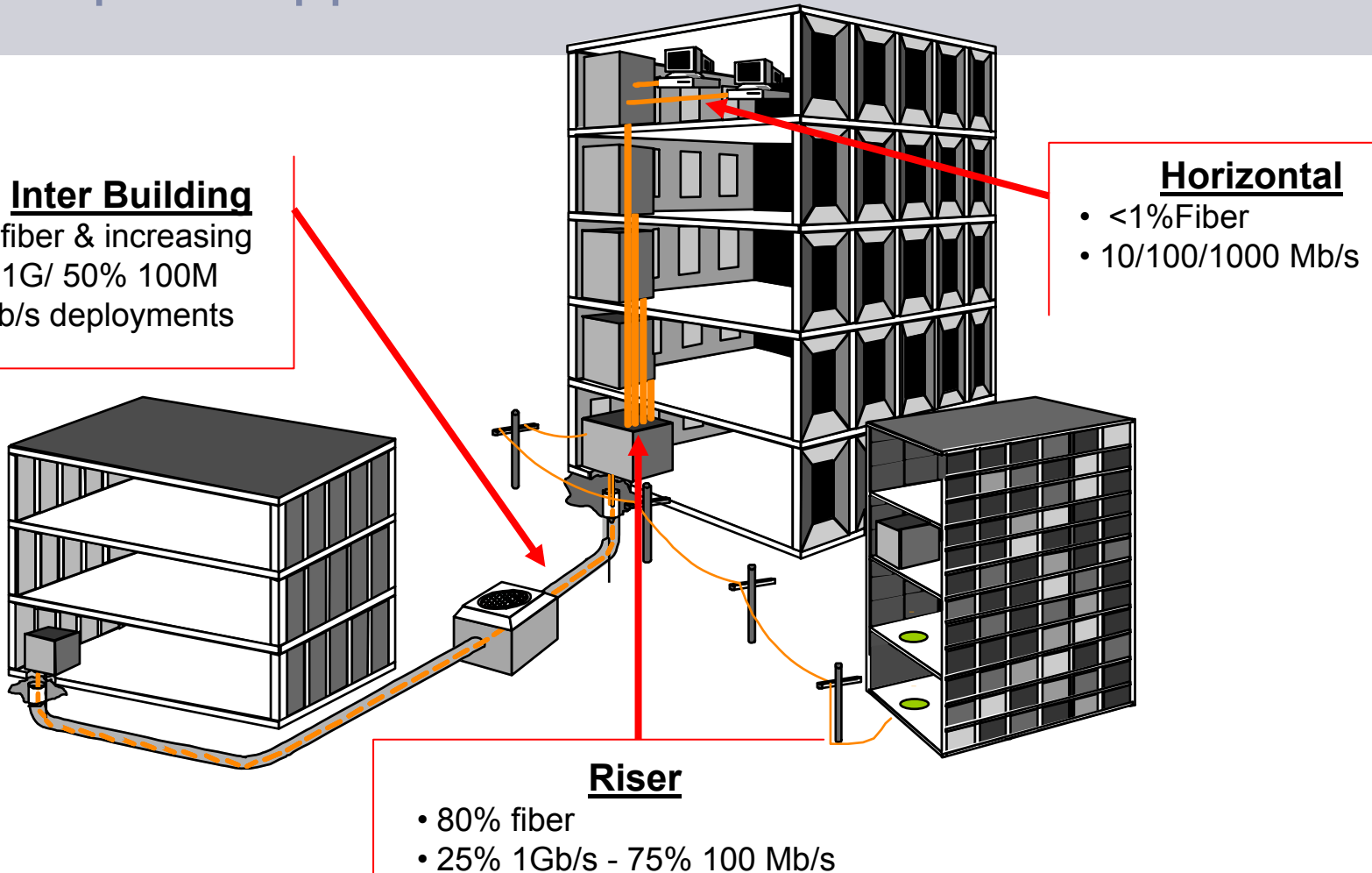
The basics

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Optical Fiber : the basics

Fiber Optic / Applications



Optical Fiber : the basics

« How does it work ? »

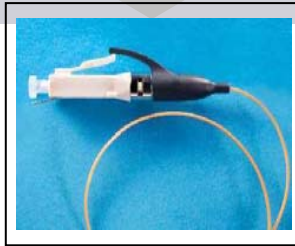
- The data is carried by sequences of « light present » or « light absent » ("1" et "0")
- An interface ,the transciever, transforms the light signal into an electrical signal
- 2 Fibers needed for a link : « outward » and « inward »

Optical Fiber : the basics

Patch panel



Connector



Cable



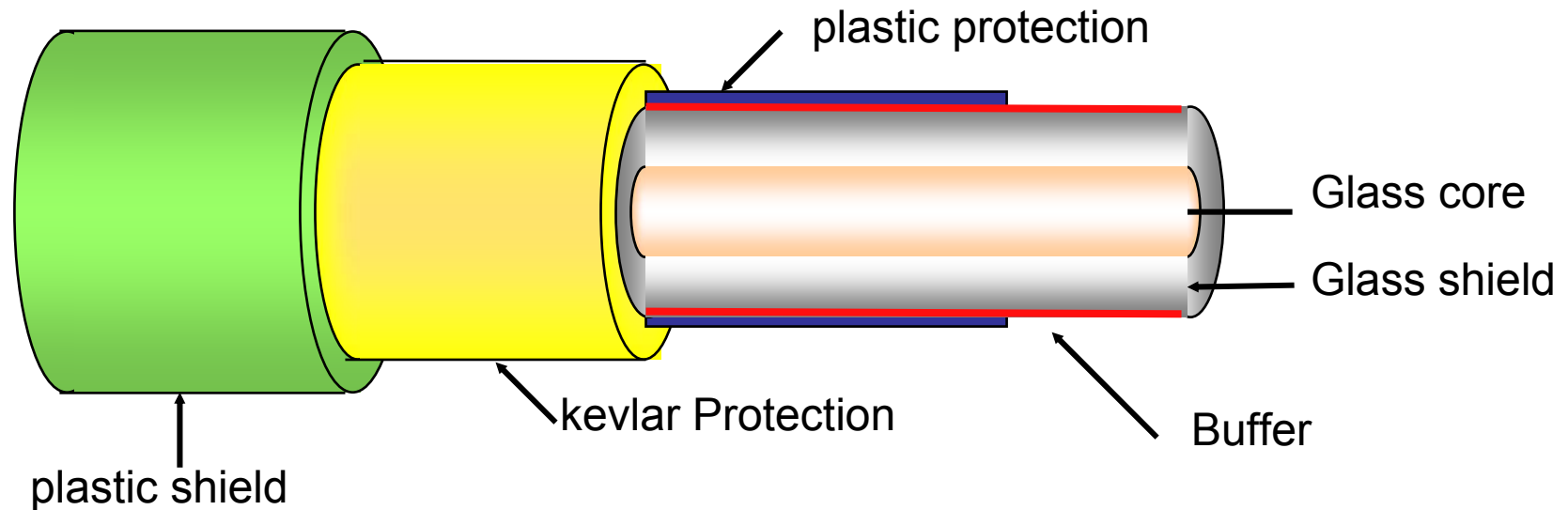
Patch cord



	■ Multimode		
	- OM1	10/100 méga	« CAT5 »
	- OM2	Gigabit	« CAT6 »
	- OM3	10 gigabits / 300 m	
	■ Singlemode		
	- OS1	10 gigabits / km	

Optical Fiber : the basics

The optical fiber

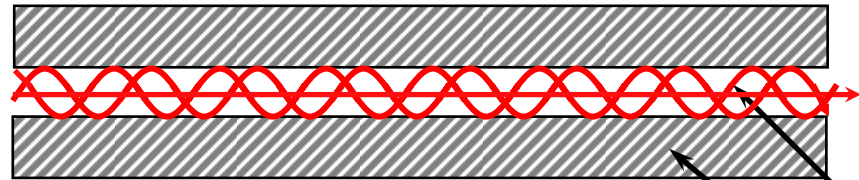


■ Multimode	62,5 / 125 μm	} = diameter of core / core + glass shield
	50 / 125 μm)	
■ Singlemode	9 / 125 μm	

Optical Fiber : the basics

The light paths

Multimode : LED or Vcsel



Glass shield

Core

Singlemode : diode laser



Optical Fiber : the basics

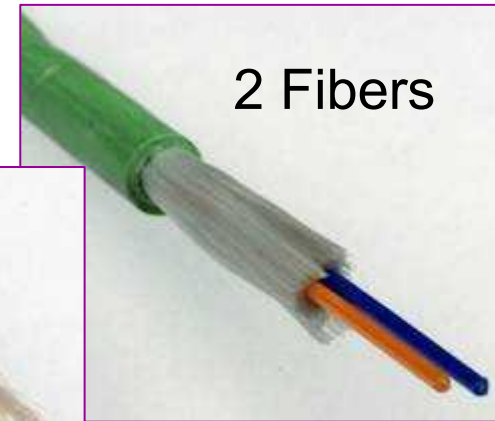
The optical Fibers

- Multimode (62,5 μm et 50 μm) :
Mainly used for Local Area Networks (LAN)
- Singlemode (9 μm) :
Usually reserved for applications requiring high data rates over long distances

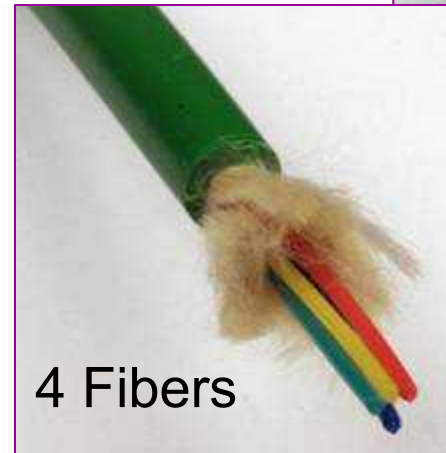
Optical Fiber : the basics

The different types of Fiber

■ The tight structure or mini break out



■ The loose structure

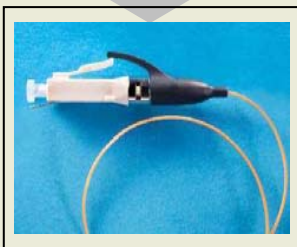


Fiber optic / Link components

Patch panel



Connector



Cable



Patch cord



■ Optical Connectors

- ST	35 %	↓
- SC	45 %	↑
- LC	15 %	↑
- MTRJ	5%	↓

LC

ST SC

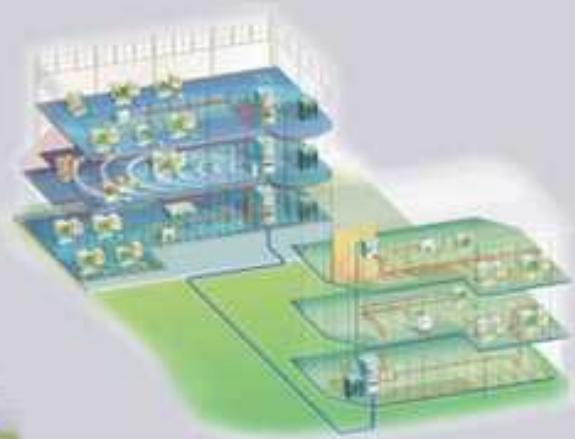


LCS Optical offer

The Legrand optical products

■ FORMATION RÉSEAU & CLIENTS -

A 8184



Optical LCS offer

The performances choice

- 1Gbit/s on length < 550m
 - OM2 Multimode solution

- 10 Gbit/s on length < 300m
 - OM3 Multimode solution

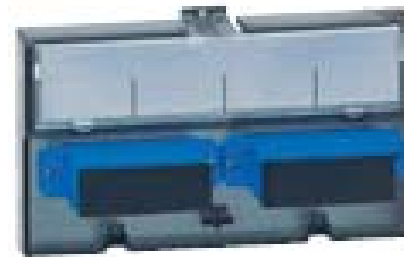
- 10 Gbit/s on length < 2km
 - OS1 Single mode solution

Optical LCS offer

The LCS optical units

■ Singlemode unit

- SC 4 fibers
- LC 6 fibers "high density"



■ Multimode unit

- SC 4 fibers
- LC 4 fibers
- LC 6 fibers "High density"
- ST 4 fibers



Dedicated to optic drawer and optic cassette

Optical LCS offer

The optical fiber drawer

- Capacity : 6 LCS units
 - 24 fibers SC, ST, LC
 - 36 fibers LC



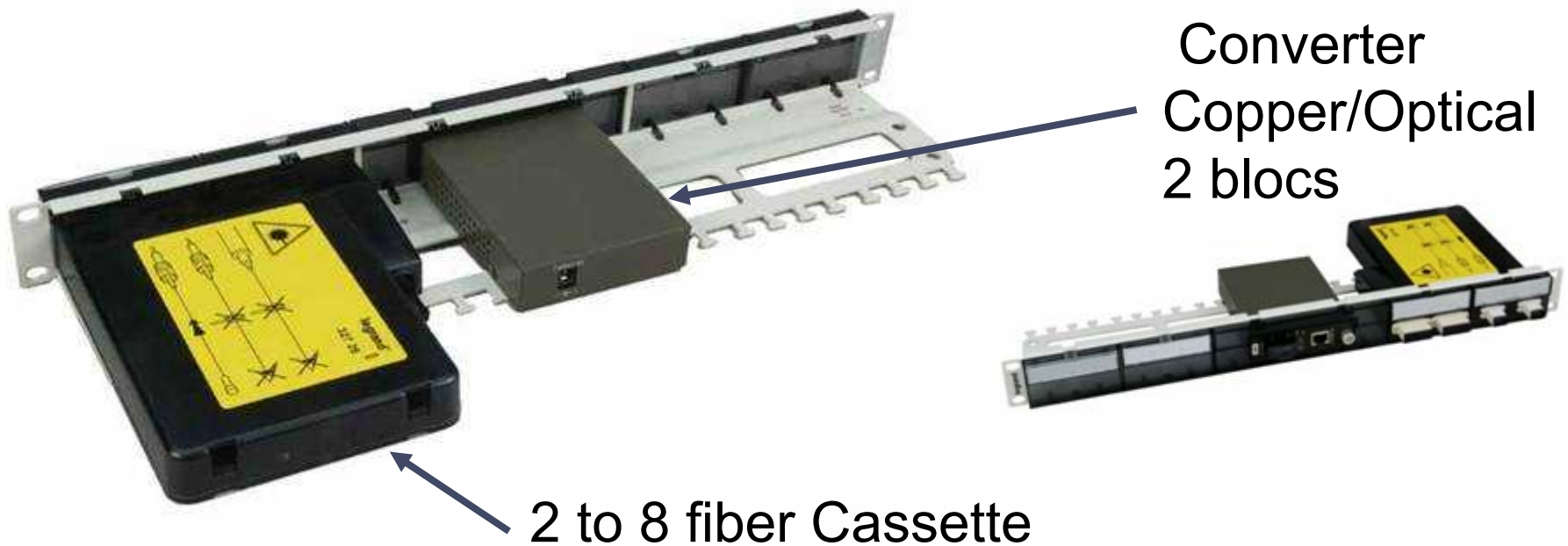
331 22

- 1U / depth 220mm
- 4 Fiber coiling accessories , 2 cable glands
- Accept the LCS media converter copper/fiber

Optical LCS offer

The optical fiber cassette

Capacity : from 2 to 12 Fibers (2 LCS units)



327 26

Optical LCS offer

The new Fast crimping connector tool kit

- Fast crimping solution
 - Dedicated connectors



- The Installation kit



Optical LCS offer

The pre-fitted on demand

- For Indoor, indoor/outdoor, outdoor applications
- With 4, 6, 12 or 24 Fibers (According to applications)
- Multimode : OM1 → 62,5 / 125 OM2 → 50 / 125
- Monomode : OS1
- Connectors ST , SC , LC , other
- Packaging in box or in reel (length >50m)



Optical LCS offer

Duplex Jumpers and accessory

■ multimode 50/125 μ m

- OM2 : SC, LC, ST
- OM3 : SC,LC

■ singlemode 9/125 μ m

- SC,LC



1,2, 3 mètres

Optical LCS offer

The terminal outlets

ST



742 28

SC



742 29

LC

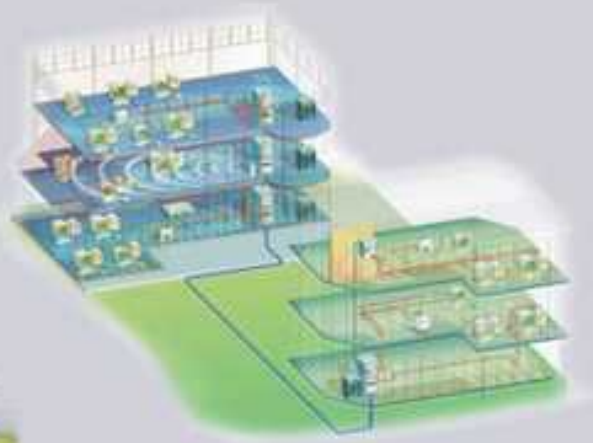


74230

Legrand Cabling System

WiFi : Technologie

■ FORMATION RÉSEAU & CLIENTS -



Legrand Cabling System

WiFi : Standards



802.11 b/g

- 2,4 GHz (13 channels)
- 11 / 54 Mbit/s
- Commercial and residential



802.11 a

- 5 GHz (8 channels)
- 54 Mbit/s
- Commercial premises



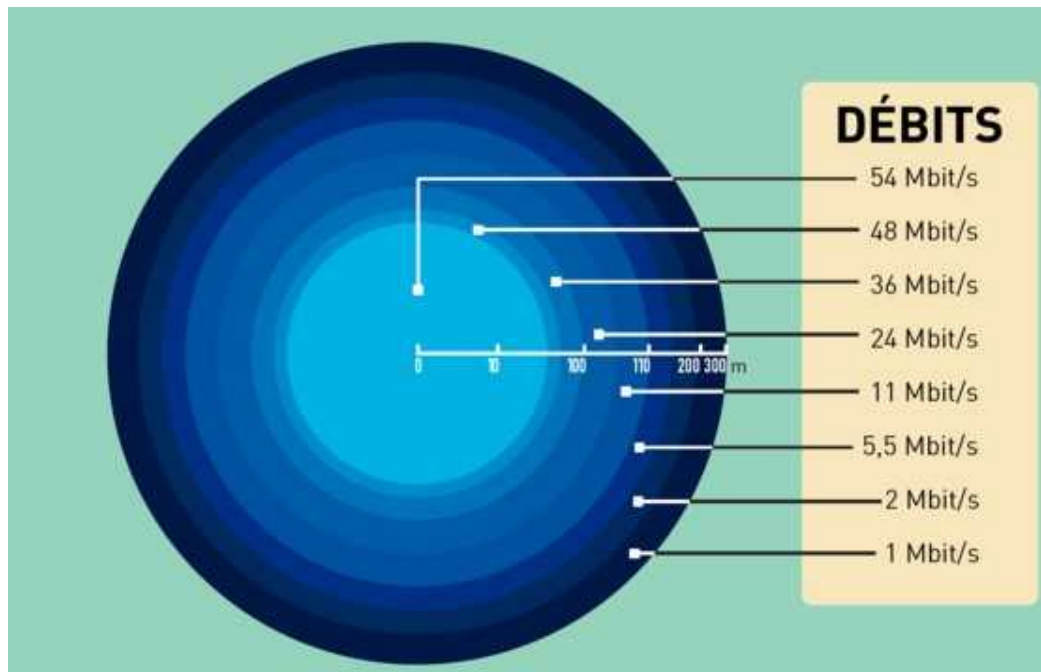
Old standard : 802.11b (11Mbit/s)

Future standard : 802.11n (> 200 Mbit/s)

Legrand Cabling System

WiFi : The rate

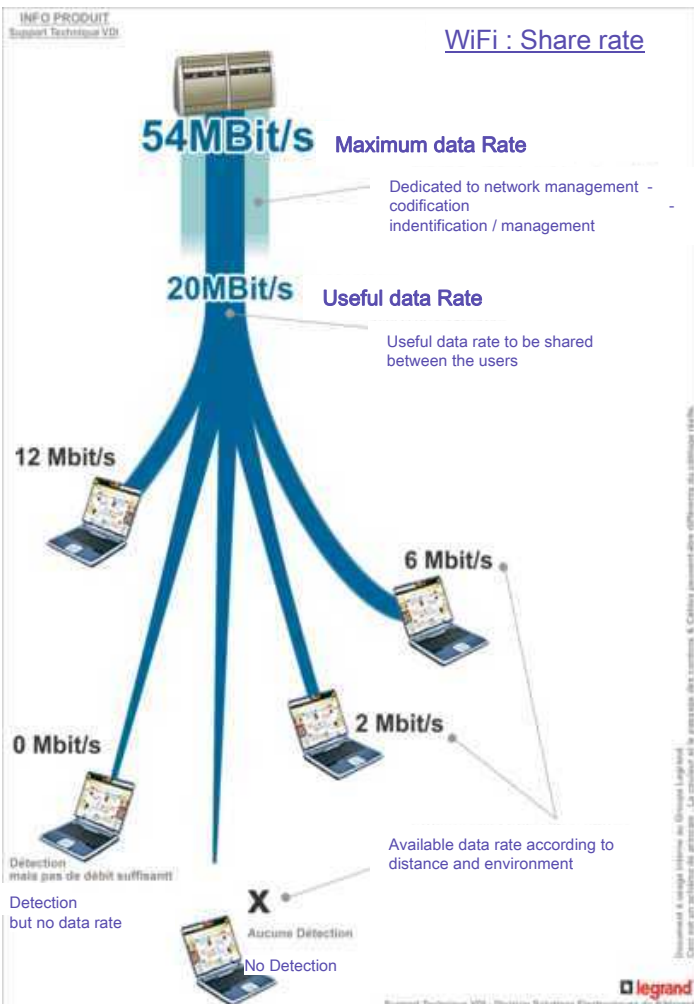
- Depend on distance between Wifi card to the AP



- The rate decrease with the air l'attenuation and obstacles

Legrand Cabling System

WiFi : Limits



- Lower performance than a cable connection
→ around 20Mbit/s
- According to the number of users :
→ 20Mbit/s to be shared between the users
- Depends on the distance
- Depends on the environment :
wall structure, people, etc...

⇒ Increase the number of access points
in order to increase the performance

Legrand Cabling System

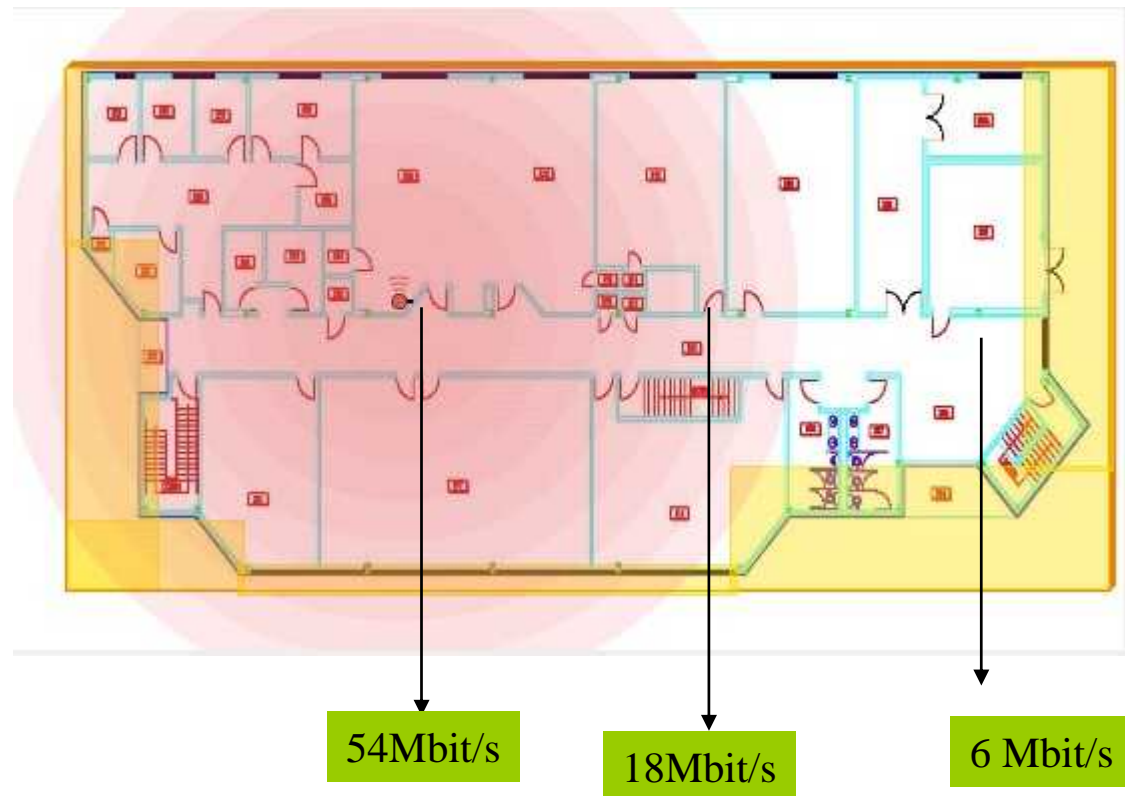
Option 1 : guest / meeting rooms

⇒ 1 Wifi AP



Guest access

Lan access in the meeting room



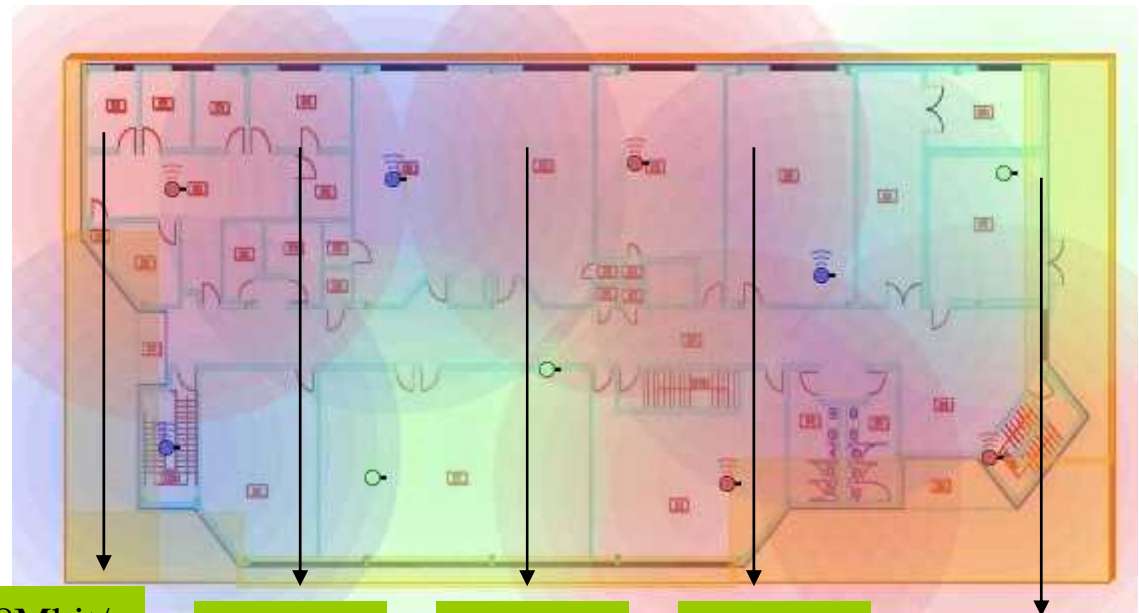
Legrand Cabling System

Option 3 : high rate wifi

→ 10 bornes Wifi



Global Lan access for employees
High rate everywhere in the building
Example : laboratory



18Mbit/s

54Mbit/s

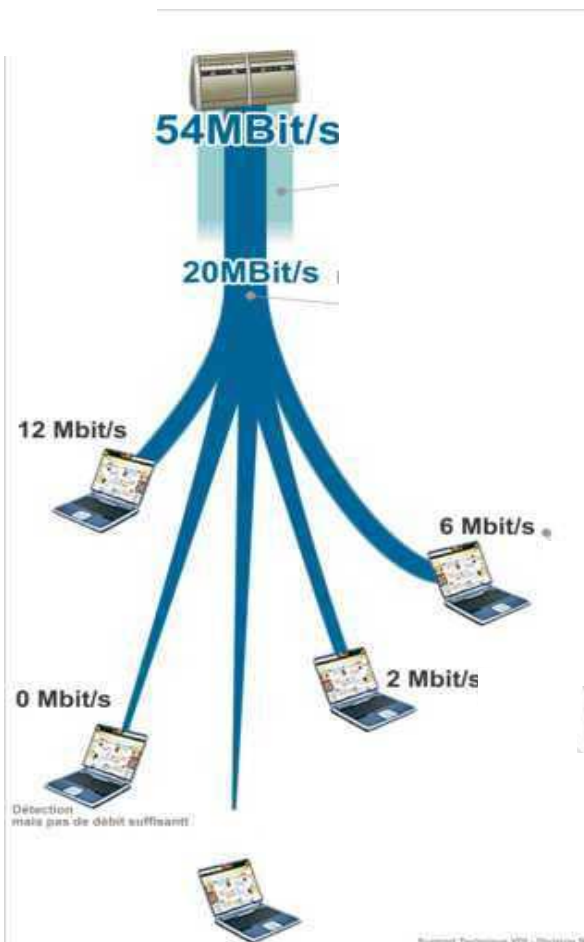
48Mbit/s

36Mbit/s

18Mbit/s

Legrand Cabling System

WiFi : Project Scope



Requested performances

- Current uses : 1 to 2 Mbit/s

Number of users

- Ideal performance : 10 users for each Access Point

User area

- Ideal performance : 1 Access Point for each 100m²
- !! : Concrete wall = high performance losses

General rules

Ask for the drawing of the building

Ask for the following information

- Number of users
- Requested redundancy
- Frequency (a or/and b/g)
- Requested performance for each user

To be checked for a good quotation

Legrand Cabling System

WiFi : Security



WEP Wired equivalent privacy

- General public uses
- Basic Encoding, old equipment



WPA Wifi Protected Access

- General public uses
- More sophisticated encoding, current equipment



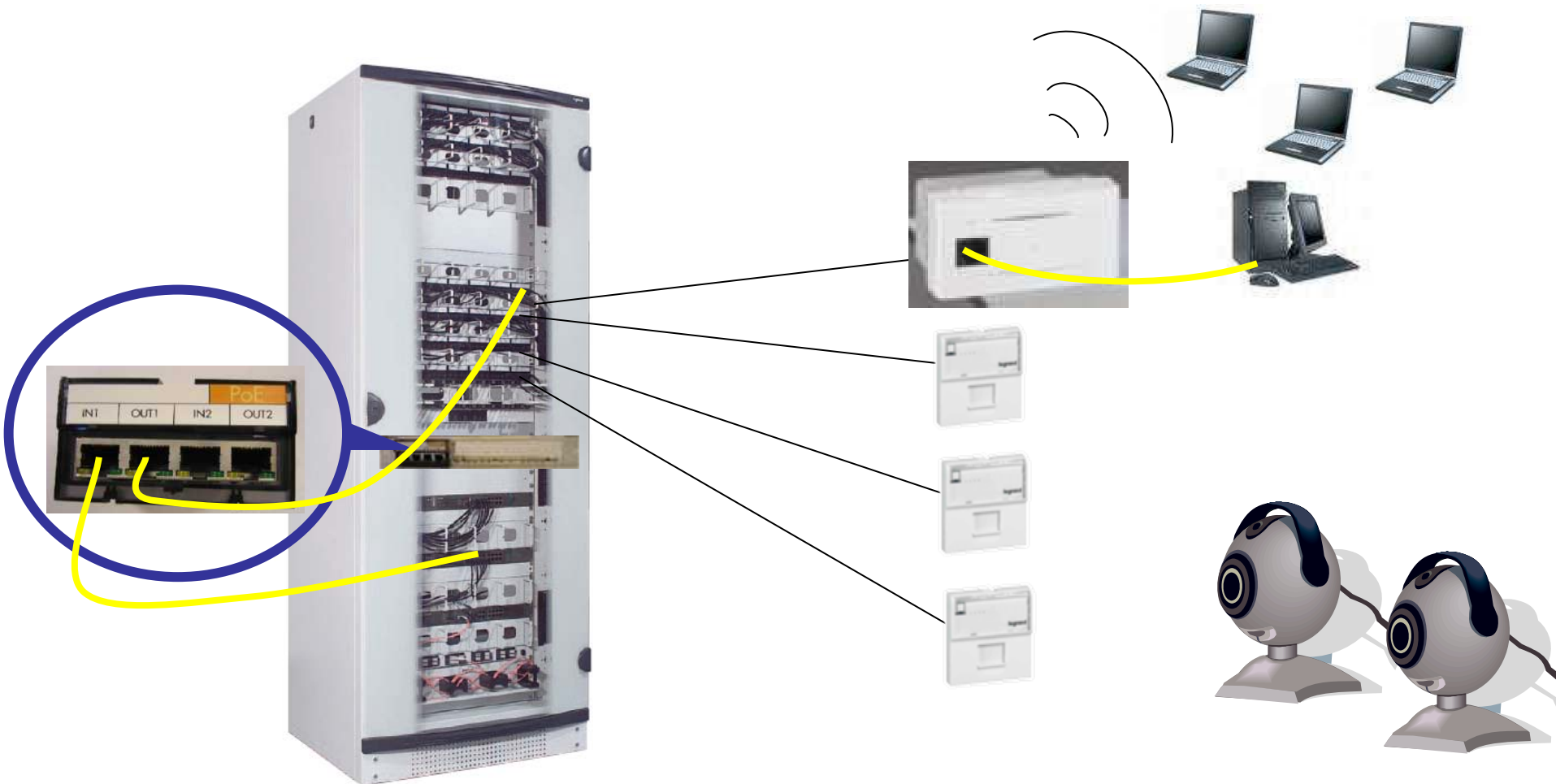
WPA 2 ou 802.11i

- Professionnal uses
- Highest data security encoding
- Include 802.1x authentication



Legrand Cabling System

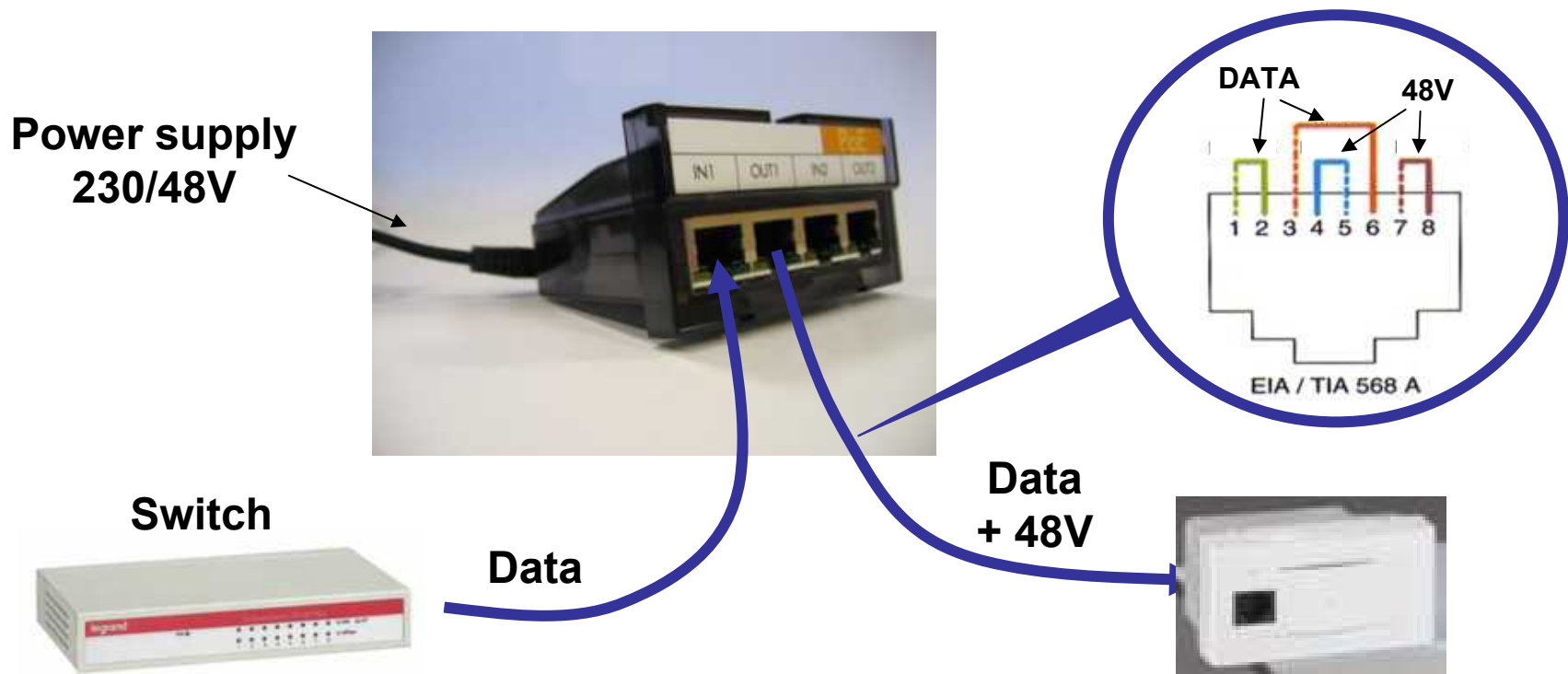
PoE: Implementation



Legrand Cabling System

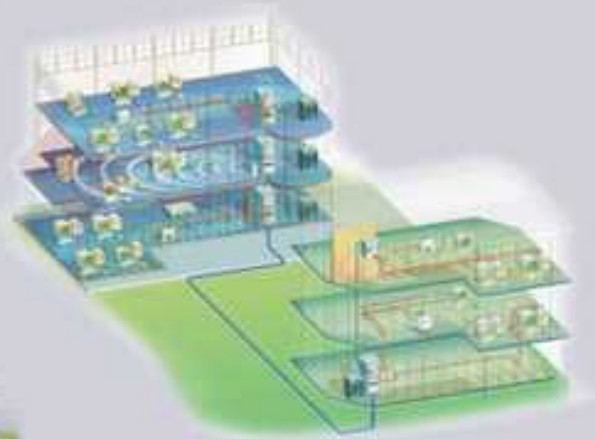
PoE: Injector

- The midspan solution : 10/100 Mbit/s



LCS PRO

■ FORMATION RÉSEAU & CLIENTS -



Which purpose ?

To give an answer to our clients in terms of

- Saving of study's time
- Define a complete, professional and selling file
- Realize a budget, calculate an affair.....

What about the software ?



LCS PRO: the VDI cabinet creator

Propriétés de l'étude : Nouvelle étude


Propriétés de l'étude :


Nom :

Numéro d'affaire :


Date de creation :


Intervenants

 Ajouter Intervenant

 Supprimer Intervenant

Bénéficiaire

 Pas de logo

 Logo du bénéficiaire


Contenu de l'étude :


Nouvelle Baie-VDI 1


Nom :

Date de modification :


Auteur :

 Nouvelle Baie-VDI

 Définir comme Baie-VDI courante

 Supprimer la Baie-VDI

Raison Sociale

 Valider

LCS PRO: the VDI cabinet creator

Nouvelle étude - Nouvelle Baie-VDI 1 *

Etude Baie-VDI Affichage Assistant ?

Communication

Assistant de Création d'une enveloppe LCS-Pro - Câblage Horizontal

Nombre de prises terminales

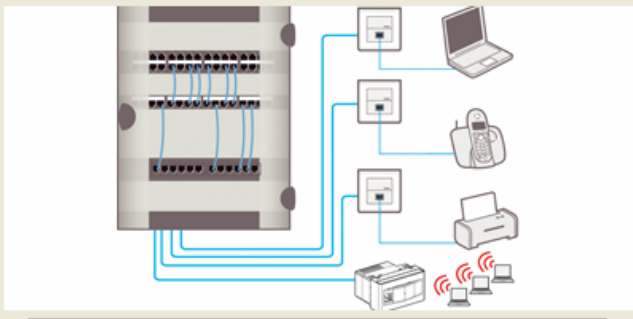
Total prises terminales : 0

Dont ressources téléphone : 0

Dont prises en attente : 0

Ressources informatiques : 0

Type de prise terminale : Programme Mosaic - Blanc - 2 Mod



Point d'accès Wifi (a/b/g) : 0

Switch Mosaic encastré

Manageable

Non manageable

Performance

Catégorie du câble

Cat. 5 Cat. 6 10 Giga

Blindage du câble

U/UTP

F/UTP

SF/UTP

S/FTP

Longueur des liens (distance enveloppe / prise murale)

Mini 10 m Maxi 90 m

35

Longueur de câble calculée : 0

Précédent Suivant

Câblage Horizontal Câblage Vertical - Rocade Informatique Composants Actifs Gestion de l'enveloppe

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NUM

LCS PRO: the VDI cabinet creator

Etude Baie-VDI Affichage Assistant ?

Communication

Assistant de Création d'une enveloppe LCS-Pro - Câblage Vertical - Rocade Informatique

Assistant

Nomenclature

Enveloppes

Visualisation

Bilan


Bilan Affaire

Traitement de dossier

Rocade Cuivre

Nombre de rocades de l'enveloppe: 0

Nombre de câbles par rocade: 3



Rocade Optique

Nombre de brins optiques arrivant dans l'enveloppe

	MULTIMODE			MONOMODE
	62,5/125µm	50/125µm OM2	50/125µm OM3	9/125µm
6FO	0	0	0	0
12FO	0	0	0	0
24FO	0	0	0	0
Calcul Total Brins	0	0	0	0

Performance des blocs LCS

Catégorie du lien: (Cat. 6 to 10 Giga)

Blindage du lien: U/UTP, F/UTP, SF/UTP, S/FTP

Longueur du lien: (Mini 10 m to Maxi 90 m)

Longueur de câble calculée: 0

Blocs Optiques

- SC
- LC (haute densité)
- LC
- ST

Connecteurs optiques à prévoir

Valise outillage

Prévoir les jarretières

Sauf si choix d'un lien optique sur mesure

Une jarretière par rocade

← Précédent Suivant →

Câblage Horizontal | Câblage Vertical - Rocade Informatique | Composants Actifs | Gestion de l'enveloppe

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NUM

LCS PRO: the VDI cabinet creator

The screenshot shows the 'Back office - Session back office' window. The main area is titled 'Enveloppes - Forme 1'. It features two columns of options: 'Famille d'enveloppe' (Armoire 19', Coffrets 19') and 'Type d'enveloppe' (Armoire XL Profondeur 600 mm, Armoire XL Profondeur 800 mm, Armoire XL Profondeur 1000 mm). A summary box for 'Armoire XL Profondeur 600 mm' shows dimensions (1308x600x654) and 16 U. A table lists 'Hauteur Utile' options: 24 U (1308 mm), 29 U (1533 mm), 33 U (1708 mm), and 42 U (2108 mm). A 'Réserve non équipée' section shows 33.6% reserved and 8 U available. An 'Association' section has radio buttons for 'Horizontale' and 'Verticale'. A 3D cabinet model is shown on the right. The bottom left has copyright information and 'Prêt', and the bottom right has a 'NUM' field.

Back office - Session back office *

Etude Baie-VDI Affichage Enveloppes ?

Communication

Enveloppes - Forme 1

Famille d'enveloppe

- Armoire 19'
- Coffrets 19'

Type d'enveloppe

- Armoire XL Profondeur 600 mm
- Armoire XL Profondeur 800 mm
- Armoire XL Profondeur 1000 mm

Armoire XL Profondeur 600 mm

(hxlxp) 1308x600x654
Nb de U : 16 U

Hauteur Utile		Largeurs Enveloppe	
Hauteur optimum	600		
24 U - (1308 mm)	800		
29 U - (1533 mm)			
33 U - (1708 mm)			
42 U - (2108 mm)			

Réserve non équipée

Réserve non équipée : 33.6%
U disponibles : 8 U

Association

Horizontale
 Verticale

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NUM

LCS PRO: the VDI cabinet creator

T: Back office - Session back office *

Etude Baie-VDI Affichage Outils ?

Communication

- Assistant
- Nomenclature
- Enveloppes
- Visualisation
- Bilan
- Bilan Affaire
- Traitement de dossier

Armoire XL Profondeur 600 mm - IP 20(8)

Dimensions (h,l,p) : 1308x600x654
Réserve non équipée : 33.6% - U disponibles : 8 U

Etabli

Vue de face

Vue de côté

Chassis Appareil Porte

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NUM

LCS PRO: the VDI cabinet creator

Back office - Session back office *

Etude Baie-VDI Affichage Bilan Affaire ?

Communication

Bilan Affaire - Chiffrage Matériel

* : Référence dont le prix varie selon le cours du cuivre. Merci de consulter votre agence régionale Legrand ou le site extranet Legrand pour connaître le dernier prix applicable

Référence	Désignation	Quantité	P.U. Tarif	P.U. Net	Total Net
032701	Panneau de brassage 19" équipé - 1 U - Cat.6 - 9 contacts - FTP	2	279.0000	279.0000	558.00
032706	Panneau de brassage 19" à équiper - 1 U - UTP - 24 connecteurs RJ 45	1	49.1000	49.1000	49.10
032707	Panneau de brassage 19" à équiper - 1 U - STP/FTP - 24 connecteurs RJ 45	1	54.0000	54.0000	54.00
032708	Bloc arrivée téléphone - pour panneau à équiper - 8 RJ 45 - contacts 4-5/7-8	4	49.0000	49.0000	196.00
032711	Bloc 4 connecteurs RJ 45 - Cat.6 - FTP - pour panneau de brassage 19" à équiper	4	42.9000	42.9000	171.60
032725	Bloc obturateur - pour panneau de brassage 19"	4	7.3200	7.3200	29.28
032756 *	Câble pour réseaux locaux - Cat.6 - F/UTP - 4 paires - L50H - L. 500 m (facturé au mètre)	3200	0.9780	0.9780	3129.60
033139	Kit de mise à la masse - pour coffret/armoire XL VDI 19" - L. 250 mm - 2,5 mm ²	1	35.0000	35.0000	35.00
033218	Armoire XL VDI 19" - métal - 24 U - 1308x600x600 mm	1	1080.0000	1080.0000	1080.00
033225	Tablette fixe - pour coffret/armoire XL VDI 19" - 1 U - prof. 250 mm	1	45.0000	45.0000	45.00
033236	Bloc d'alimentation 19" - 230 V~ - 9 x 2P+T	1	148.0000	148.0000	148.00
033255	Panneau passe-fils 19" - 2 U - 2 axes	1	53.0000	53.0000	53.00
033256	Panneau passe-fils 19" - 1 U - 2 axes	4	46.8000	46.8000	187.20
034664	Montants 19" (2) - 24 U - pour armoires XL VDI 19" prof. 600	1	64.5000	64.5000	64.50
051763	Cordon de brassage RJ 45 - Cat.6 - FTP écranté - L 2 m	63	9.7500	9.7500	614.25
051764	Cordon de brassage RJ 45 - Cat.6 - FTP écranté - L 3 m	35	12.8000	12.8000	448.00
077920	Switch-line prog Mosaic -10/100 base T manageable - 6+1RJ 45 -230V -6 mod -blanc	1	595.0000	595.0000	595.00
078691	Prise RJ 45 prog Mosaic - Cat. 6 FTP - 9 contacts - 2 mod - blanc	63	10.3000	10.3000	648.90
079290	Prise RJ 45 prog Mosaic - Cat. 6 FTP - 9 contacts - 1 mod - alu	1	11.3000	11.3000	11.30

Prix net achat materiel Legrand

Liste des Baies-VDI | Liste du Matériel | Chiffrage Matériel | Bon de Commande | Récapitulatif Commercial

(Tarifs du : 2007-07)

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NUM

LCS PRO: the VDI cabinet creator

The screenshot shows the 'Bilan Affaire - Récapitulatif Commercial' window in the LCS PRO software. The window title is 'Back office - Session back office *'. The menu bar includes 'Etude', 'Baie-VDI', 'Affichage', and 'Bilan Affaire ?'. The left sidebar contains navigation options: 'Assistant', 'Nomenclature', 'Enveloppes', 'Visualisation', 'Bilan', 'Bilan Affaire', and 'Traitement de dossier'. The main content area displays a table of financial data and a 'Données Variables' section.

Bilan Affaire - Récapitulatif Commercial

Cette étude comporte des références dont le prix varie selon le cours du cuivre. Merci de consulter votre agence régionale Legrand ou le site extranet Legrand pour connaître le dernier prix applicable

Total Tarif	8117.73 €
Nombre de Baies-VDI	1
Total Net Matériel Legrand	8117.73 €
Total Net Autre Matériel	0.00 €
Total Matériel	8117.73 €
Total Fournitures de Cablage	0.00 €
Total Achat Matière	8117.73 €
Total Marge Brute	0.00 €
Total Vente Matériel	8117.73 €
Total Heures	0.00
Total Main d'Oeuvre Estimée	0.00 €
Total Transport	0.00 €

Données Variables

Remise Matériel Legrand	<input type="text" value="0.00"/> %
Fournitures de cablage	<input type="text" value="0.00"/> %
Marge Brute	<input type="text" value="0.00"/> %
UMO en centième(s) d'heure	<input type="text" value="5.00"/>
Taux Horaire	<input type="text" value="20.00"/> €

PRIX NET H.T. DE L'AFFAIRE : €

Navigation: Liste des Baies-VDI | Liste du Matériel | Chiffrage Matériel | Bon de Commande | **Récapitulatif Commercial**

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The standardization

The LV / ELV routing

■ FORMATION RÉSEAU & CLIENTS -



EN 50 174-2

The contents

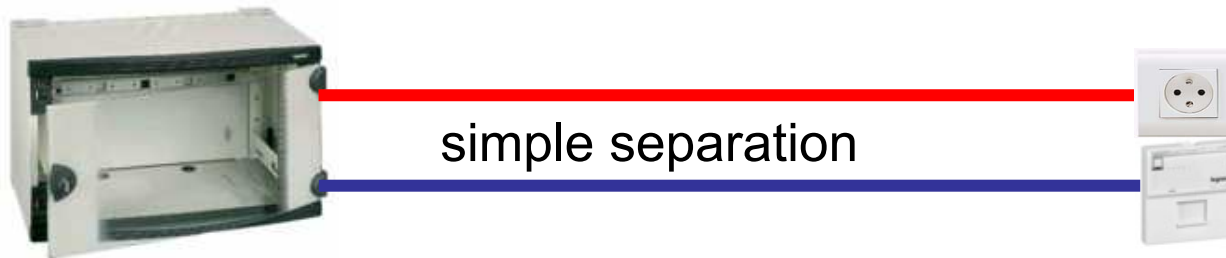
The practice of installation inside buildings

- safety prescription
- earth link and equipotentiality
- protection against lightning and overvoltage...
- routing practice...
- **ELV and LV routing**

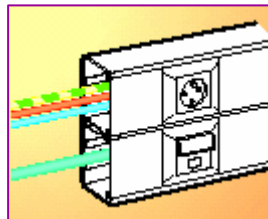
EN 50 174-2

ELV / LV routing for horizontal subsystems

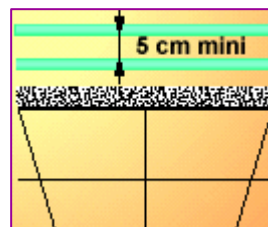
If link ≤ 35 m and shielded cable FTP / SFTP



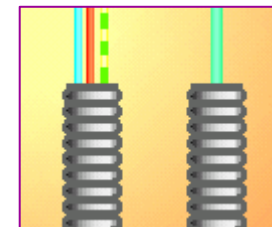
■ for trunking : partition



■ for ducting : 5 cm



■ For conduits



EN 50 174-2

ELV / LV routing for horizontal subsystems

If link > 35 m or unscreened cable (UTP)



See the following
table

≤ 15 m
Simple
separation

UTP : 20 cm *

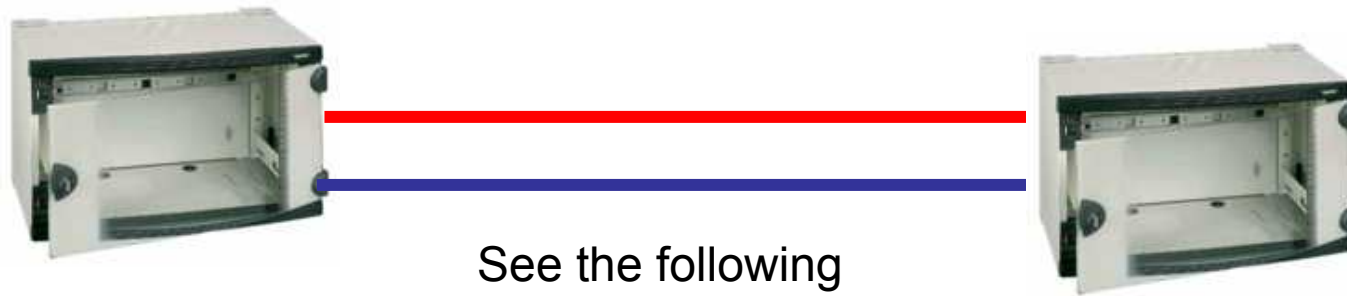
FTP : 5 cm *

SFTP : 5 cm *

* : with unscreened low voltage cable and no metal partition

EN 50 174-2

ELV / LV routing for backbone subsystems



See the following
table

UTP : 20 cm *

FTP : 5 cm *

SFTP : 5 cm *

* : with unscreened low voltage cable and no metal partition

EN 50 174-2

	No separation	Aluminium partition	Steel partition
Unscreened LV Unscreened ELV	200 mm	100 mm	50 mm
Unscreened LV Screened ELV	50 mm	20 mm	5 mm
Screened LV Unscreened ELV	30 mm	10 mm	2 mm
Screened LV Screened ELV	0 mm	0 mm	0 mm