The background features a dark blue, textured surface. A large, glowing globe is centered, with red lines representing network connections or data paths. The text is overlaid on this background.

# VOICE/DATA DESIGN CONSIDERATIONS

Henry W. Hudson, IV  
Walter P. Herring RCDD/LAN/OSP  
Bala Consulting Engineers, Inc.

# HOW IMPORTANT IS YOUR CLIENT'S NETWORK?

1975	10%	<i>Telephone</i>
1980	20%	<i>Mainframe to Minicomputer</i>
1985	35%	<i>Facsimile/Voice mail, Desktop PC</i>
1990	40%	<i>LAN in small business, small scale</i>
1995	60%	} <i>Robust LAN's, return on investment is huge</i>
2000	85%	
2005	95%	<i>Convergence, cost effective maximum efficiency</i>

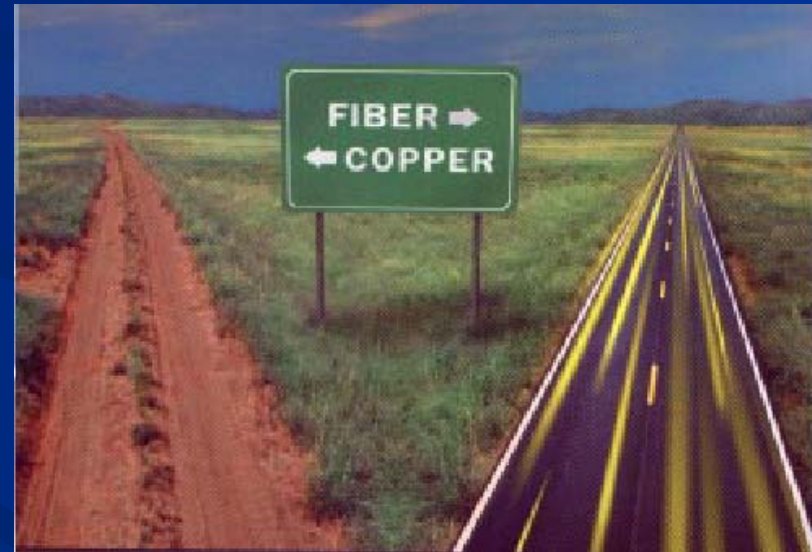
*Computer Processing doubles every 18 months!!*  
*Internet traffic doubles every 12 months!!*



# ARE YOU DESIGNING YOUR CLIENT'S INFRASTRUCTURE TO SUPPORT THEIR NEEDS TODAY AND TOMORROW?

*“ Today, less than 5% of the estimated total number of required commercial outlets meet the premise distribution needs of the information age”*

--Information Gatekeepers Group



# WHERE DO MOST CLIENTS FIT IN??

**95% of companies are here!!**



Category of Cable



1980's	10,000,000 b/s	10Mb/s	<b>95%</b>	3
1990-1995	100,000,000 b/s	100Mb/s	<b>5%</b>	5
1995-1999	1,000,000,000 b/s	1Gb/s		5e,6
1999-2002	10,000,000,000 b/s	10Gb/s		Optical Fiber



# THE BENEFIT OF HIGHER SPEED APPLICATIONS

Down load the DVD “The Matrix” (7.81Gb)

<u>Technology</u>	<u>Minutes</u>	<u>Hours</u>	<u>Days</u>
Modem (56K)	18,595	310	12.9
ISDN (128K)	8,135	135	5.6
T-1/DSL (1.54Mb/s)	676	11.3	0.47
Cable Modem	104	1.7	---
100 Base T	10.4	0.2	---
Gigabit Ethernet	1	---	---
10 Gigabit Ethernet	0.1	---	---



# OVERALL TELECOMMUNICATIONS CONSIDERATIONS



# SYSTEMS DESIGNS

- ✓ Voice Systems
- ✓ Data Systems
- ✓ Audio Visual Systems
- ✓ Security
- ✓ VOIP
- ✓ Integrated Networks
- ✓ Wireless
- ✓ PBX



# DESIGN PROCESS SCENARIOS

- ✓ No I. T. Department
- ✓ In-House I. T. Department
  - Post A/E I.T. Squeeze
  - No Sounding Board
- ✓ Bala's Approach
  - Coordinated/Integrated Timely Design
  - Technical Expertise



# GENERAL DESIGN CONSIDERATIONS

- ✓ Due Diligence/Building Surveys
- ✓ Type of Transmission Medium
- ✓ Pathway Considerations
- ✓ Space Considerations & Adjacencies
- ✓ Power & HVAC Requirements
- ✓ Bonding and Grounding



# GENERAL DESIGN CONSIDERATIONS

✓ Due Diligence/Building Surveys



# GENERAL DESIGN CONSIDERATIONS

- ✓ Due Diligence/Building Surveys
- ✓ Type of Transmission Medium

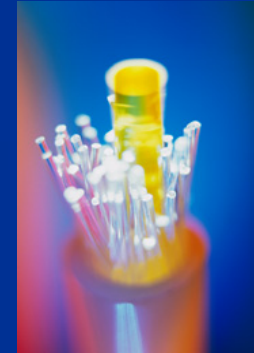


# TYPE OF TRANSMISSION MEDIUM

## Cable Considerations

### COPPER UTP (90m) ANSI/TIA/EIA 568 B.1

- ✓ Category 3
- ✓ Category 5e
- ✓ Category 6
- ✓ Category 7 (Proprietary)
- ✓ Category 5 is no longer recognized



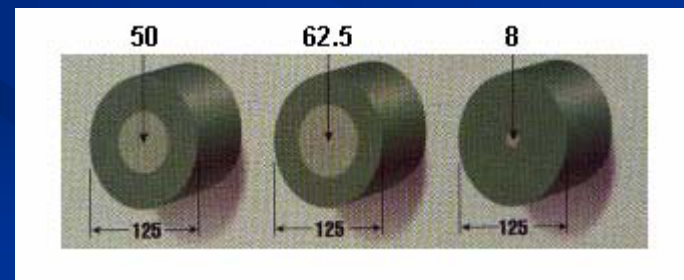
### OPTICAL FIBER (300m to 15mi.) ANSI/TIA/EIA 568 B.3

#### **Multimode**

- ✓ 62.5/125um
- ✓ 50/125um

#### **Singlemode**

- ✓ 8.3 – 9/125um



# WIRELESS

- ✓ Huge Mobility Factor in Work Place
  - Desktop, Laptop, Handheld Computers
  - Cellular Phones
  - Printers and Scanner
- ✓ On The Go Mobile Computing
- ✓ Not Truly “Without Wire” Solution



# GENERAL DESIGN CONSIDERATIONS

- ✓ Due Diligence/Building Surveys
- ✓ Type of Transmission Medium
- ✓ Pathway Considerations



# PATHWAY CONSIDERATIONS, ISP

## ANSI/TIA/EIA 569

### Horizontal

- ✓ Cable Tray
- ✓ J-Hook Support
- ✓ Multi Cable Slings

### Vertical

- ✓ Sleeves
- ✓ Slots
- ✓ Strand
- ✓ Kellums Grip
- ✓ Strapping/Lashing

*Fire Stop*



# PATHWAY CONSIDERATIONS, OSP

## ANSI/TIA/EIA 758

- ✓ Aerial
- ✓ Direct Buried
- ✓ Underground
- ✓ Vaults
- ✓ Maintenance Holes
- ✓ Hand Holes
- ✓ Pole Lines
- ✓ Building Entrances
- ✓ Bonding and Grounding of System



# GENERAL DESIGN CONSIDERATIONS

- ✓ Due Diligence/Building Surveys
- ✓ Type of Transmission Medium
- ✓ Pathway Considerations
- ✓ Space Considerations & Adjacencies



# SPACE CONSIDERATIONS (569)

- ✓ Entrance Facilities (EF)
- ✓ Equipment Room (ER)
- ✓ Main Cross Connect (MC)
- ✓ Telecommunications Room (TR)

Consider pathway, cabling, power, mechanical, misc. facilities within and adjacent to space.



# GENERAL DESIGN CONSIDERATIONS

- ✓ Due Diligence/Building Surveys
- ✓ Type of Transmission Medium
- ✓ Pathway Considerations
- ✓ Space Considerations & Adjacencies
- ✓ Power & HVAC Requirements



# POWER & HVAC REQUIREMENTS

- Manufacturer's Warranty
- Lifespan



# POWER & HVAC REQUIREMENTS

## POWER

- ✓ 120V Backed Up Somehow
- ✓ 208V for Equipment Rooms
- ✓ Placement of Power in Rooms

## HVAC

- ✓ Temperature
- ✓ Humidity
- ✓ Airflow
- ✓ Pathways in field usually require a huge coordination effort.



# GENERAL DESIGN CONSIDERATIONS

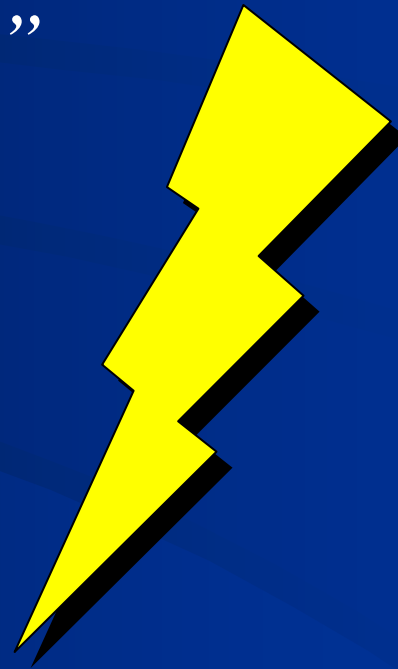
- ✓ Due Diligence/Building Surveys
- ✓ Type of Transmission Medium
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- ✓ Power & HVAC Requirements
- ✓ Bonding and Grounding



# BONDING AND GROUNDING

NEC, ANSI/TIA/EIA 607

*“You don’t want your client to become a grounding electrode!”*



# WHAT'S THE DESIGN DELIVERABLE?



# 16750 SPECIFICATION

- ✓ Cabling and Components
- ✓ Spaces and Pathways
- ✓ Required Equipment
- ✓ Installation Requirements
- ✓ Contractors Requirements
- ✓ Bonding and Grounding
- ✓ Administration



# DRAWING PACKAGE

- ✓ Campus and Site Plans
- ✓ Layout of Complete Building per Floor
- ✓ Serving Zones
- ✓ Communication Equipment Rooms
- ✓ Typical Detail Drawings
- ✓ Schedules



# CONTRACT ADMINISTRATION

- ✓ Shop Drawings
- ✓ RFI Response
- ✓ Site Visits, with Field Reports
- ✓ Validation of System
- ✓ Closeout Documentation



# DIVERSE REQUIREMENTS

- ✓ Commercial Office Space
- ✓ Data Centers
- ✓ Educational
- ✓ Pharmaceutical
- ✓ Healthcare
- ✓ Retail



# QUESTIONS & ANSWERS

