Internet Access

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"To Be Connected"
Physical Viewpoint

To have a direct (Layer 2) connection to a router that is part of the Internet, i.e., that is connected

Internet

Router
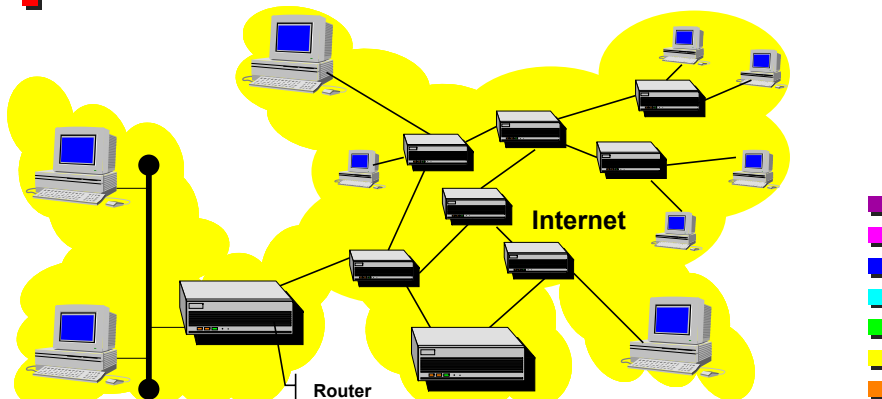
"To Be Connected"
Physical Viewpoint

Host

- **Dial-up connection**
  - POTS (Plain Old Telephone System)
  - ISDN (Integrated Service Digital Network)
- **High speed connection**
  - x-DSL (Digital Subscriber Line)
  - Cable Modem
- **Wireless**
  - Cellular
  - Satellite
  - Fixed
- **LAN (Local Area Network)**
  - Ethernet

"To Be Connected"
Physical Viewpoint

Network → Router

- **Leased line**
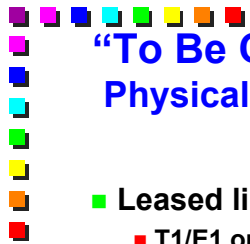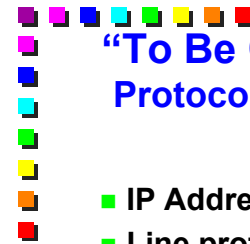 - **T1/E1 or fraction**
  - **STS-1**
  - **OC-192**
- **DSL/Cable Modem**
- **MAN/WAN (Metropolitan Area Network/Wide Area Network)**
  - **Frame Relay**
  - **ATM**
  - **Ethernet**
- **LAN (Local Area Network)**
  - **Ethernet**

"To Be Connected"
Protocol Viewpoint

Host

- **IP Address**
- **Line protocol**
  - **PPP (Point-to-point protocol)**
  - **SLIP (Serial Line IP)**
  - **Ethernet**
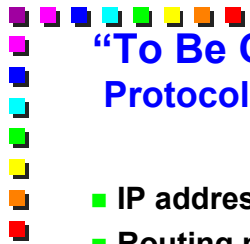
"To Be Connected"
Protocol Viewpoint

Network

- **IP address pool**
- **Routing protocol**
- **Line protocol**
  - **PPP (Point-to-point protocol)**
  - **HDLC (High-level Data Link Control)**
  - **Frame Relay**
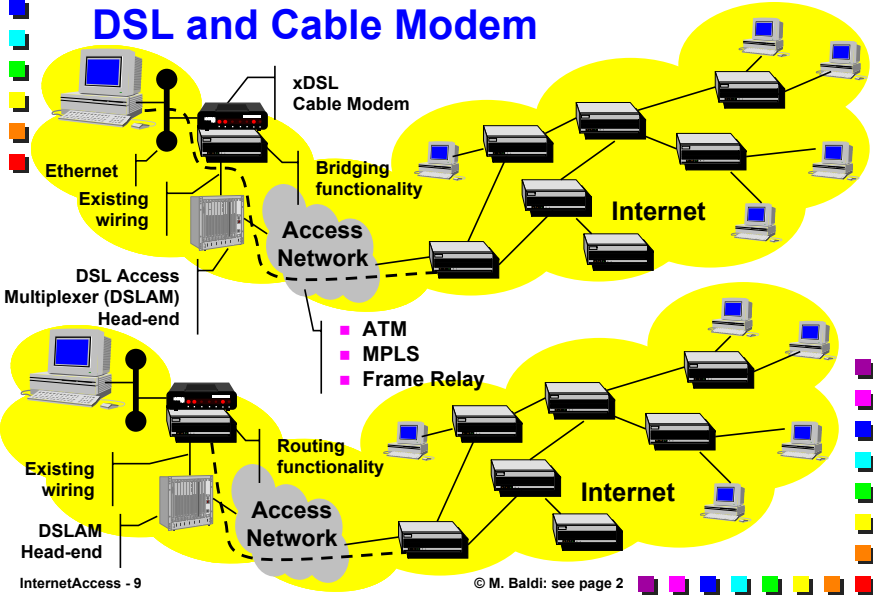 - **ATM**
  - **Ethernet**
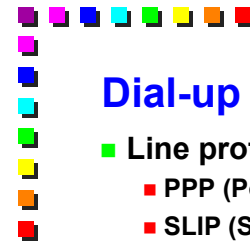
Dial-up Access

- **Line protocol**
  - **PPP (Point-to-point protocol)**
  - **SLIP (Serial Line IP)**
- **Address negotiation**
  - **PPP → IPCP (IP Control Protocol)**
  - **SLIP → (Non standard) text based**

Modem

POTS

Internet

DSL and Cable Modem

xDSL
Cable Modem

Ethernet

Existing
wiring

Bridging
functionality

Internet

**Access
Network**

DSL Access
Multiplexer (DSLAM)
Head-end

- ATM
- MPLS
- Frame Relay

Existing
wiring

Routing
functionality

Internet

DSLAM
Head-end

**Access
Network**

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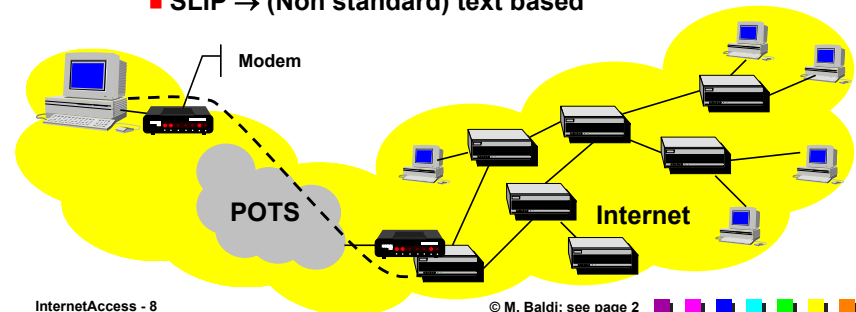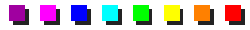
Security

Unauthorized access

- **Always on connection has higher risk**
  - **More time for the attacker**
- **Static addressing has more risk**

The "solution": restricted access

- **Filtering at access point**
- **Access router**
- **Dedicated** *firewall*
  - **Better programming interface**
  - **More flexibility**
  - **Hardware or software**

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