Call for New Connectors for BASE-T Ethernet

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Supporters

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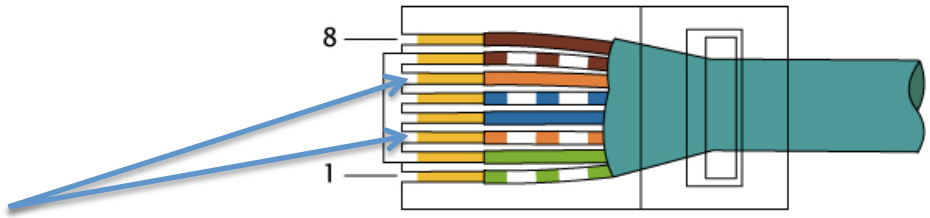
• Yakov Belopolsky	Stewart Connector
• George Zimmerman	CME consulting

RJ45 Issues

- Laptops are increasingly becoming thinner and lack physical space to accommodate RJ45 connector
- Switches are generally limited to 48 ports in 1U form factor due to the size of RJ45 connector
- RJ45 connector has legacy “3-6 split-pair”

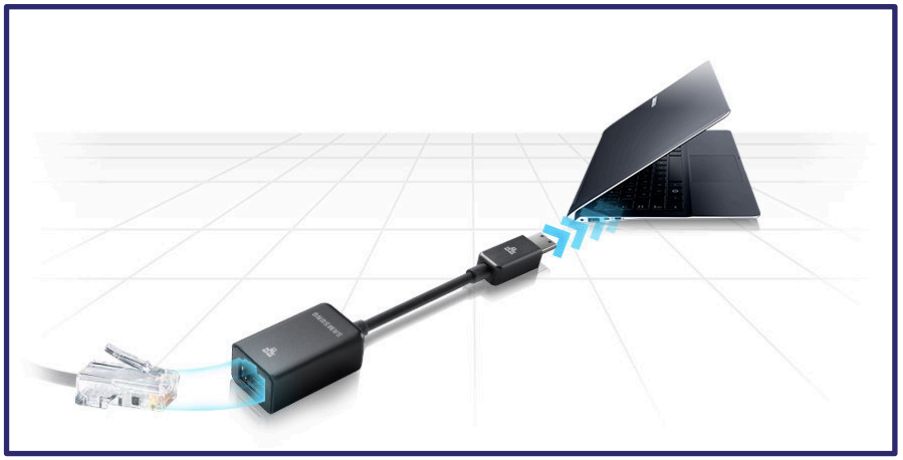


EIA/TIA-568A

Pair “B” is non-optimal

Some Proprietary offerings

Lenovo
“Drop-Jaw”



Samsung ATIV
Passive “Dongle”

Commercial existence of proprietary solutions indicates the market need

Considerations for new connector

- Size
  - Needs to be significantly thinner and smaller than RJ45
- Power delivery
- Number of pins
  - Increase number of pins to allow for future usage?
- Compatibility with existing infrastructure
  - Wall jacks are not to be changed

Compatibility with existing infrastructure

- Achieve backward compatibility via mixed connector patch cords and Dongles
  - RJ45 to New connector “patch cord”
    - Male connector on RJ45 side
  - RJ45 to New connector “Dongle”
    - Female connector on RJ45 side
- Study and define allowed loss in mixed connector cords and dongles

Data and Power for Laptops

- Laptops are generally based on ~20V DC input
- Powering Laptops from 48V PoE would require additional DC conversion step
- Define a new connector that carries data on traditional 8 pins and 20V power on extra pins
- This would allow the use of existing brick design with primarily mechanical changes to combine power and Ethernet connectors
- Extend the concept to other voltages

Laptop Power Example: 48V traditional PoE

- New Connector!
- 8 pins
- Single cable to PC
- 48V DC + Data

48V

Cubicle outlets

Two main issues!!

- Switch needs to provide higher total PoE power
- Requires 48V to 20V DC-DC conversion inside laptop

Laptop Power Example: 20V w/ external convertor

- New Connector!
- Single cable to PC
- 20V PoE?
- 8 pins (?)

4-pair PoE

20V PoE (?)

Max 10 meters (?)

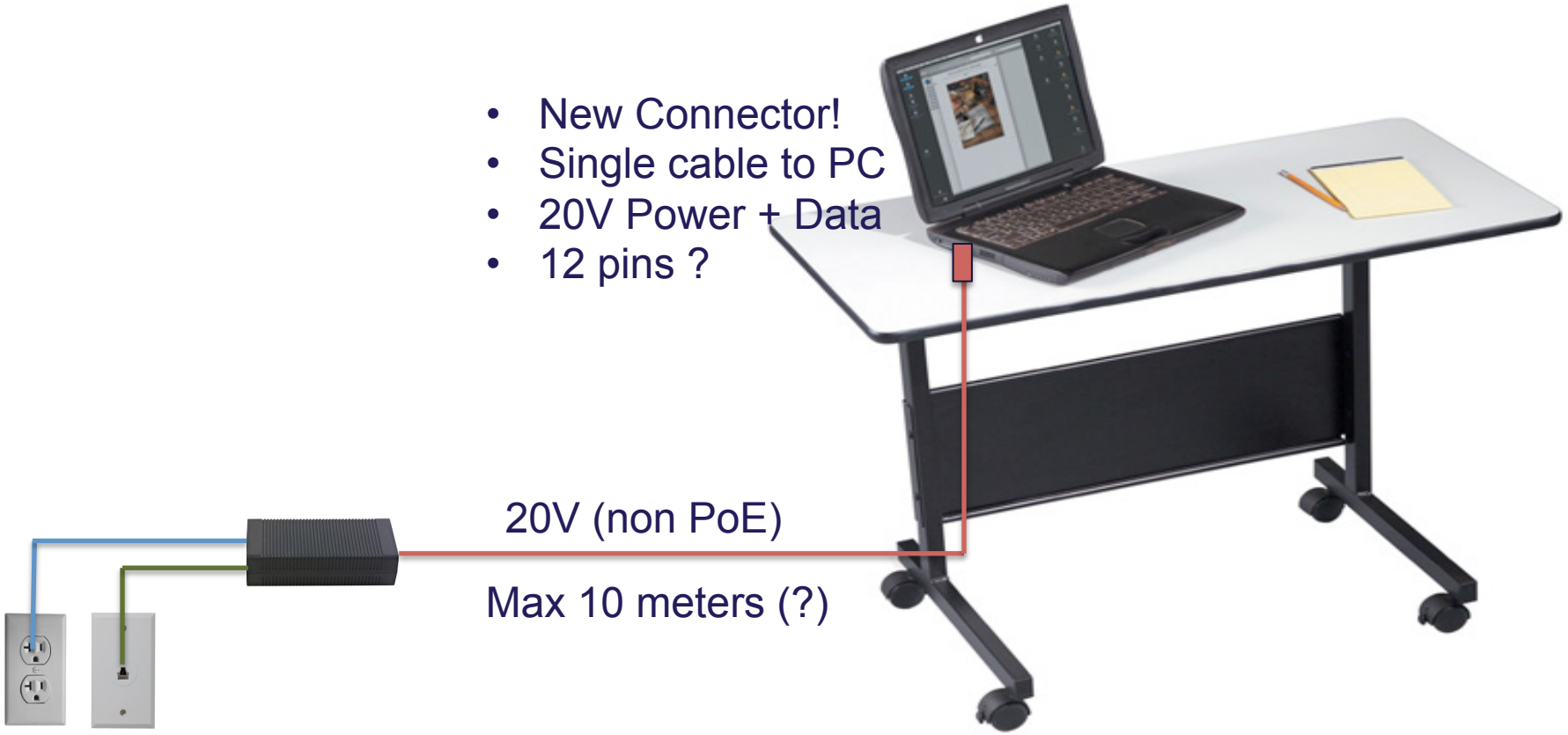
Cubicle outlets

Main issue!!

- Switch needs to provide higher total PoE power

Laptop Power Example: 20V

- New Connector!
- Single cable to PC
- 20V Power + Data
- 12 pins ?



20V (non PoE)

Max 10 meters (?)

Cubicle outlets

Reuse space already allocated to power connector

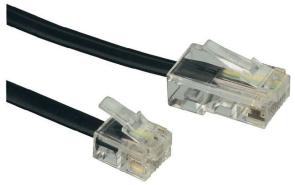
Proposal

- Include an objective to define 2 new connectors
  - New 8-pin connector
    - Data + Power using PoE
    - Thinner and smaller than RJ45
    - Primarily for
      - non-PoE equipment
      - PoE equipment using standard 48V power
    - Can be used for lower-than-48V if PoE group defines lower voltage framework in future
  - New 12 pin connector
    - Data & Power on separate pins
    - Thinner and smaller than RJ45
    - Primarily targeted at equipment using non-48V power
    - Usage is likely to be in the form of Power injectors located near PD
    - Examples – Laptop @ 20V; IP Camera @ 5V

Why study this in NGEABT group?

- Need for new connectors is relevant to enterprise and consumer Ethernet equipment
- Group is chartered to study Ethernet for future enterprise networks and should take a holistic look at all aspects of future networks including connectors
- Channel limits for 2.5G and 5GBase-T will need to take dongle (5th connector) and patch cord loss into account !

Summary



RJ45 came from this (RJ11) world

We need new connectors to come from this world ☺