NORTEL NETWORKS

Powering and Discovery Alternatives

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May 24, 2000

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Powering via Pairs 1-2, 3-6

- **Issues:**
  - ➔ **Potential noise interference into data signal**
  - ➔ **100 BASE-TX transmission is close to the margin for CAT-5 cable performance**
  - ➔ **Possible interoperation problems with legacy equipment**
  - ➔ **Mid-span insertion likely requires data repeaters**
  - ➔ **“Pure DC” power source and load required**
- **Attributes:**
  - ➔ **Powering would work on non-standard legacy two pair cabling**
  - ➔ **Uses less wires**

Powering via Pairs 4-5, 7-8

- **Issues:**
  - ➔ **Powering requires standard four pair cabling**
- **Attributes:**
  - ➔ **Does not require revising specifications for existing 802.3 transmission interfaces**
  - ➔ **“Three fingers” of isolation between the powering and signaling pairs**
  - ➔ **Mid-span insertion of power is transparent to the data signal**
  - ➔ **Greatly reduces interoperation risks with legacy equipment**

Differential Detection

- **Issues:**
  - **If detection and power are on signal pairs:**
    - **Authentication and data signals interfere with each other**
    - **Central back-up support for locally powered terminals may require data service interruption**
    - **Increases crosstalk paths at DTE end**
  - **Detection on signal pairs and power on other pairs would cause safety and inter-operational liability problems**
  - **May miss common mode faults e.g. DC power short**
- **Attributes:**
  - **Detection means is IEEE 802.3 type digital signature**
  - **Discovery and data can share interface and PHY design commonality**

Common Mode Detection

- **Issues:**
  - **Reliability of detection subject to mechanism for unique DTE identification**
  - **May miss some benign differential mode faults**
- **Attributes:**
  - **Detection and power are on same pairs separate from the 10/100 data pairs:**
    - **Minimizes interference between discovery and data signals**
    - **Facilitates central back-up power authentication for locally powered terminals**
    - **Improves control over crosstalk paths**
  - **Reduces safety and inter-operational liability problems**
  - **Approach allows integration into either power supply or PHY silicon designs**

Conclusions

- **Use 4-5, 7-8 pairs for powering and detection**
- **Minimizes interference and inter-operation risks**
- **Facilitates mid-span power insertion and introduction of DTE powering into installed base**
- **Simplifies engineering and required standards effort**
- **Combining discovery and powering mechanisms minimizes safety and liability issues**
- **Simplifying of powered DTE devices will increase the market opportunity**