

A Digital Transmission Network

Solution of Case Study

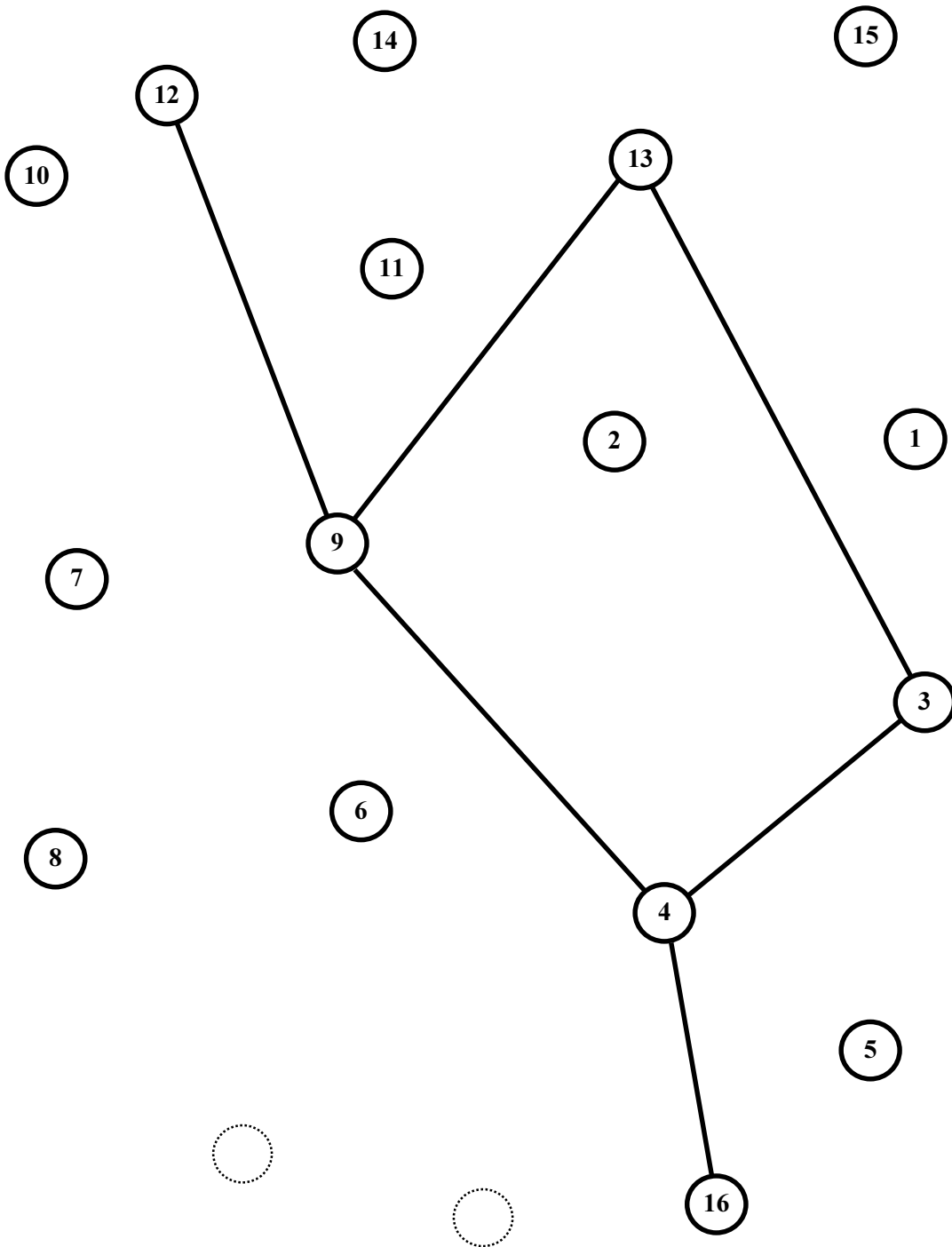
Mr. H. Leijon, ITU



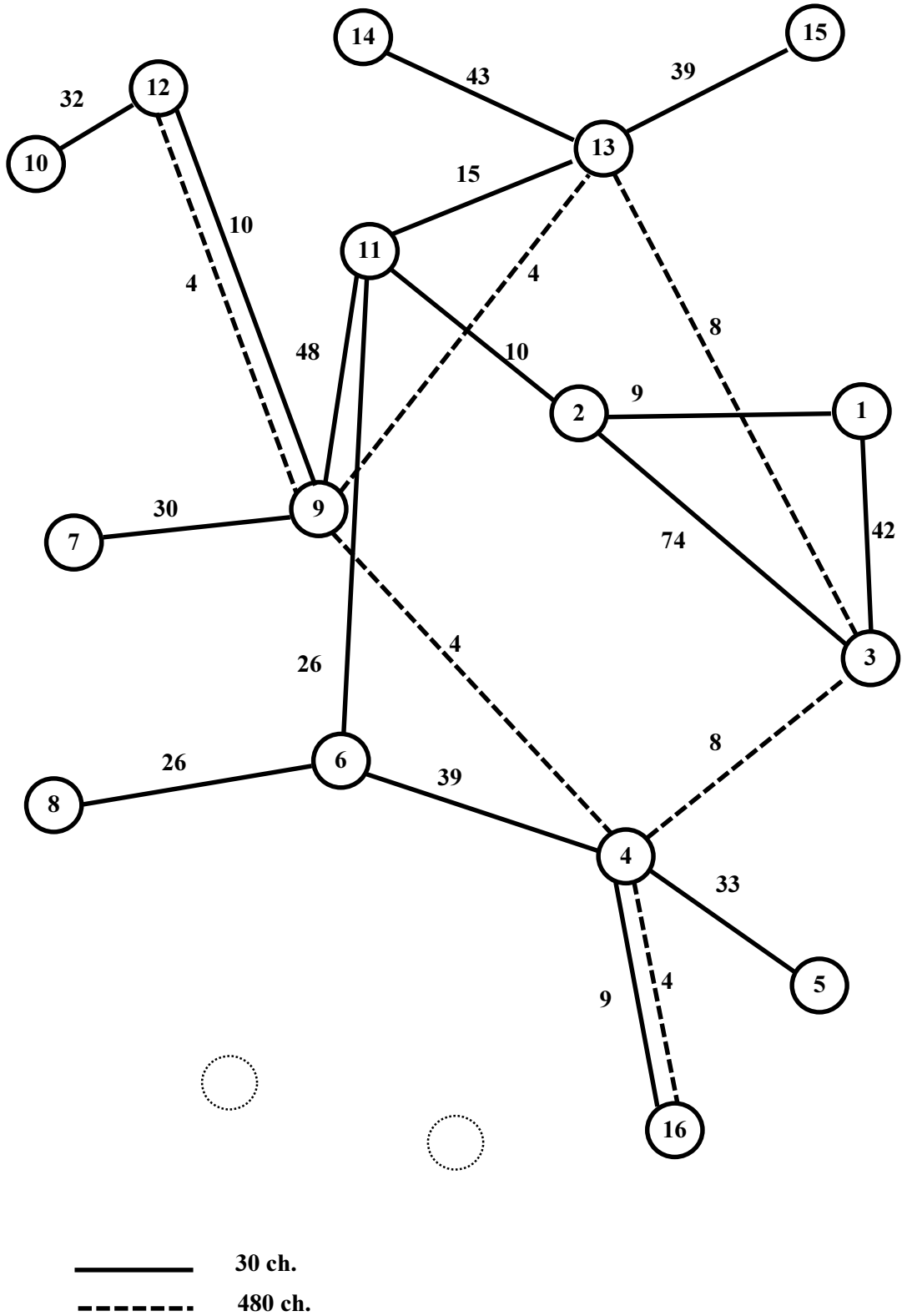
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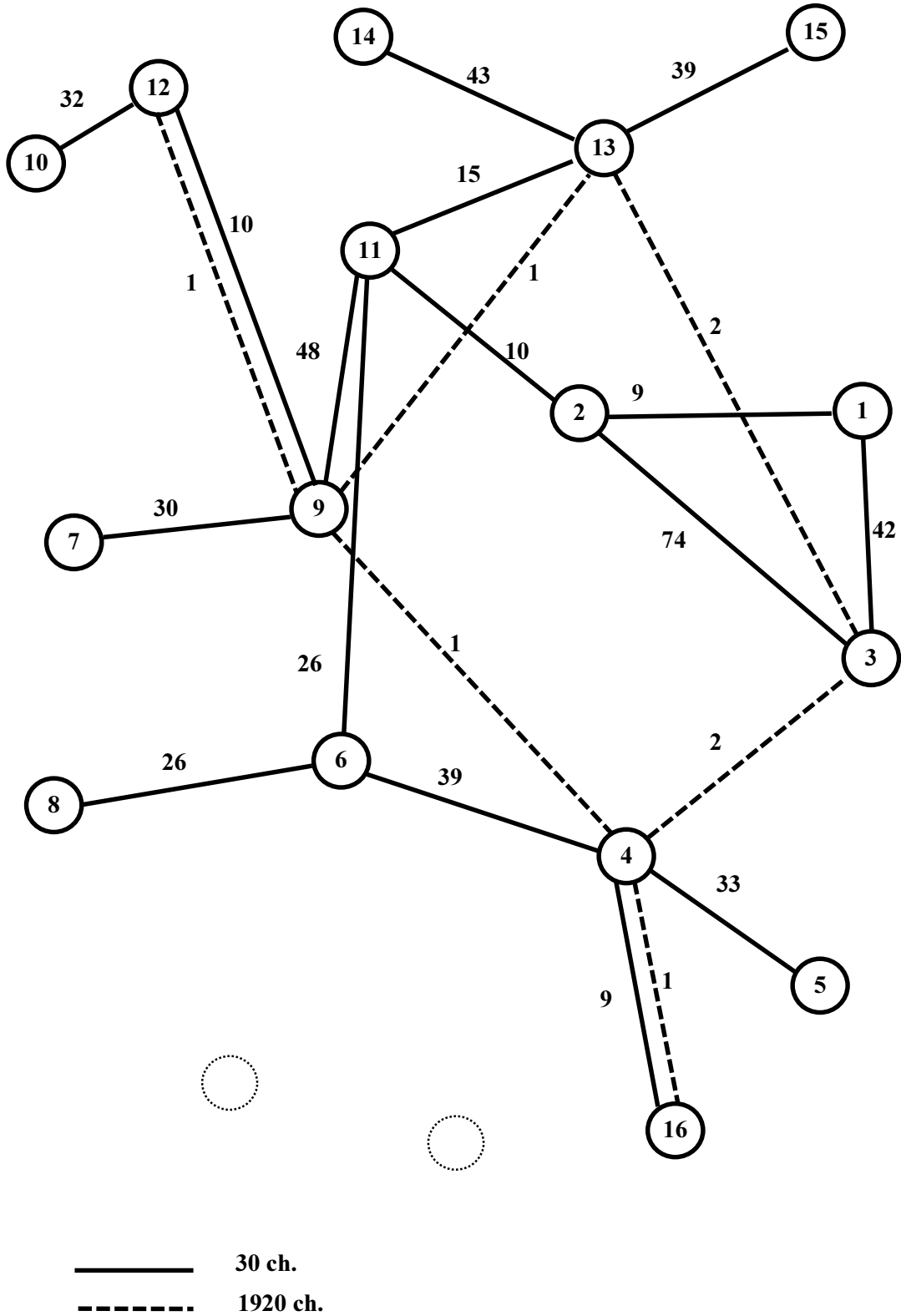
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| Equipment | | 2 Mb / s | 2 Mb/s + 140 Mb/s Throughconnection: | | 2 Mb/s + 34 Mb/s Throughconnection: | |
|-------------------|-----------------|----------|---|--------|--|--------|
| | | | alt. 1 | alt. 2 | alt. 1 | alt. 2 |
| Line Terminals | LT ₁ | 2122 | 1034 | 1034 | 1034 | 1034 |
| | LT ₃ | | | | 64 | 64 |
| | LT ₄ | | 16 | 16 | | |
| Digital MUX | M ₂ | | 252 | 152 | 252 | 152 |
| | M ₃ | | 64 | 44 | 64 | 44 |
| | M ₄ | | 16 | 16 | | |
| Repeaters | R ₁ | 1771 | 342 | 342 | 342 | 342 |
| | R ₃ | | | | 44 | 44 |
| | R ₄ | | 11 | 11 | | |
| Repeater Boxes | B ₁ | 93 | 21 | 21 | 21 | 21 |
| | B ₃ | | | | 11 | 11 |
| | B ₄ | | 9 | 9 | | |

Throughconnection

alt. 1 : 30-group throughconnection (2Mb/s)

alt 2 : Throughconnection on highest possible level

General Remarks:

"B" and "C", compared to "A", has:

- much less line equipment;
- more terminal equipment, due to MUX;
- specific cables for higher order systems;
- simpler network (less equipment involved in connections).

Maintenance:

"A" has more equipment outdoors, i.e.:

- fault localization and repair takes more time;
- also more pieces of equipment.

"B" and "C" has more equipment indoors, i.e.:

- fault localization and repair takes less time;
- also fewer pieces of equipment.

Reliability:

"B" and "C":

- have fewer pieces of equipment;
- specific cables are used.

Therefore, better reliability: "A" uses existing pair cables, which also may be used as, e.g., leased lines. Possible changes in the pair cable network may then occur, being also a source of faults for the PCM-pairs in the cable.

Rerouting in case of faults:

"B" and "C" have fewer system lines, i.e.:

- rerouting can be done using fewer system lines;
- rerouting cost is lower since the cost for a system line compared to terminal equipment is low, and the terminal equipment is common to both the ordinary and the reserve path.

Cost (Investment):

For 30-group through connection: "A" \approx "B" \approx "C" ("B" slightly cheaper)

For through connection on higher level: "B" and "C" **much cheaper than "A"**.

Relative costs:

Terminal cost/Line cost: for "A": $\approx 70/30$,
for "B" and "C": $\approx 90/10$.

Therefore, in alt. "B" and "C" we can afford to use a high quality cable, which may be very good for future developments (broad band services, etc.).