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X-Win and Geant2 - the next generation of research networks in Germany and Europe

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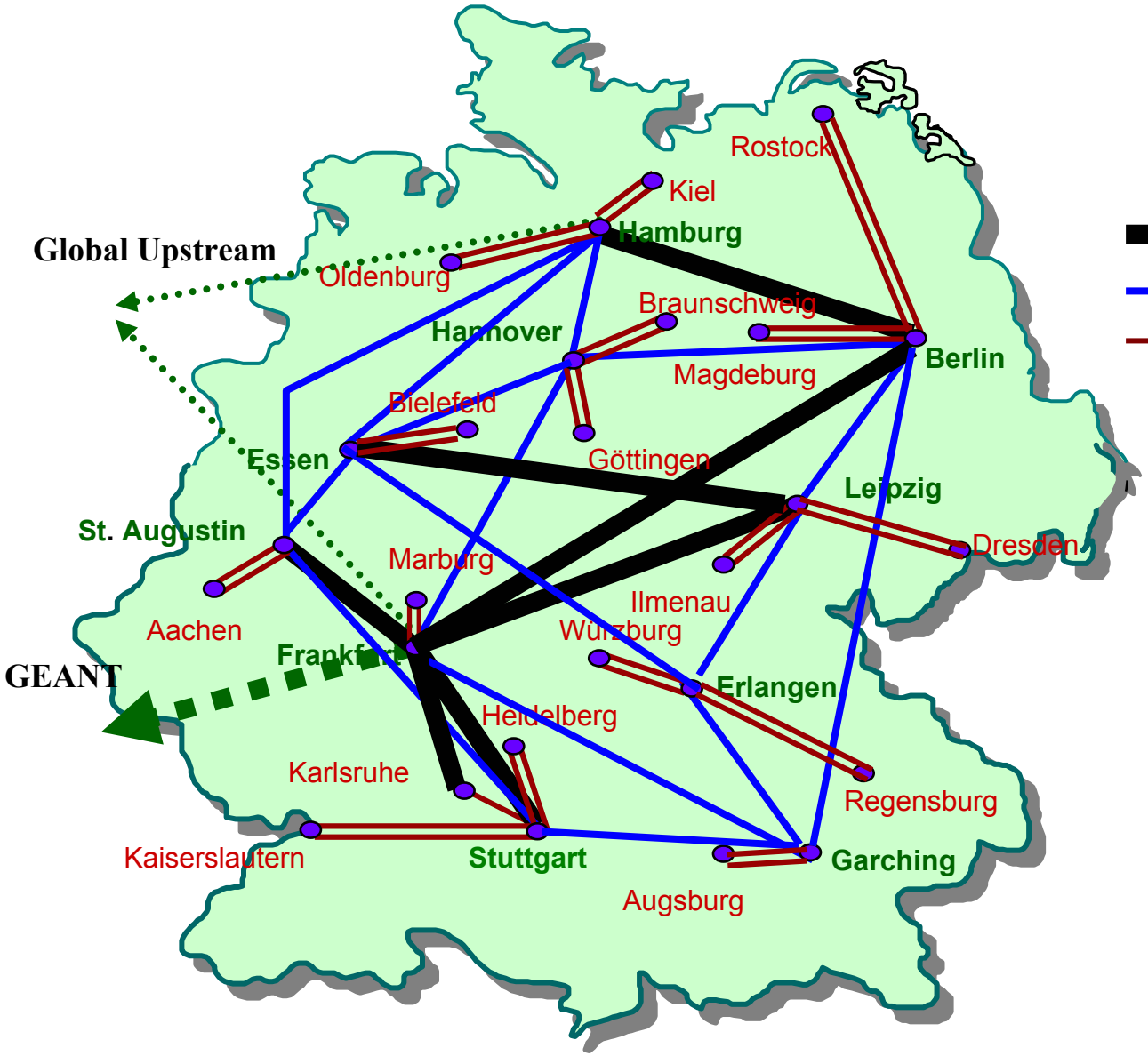
Situation today

- Core network
  - 27 nodes operated by DFN
  - SDH transparent wavelength
  - links with 2,5 and 10 G SDH Interfaces
  - 24/7 Control by service provider
- Contract
  - one contract with Carrier (T-Systems)
    - provision and control of all links
    - operational responsibility secured via contractual binding SLAs
  - finishes end of 2005

Logical topology



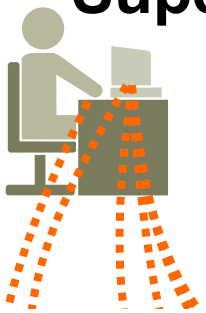
27 nodes
10 Gbit/s
2,4 Gbit/s
2,4 Gbit/s

as of 15.03.2004

Concepts new core network

- Technical concept
  - inclusion of wavelengths and dark fiber
  - possibly more nodes
  - protect invest in SDH-technology
- economic concept
  - (re-)define core network via package of services
  - make possible to establish more than one provider
  - minimize risk for bidders by
    - usual contractual rules (i.e. liability, risks)
    - operational responsibility with DFN

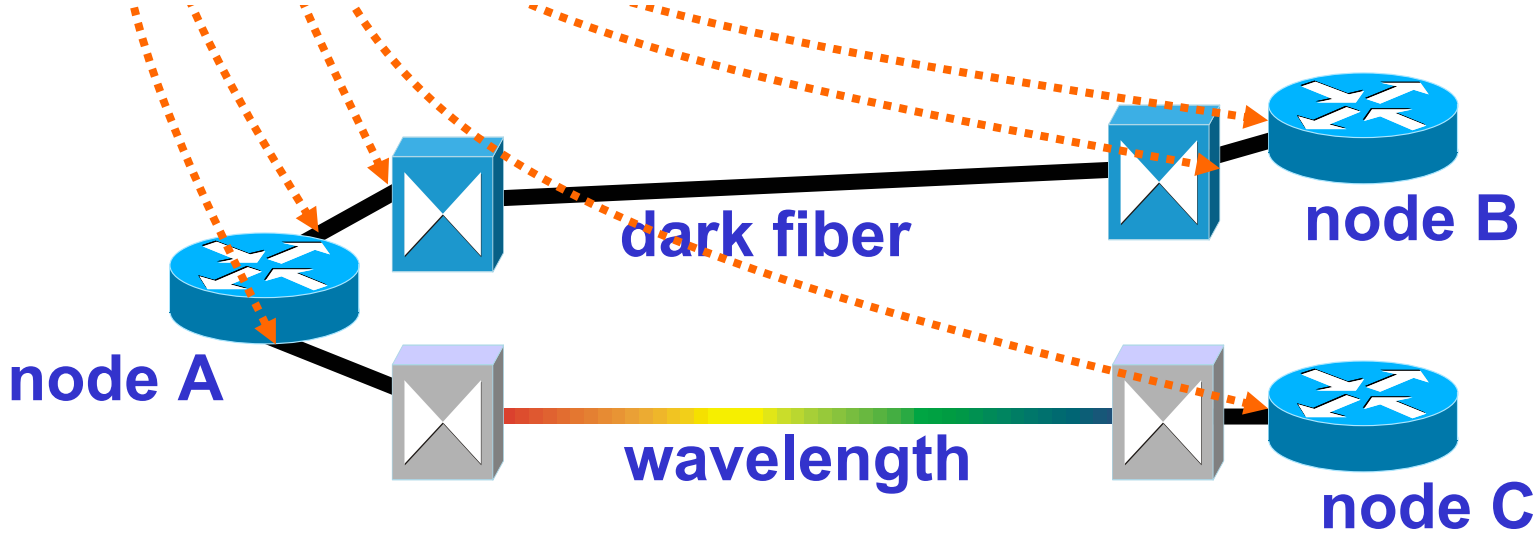
New operational model



Supervisor

alarms and supervises support
(i.e. for links, equipment)

Access to management
data of DFN equipment



Wavelength (1)

- Technical definition:
  - several digital protocols up to 10 Gbit/s
  - change of digital protocol should be possible
    - fast in the framework of usual replacement times
    - economic in the sense of usual interface costs
  - reduced requirements in respect to availability
- Service:
  - support of all levels: 24/7 hotline and debug
  - usual times for reaction
  - integration into DFN defined processes

Wavelength (2)

- Decision:
  - every links one part to be decided (partial lot)
  - bundling allowed
  - decision for framework contract, not automatically an order)
- Contract:
  - prices for different contract times
  - usual rules as for bandwidths
  - usual SLAs

Dark fiber (1)

- Technical definition
  - ITU-T conform and "WDM-compatible"
  - requirements on technical parameters
    - i.e. damping
- Service:
  - Support of all levels: 24/7 hotline and debug
  - provision of colocation rooms
  - end-to-end responsibility
  - usual reaction time in case of failures
  - integration into DFN defined processes

Dark fiber (2)

- Decision:
  - every link one part to be decided on (partial lot)
  - bundling within dark fibre offers allowed
  - decision for framework contract, not automatically an order
- Contract:
  - prices for different contract times
  - using usual contract forms
  - usual SLAs

Equipment for dark fiber (1)

- Technical definition:
  - provision of digital interfaces plus necessary equipment
  - provision of a management system
- Service:
  - inclusive installation and maintenance
  - 24/7 hotline and debug
  - usual reaction time in case of failures
  - integration into DFN defined processes

Equipment for dark fiber (2)

- Decision:
  - One provider
  - decision for framework contract
- Contract:
  - service contract
  - port prices for different digital protocols
  - prices for different contract times
  - usual SLAs

Operation (1)

- Definition
  - Supervision of management data
  - Well defined procedures for operation
    - Identification of failures (equipment? - links?)
    - alarm of respective support unit
    - supervision of debug process
    - triggering escalation, if necessary
  - Procedures DFN defined
  - Monthly reporting
  - Open for integration of new equipment

Operation (2)

- Decision
  - One Provider
- Contract
  - service contract
  - no (network) SLA responsibility
  - contractually secured reaction time
  - contractually secured reachability

Evaluation and decisions

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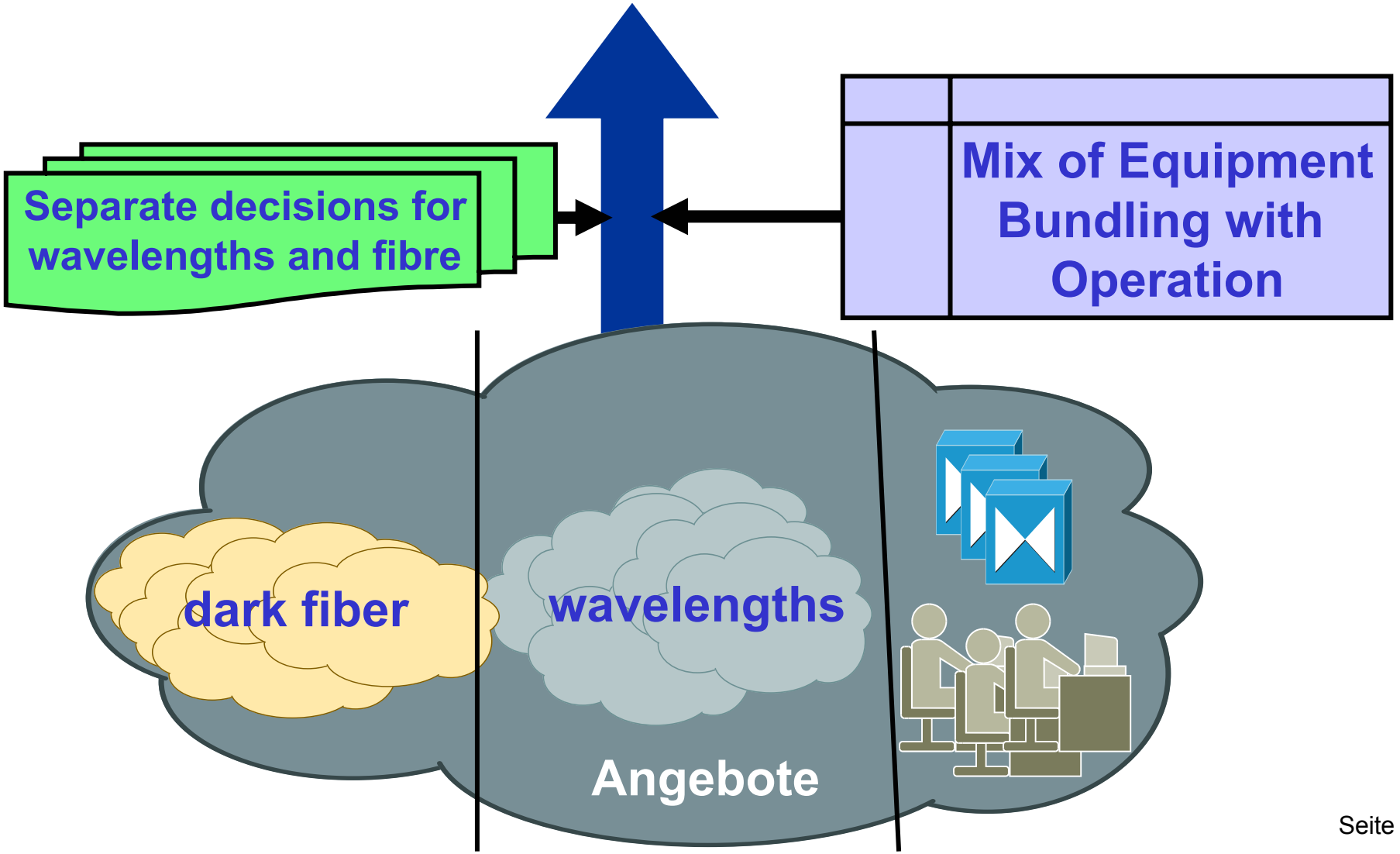
Decisions



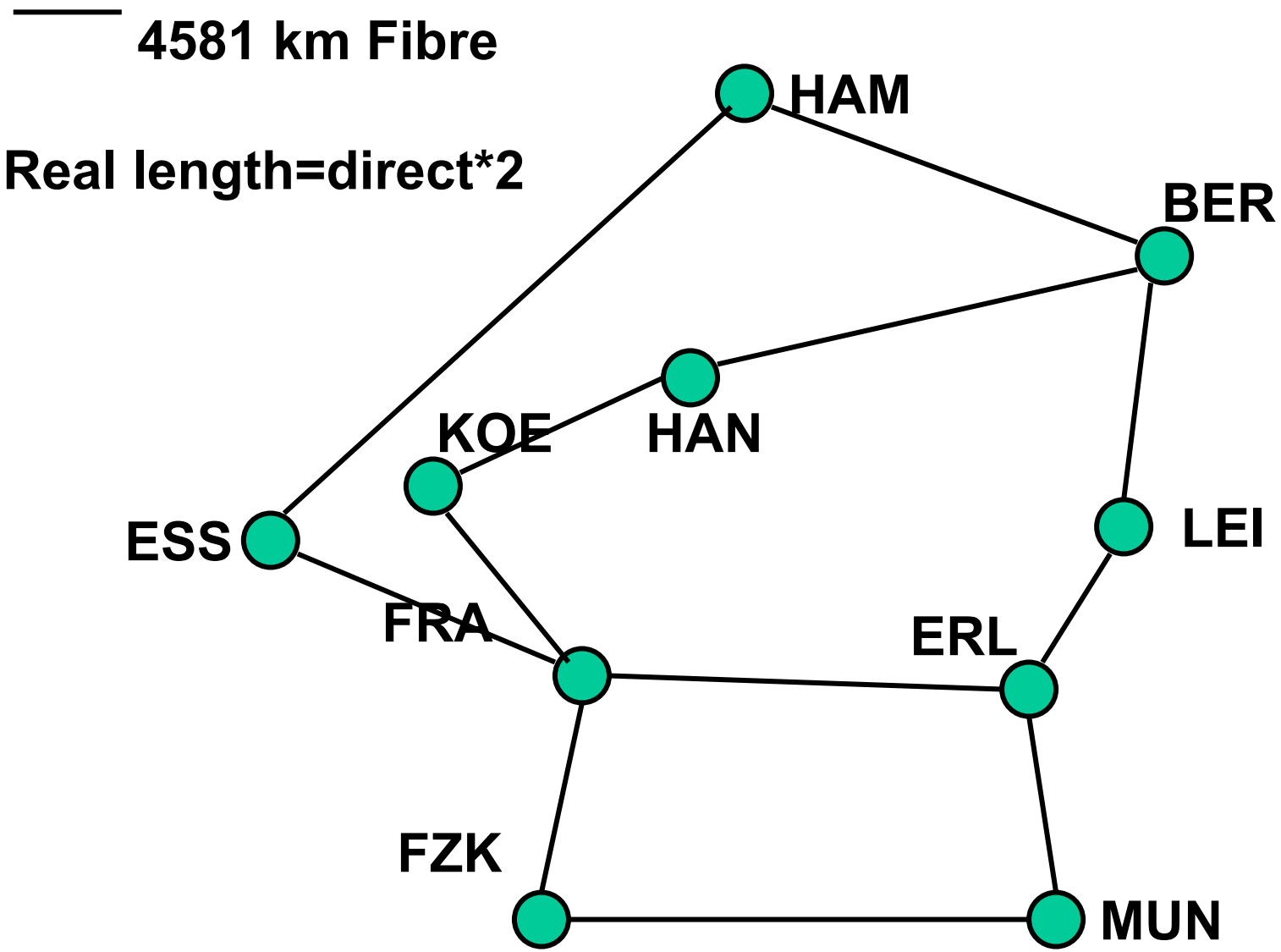
Tendering process

- Europe wide call in 2004, starting with a careful market evaluation in 2003
- No negotiation procedure, i.e. with call the following items have been already definined :
  - minimal requirements, informations to be provided, evaluation scheme, all contracts
- Decision November 2004
- Start operation until end 2005

Main Results

- Most of the X-WiN core will be a fibre network, the rest will be provided by wavelengths
- several wavelengths and fibre providers
- fibre is relatively cheap - in most cases (!) more economic than (one) wavelength
- future network creates many new options besides being cheaper than the G-WiN core

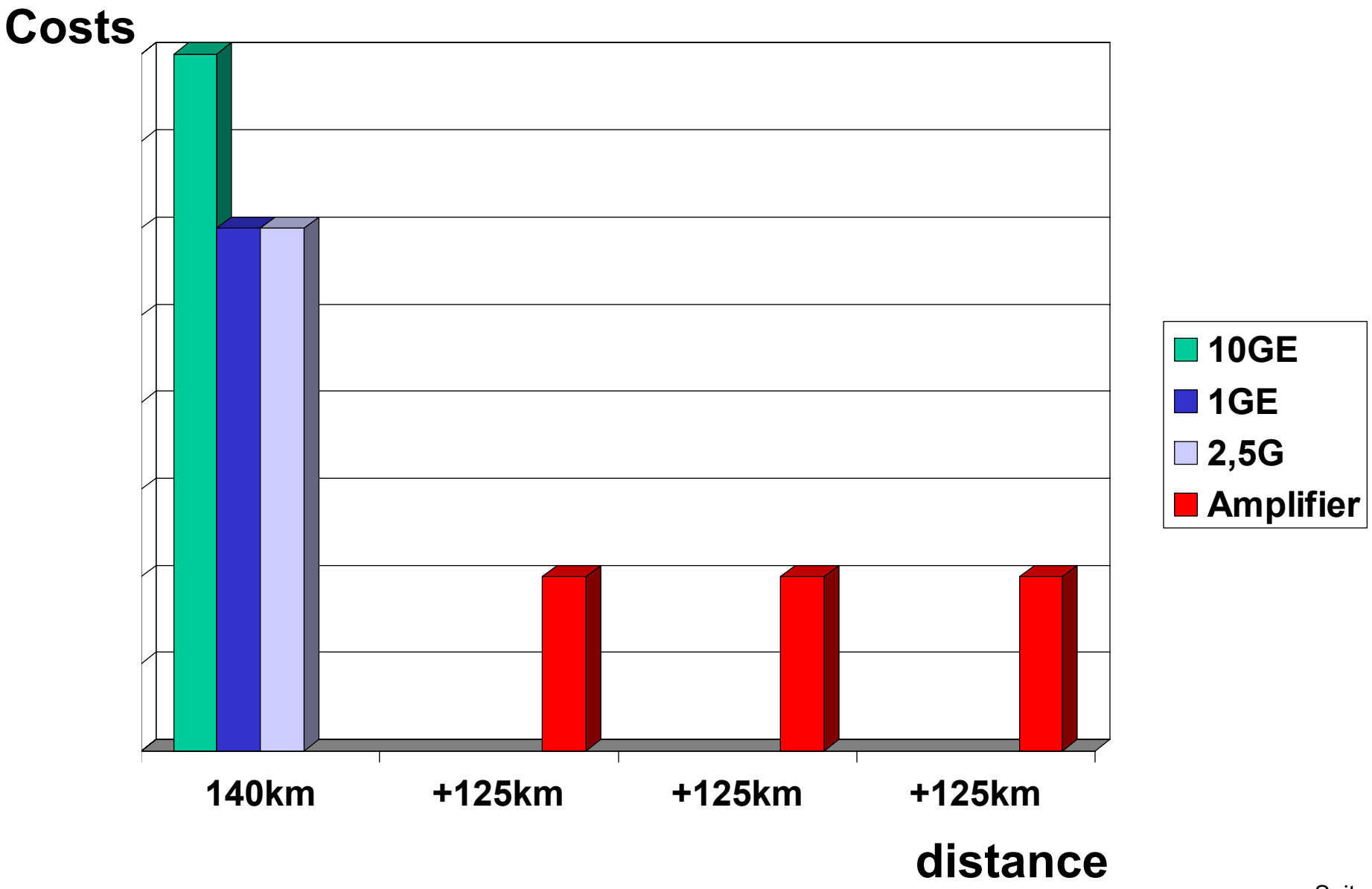
Example network for X-WiN

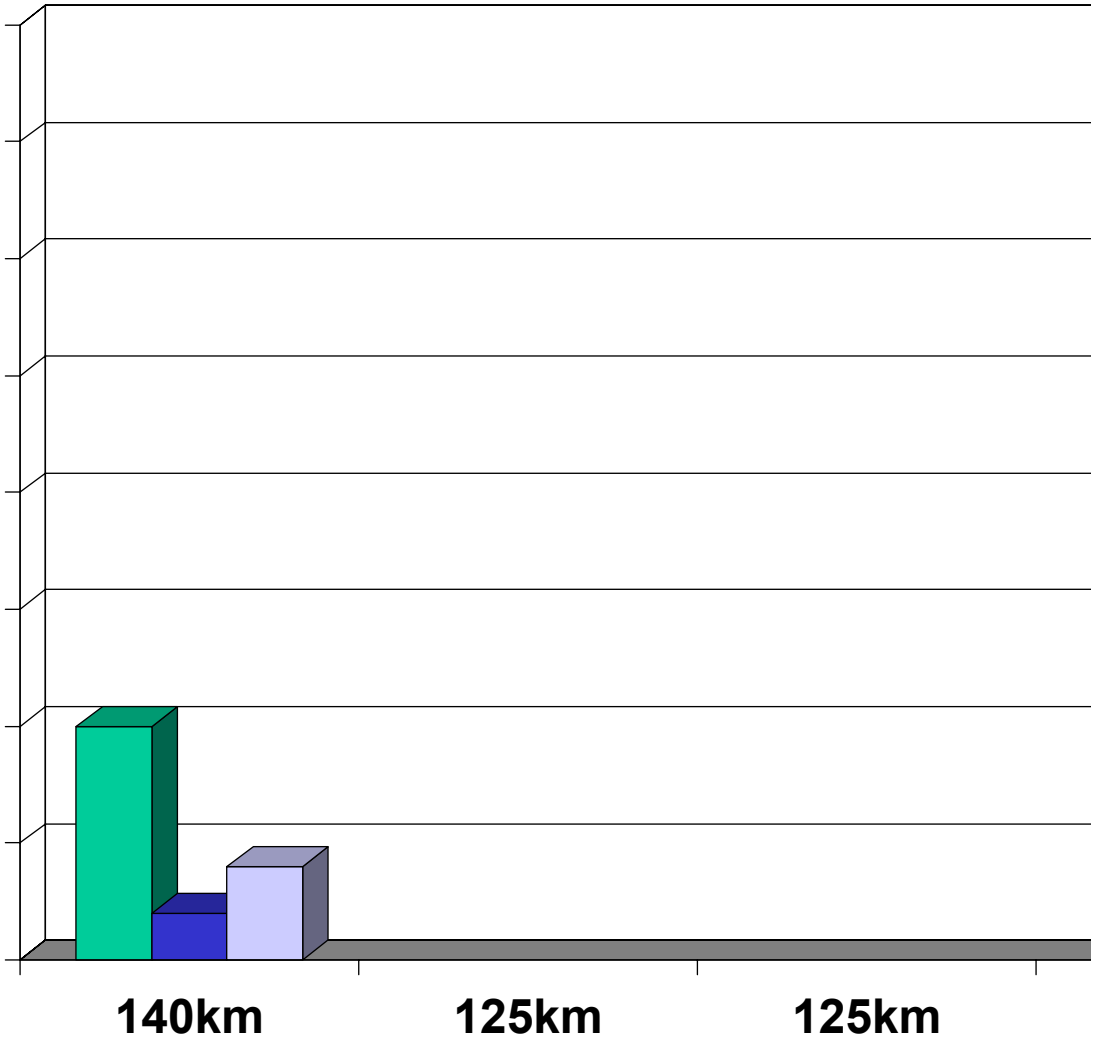


Economy of fibre links (1)

- 1st link is relatively expensive - will be used for Internet traffic
- n-th link (n>1) is cheap and will enable very many VPN constructs

Economy of fibre links (2)





10GE
1GE
2,5G

European Scenario

- The same vision is true for the European Backbone Geant2
- NRENs and DANTE are implementing as much fibre as possible
- CERN will be node in Geant2 and will be very likely linked via fibre to DFN-Frankfurt/M
- basically the same economy as in X-WiN applies (!)
- DANTE tender will be finished in December