OPEX reduction through GMPLS/ASON
- a business case study

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Motivation

- ASON/GMPLS often promoted as a key technology to reduce OPEX and CAPEX
- Few studies on OPEX so far
- We quantify the cost reduction potential of ASON/GMPLS

Outline

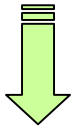
- Defining OPEX
- Process-based OPEX modelling
  - Approach
  - Typical processes
  - ASON/GMPLS modified processes
- Quantitative results
  - Service provisioning
  - Overall OPEX
- Analysis and conclusions

Defining OPEX

Total expenditures of a company

- Capital expenditures: CAPEX
  - Contribute to fixed company infrastructure
  - Depreciated over time
- Operational expenditures: OPEX
  - Cost to keep company operational
  - Do not contribute to infrastructure itself, not subject to depreciation

Network operator

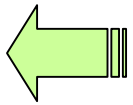


- Purchase of land and buildings
- Network infrastructure
- Software

- Rented and leased infrastructure
- Personnel wages

OPEX subparts

- Network operation
  - For a network which is up and running
  - Maintenance, service provisioning,etc.



Strong impact of technology

- Equipment installation
  - First time installation costs
  - Up-front planning

- General OPEX
  - Non-telco specific infrastructure and administration

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Approach

- Formal description of network operations
  - Identify generic processes
  - Modelling
- Changes expected with ASON/GMPLS
  - Qualitative and quantitative variation
- Relate to total OPEX
  - Network scenario
  - Relative weight of each OPEX category

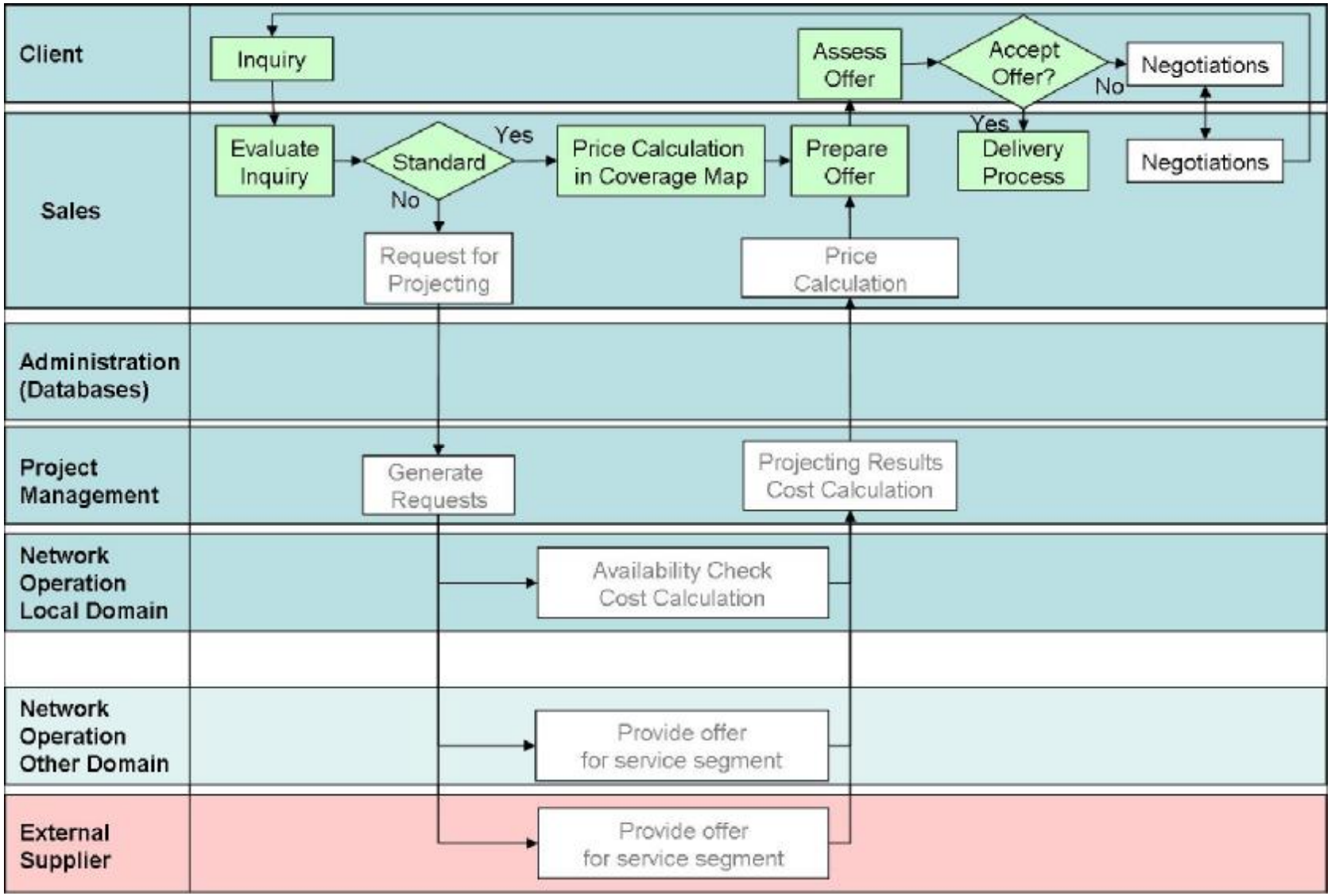
Operational processes

- Continuous and recurring processes
  - Continuous cost of infrastructure
  - Routine operations, maintenance
  - Reparation
  - Operational network planning
  - Marketing
- Service management processes
  - Service offer
  - Service provisioning
  - Service cessation
  - Service move or change

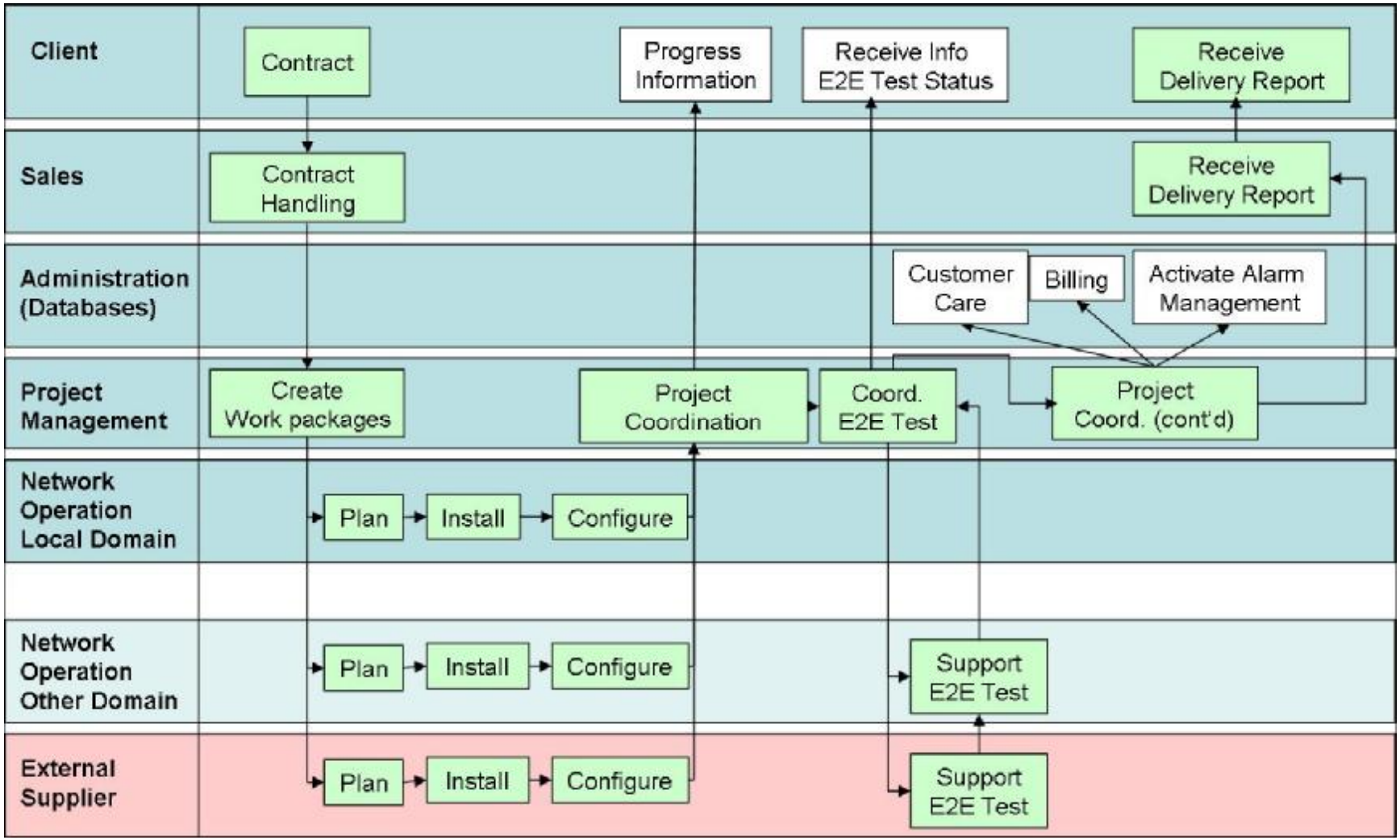
Service management processes

- Service offer
  - The operator makes an offer at the customer's request
- Service provisioning
  - According to the terms of the contract, physical delivery of the service is carried out
- Service cessation
  - Contract update, coordination between new service setup and release of the previous service.
- Service move or change
  - End of the contract, release of the connection and recovery of equipement

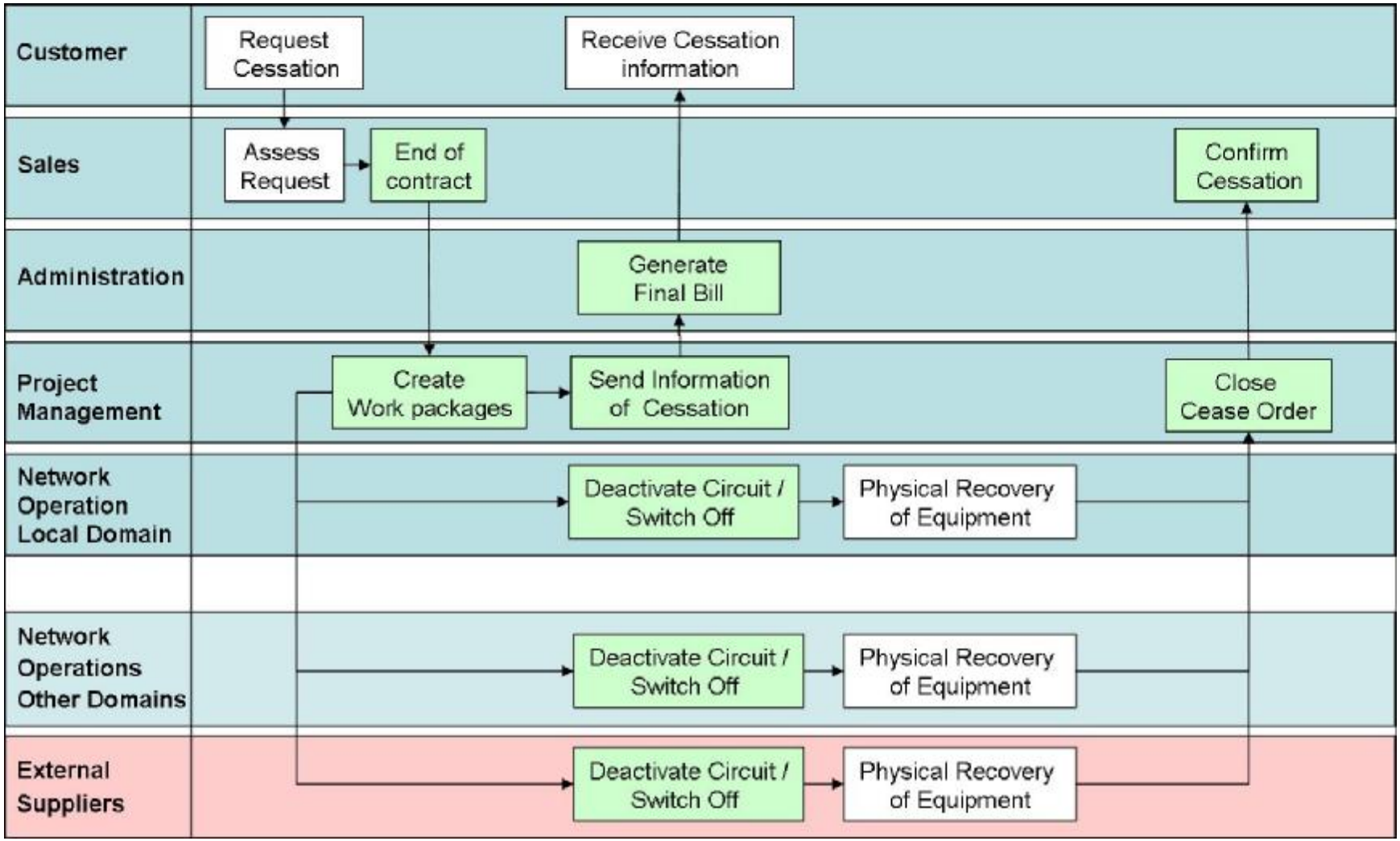
Service offer



Service provisioning



Service cessation



Service move or change

- Combination of services
  - Prepare offer for „new“ service
  - provisioning of new service
  - Cessation of previous service
- Requires additionnal coordination
  - Common resources

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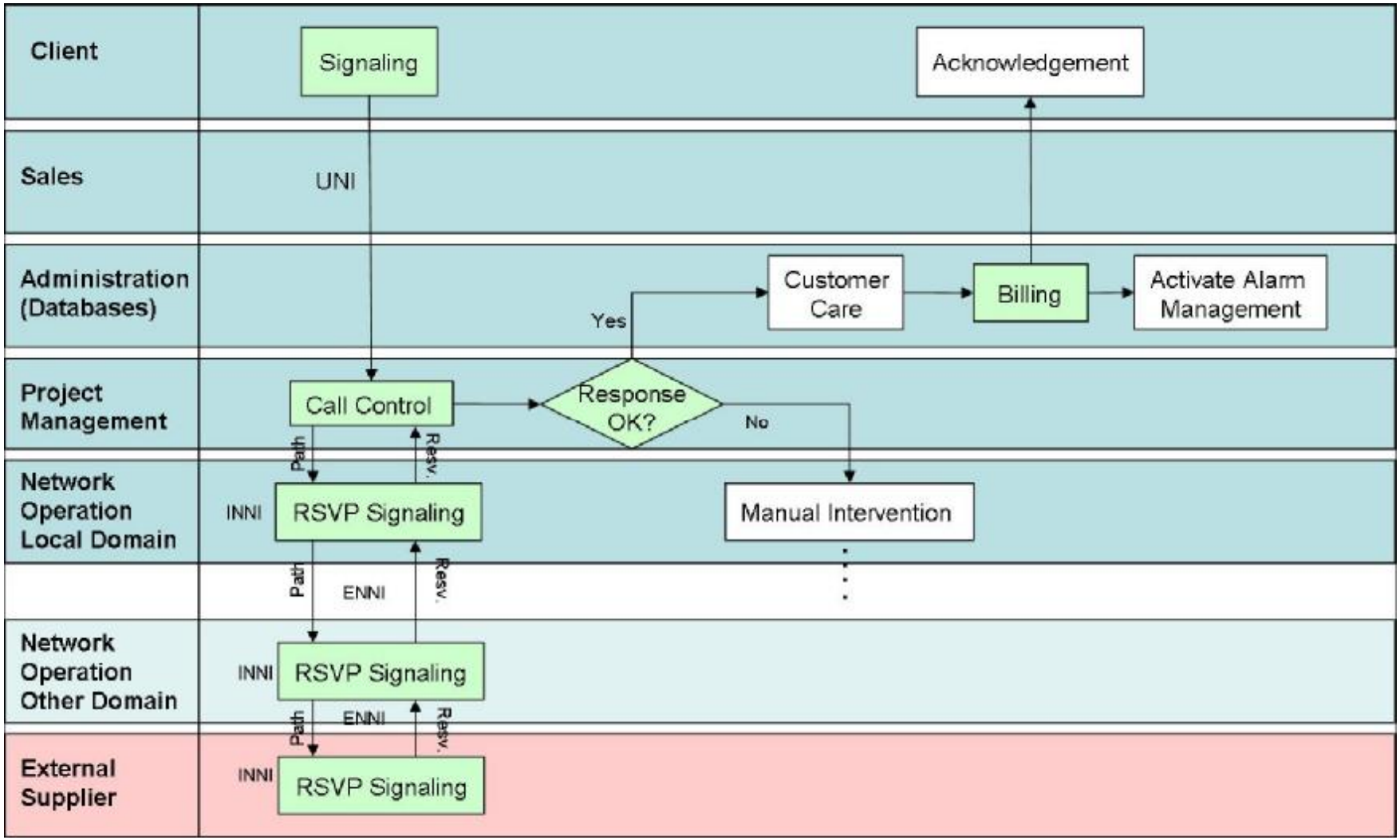
NMS: Current Limitations

- OTN currently operated by NMS
  - Administration & maintenance
  - Centralized provisioning
- NMS are widespread but
  - Manual configuration
  - Human communication
  - Limited to a domain
  - Lack of standardized interfaces

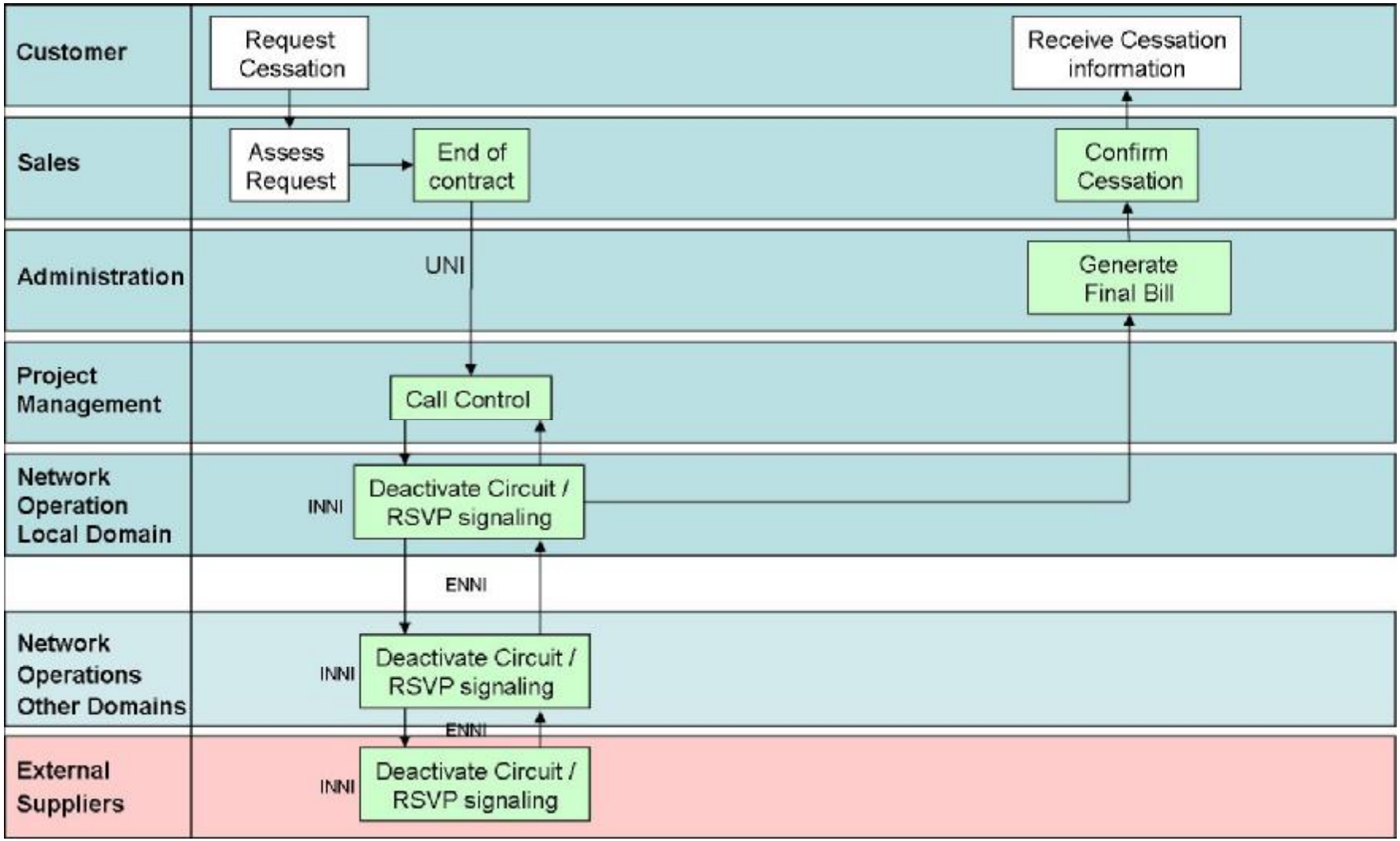
GMPLS/ASON: Expected improvements

- Compatibility between different domains
  - Standardized interfaces (UNI, NNI)
- Automatic configuration of connections
  - Call control, connection control
- Service Level Agreement (SLA)
  - Unified set of service classes

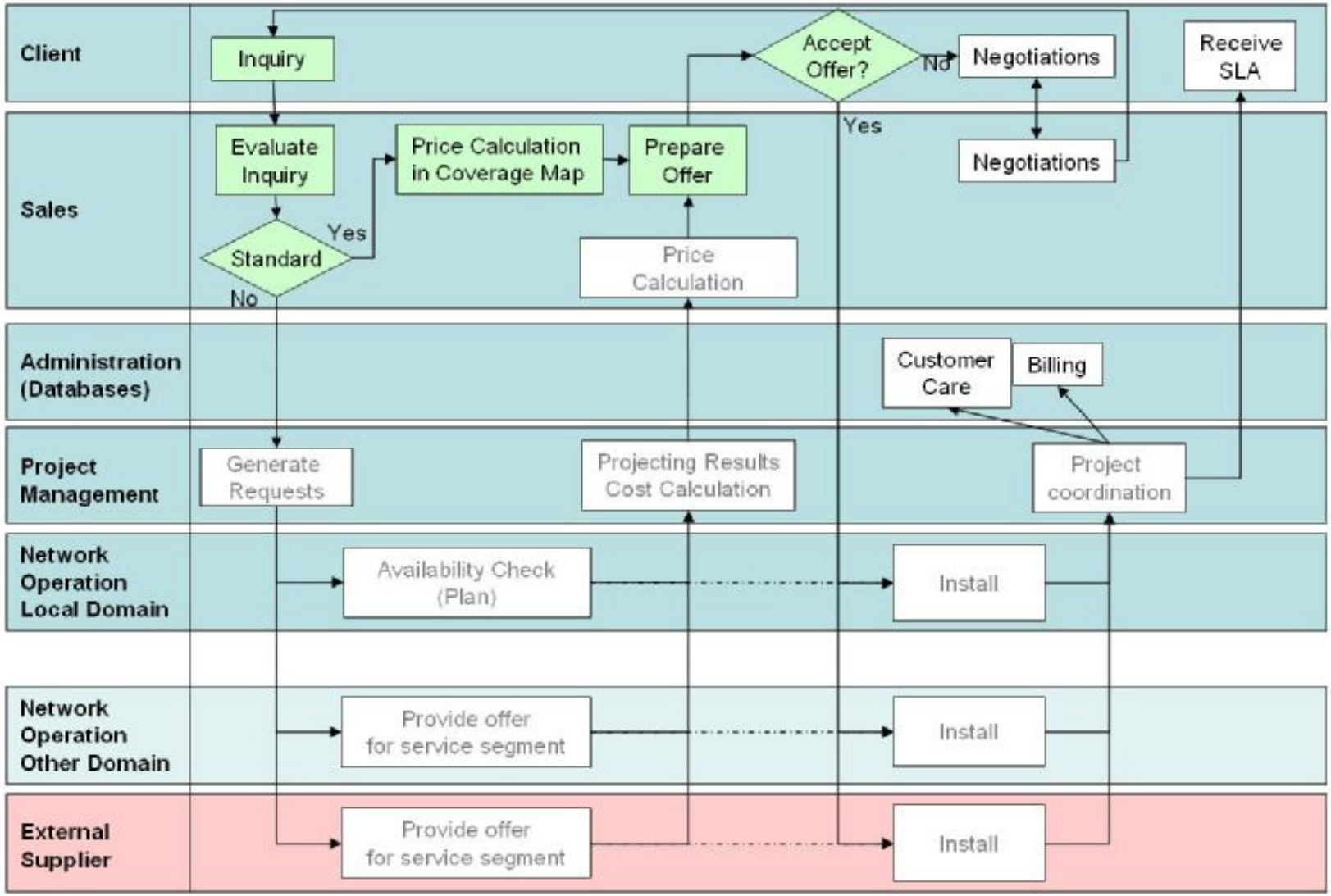
Automated service provisioning



Automated service cessation



SLA negociations



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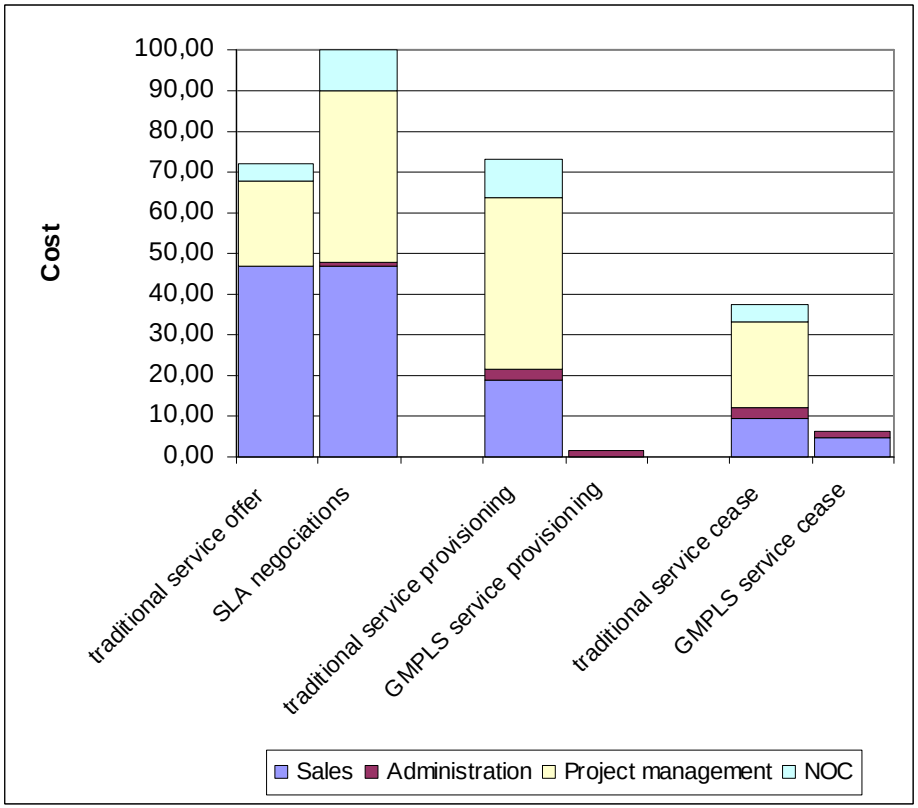
Quantitative Results

- Focus on labour costs
- Assign duration (hours) to the activities, and probabilities to the decisions
- Estimate hourly wages for each employee category
- Sum up costs for all steps
  - Gives an upper bound estimate of a given process
- Figures obtained by means of surveys and interviews

First analysis

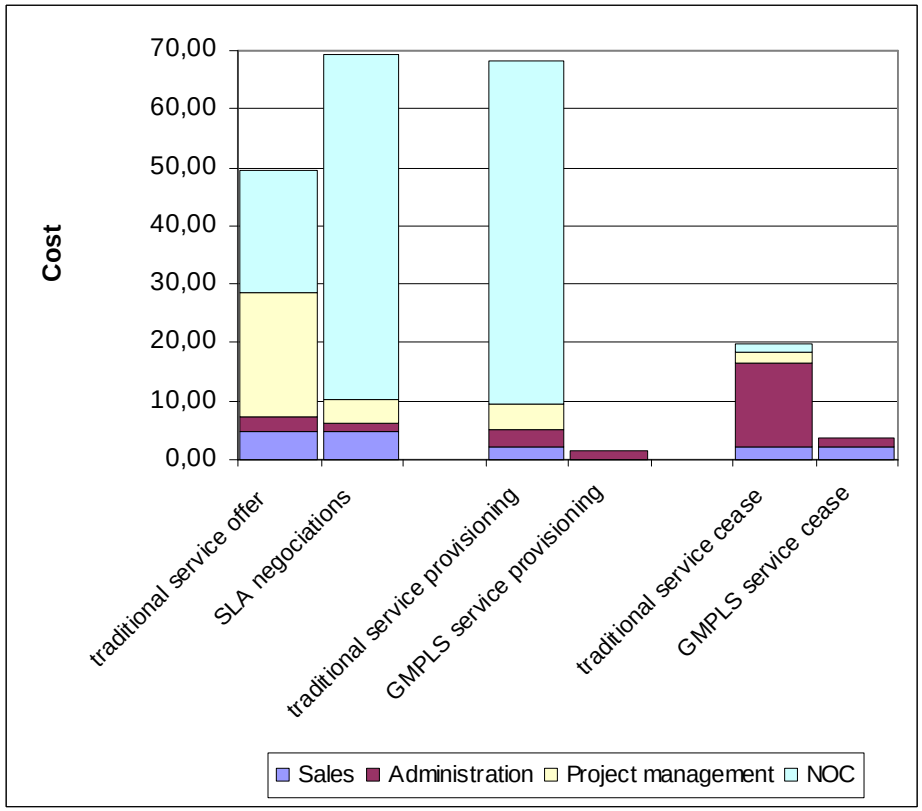
- Reveals two types of operators
  - „Incumbent“
    - More hours for sales, administration and management
  - And so called „new entrant“
    - Lower figures for these, the rest remaining in the same range
    - Due to
      - smaller network to maintain
      - Fewer types of services offered

Incumbent



- Service offer
  - Nearly as expensive as service delivery
- Service cessation
  - Less management and operations
- ASON processes
  - SLA negociations more expensive
  - Consider offer+delivery

New Entrant



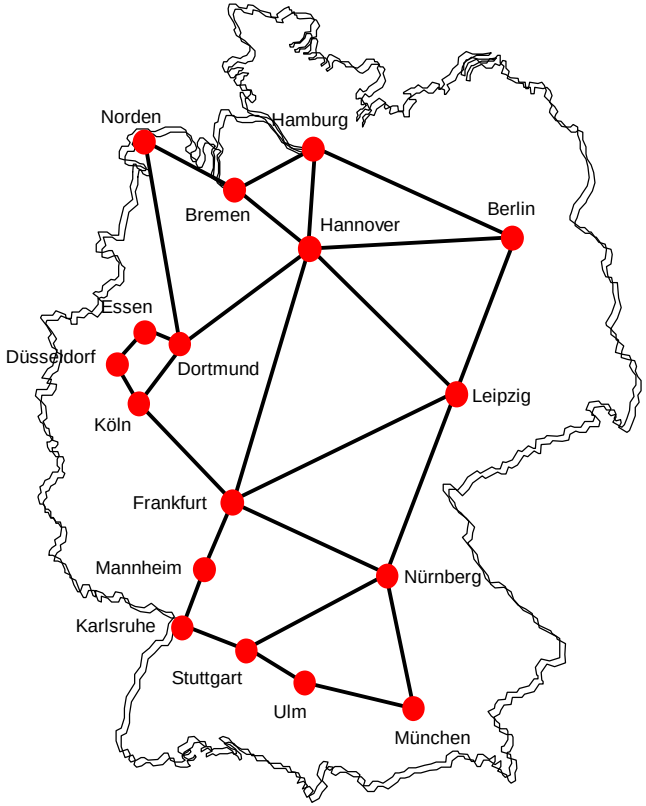
- Processes are cheaper
  - Less administration and management (smaller network)
  - But less types of services
  - Need for external supplier
    - Rental costs
    - Tests at interconnection point
- ASON processes
  - Cheaper
  - In the same proportion

Overall OPEX

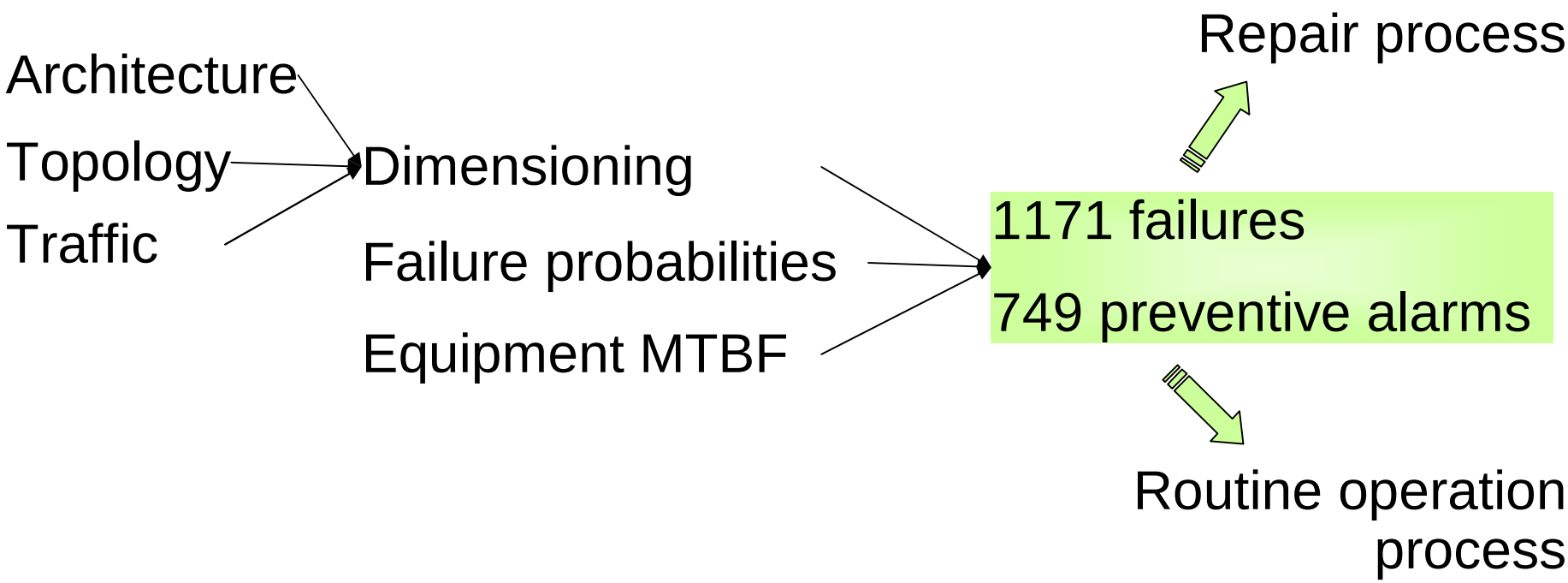
- Significant impact on OPEX related to service management
- How does it relate to other OPEX subparts?

Estimating yearly OPEX – input data

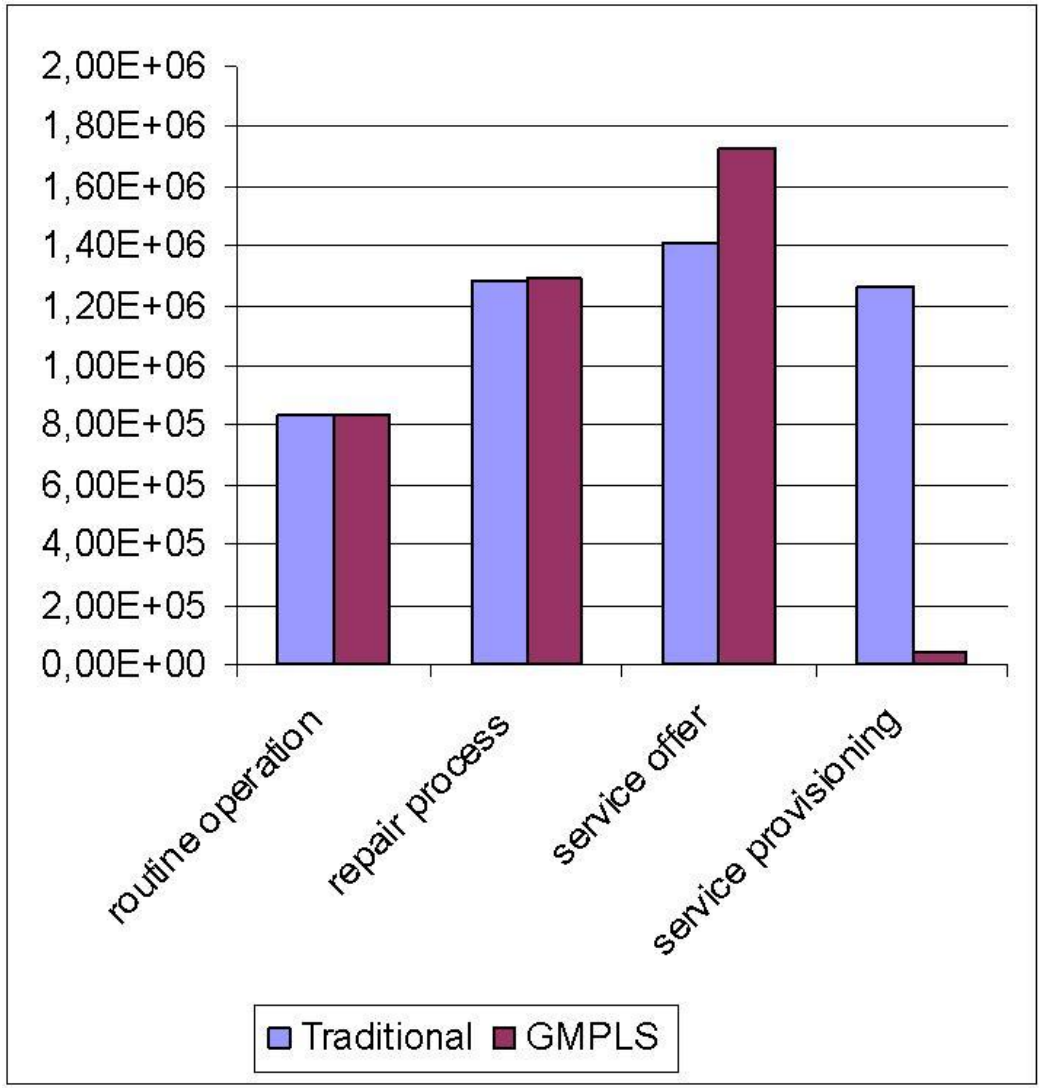
- Reference network
  - WDM network
  - 2.5 Gbps leased lines
- Traffic
  - Figures of reference network for 2004
  - Leads to a total of 1214 services in one year
  - 80% of services are standard
- Equipment
  - MTBF, life time
- Failure probabilities
  - Alarm types: preventive alarms, failure alarms
  - Failure types: external, hardware, misconfiguration/software, etc.



Estimated number of failures



Yearly OPEX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8,00E+05
6,00E+05
4,00E+05
2,00E+05
0,00E+00
routine operation
repair process
service offer
service provisioning
Traditional
GMPLS

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Conclusion

- Most network operator‘s processes are similar and can be modelled quite generically
- When looking at typical effort
  - Major differences between incumbent and „new entrants“
  - Lighter business processes, but interactions with external suppliers
- OPEX effort and cost reduction in the order of 50% for both types

Thanks for your attention

Questions?

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