Operational Cost Reduction using ASON/ASTN

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Abstract: ASON/ASTN technologies promise automated network operations, significantly reducing costs. This paper presents some results from a process-based quantitative approach analyzing the reductions in operational costs to be expected for networks operators using these technologies.

OCIS codes: 999.9999 Network control and management, Economic analysis and business cases

1. Introduction

The transport network has witnessed great evolution since the beginning of the 90's. From Plesiochronous Digital Hierarchy (PDH) to Synchronous Optical Networks (SONET) it converged now to a mixture of the SONET/SDH-based sub-networks and the WDM-based wavelength infrastructure. In order to make the optical network much more profitable, bandwidth management techniques and fast service provisioning are needed. This will enable carriers to offer different types of services, service delivery time reduction, and an increase in the customer control over his connectivity.

New technologies like ASON/ASTN (Automatic Switched Optical Network/Automatic Switched Transport Network) and standardized interfaces like the optical UNI, promise to automate the operation of telecom networks, efficiently service and use the bandwidth, and reduce the manual effort to reconfigure equipment. As for network operators this technology is expected to improve the network cost in terms of capital expenditures (CAPEX) and operational expenditures (OPEX). Some studies were conducted concerning the CAPEX side. However, so far no quantitative studies concerning the OPEX situation are available.

2. Approach

The influence of the intoduction of ASON/ASTN on OPEX can only be estimated correctly by considering the involved changes in the internal processes of the network operators. Thus, our investigations started by describing and modelling the traditional main business processes of typical network operators. They were derived from discussions with major European network operators. Once the main steps of these processes were identified, we evaluated the impact of the introduction of ASON/ASTN by looking upon how these processes will be modified [1] [2]. Having the traditional processes and those improved by ASON/ASTN we then quantified the OPEX for both cases in terms of time and salaries. Finally, we determined the potential OPEX savings that ASON/ASTN allows for each process by comparing both scenarios.

3. Considered processes

Network operations comprise all the processes and functions needed to operate a network and deliver services to customers. They include the sales department, the various support functions, the technicians and engineers for provisioning and monitoring, and some corporate processes in general. The processes which have been identified as the most technology dependent are:

- Service Offer Process: the network operator makes a contract offer at the customer's request.
- Service Delivery Process: according to the contract terms, physical delivery of the connection is carried out.
- Cease Process: end of the contract, release of the connection and recovery of equipment is carried out.
- Move and Change Process: contract update, new connection setup and release of the previous connection.
- Repair Process: action taken when a fault is reported, either by the network management or the customer.

4. Example of the service delivery process

The most striking example of automation is certainly provided by the service delivery process. In the traditional process (illustrated in Fig.1) the work is first split in several work packages which are then handed over to the different network domains or external suppliers. Each domain builds the required connectivity and then provides

assistance for the end-to-end testing under the coordination of a system engineer. Finally, databases are updated, the alarm management is activated, and a delivery report is issued.

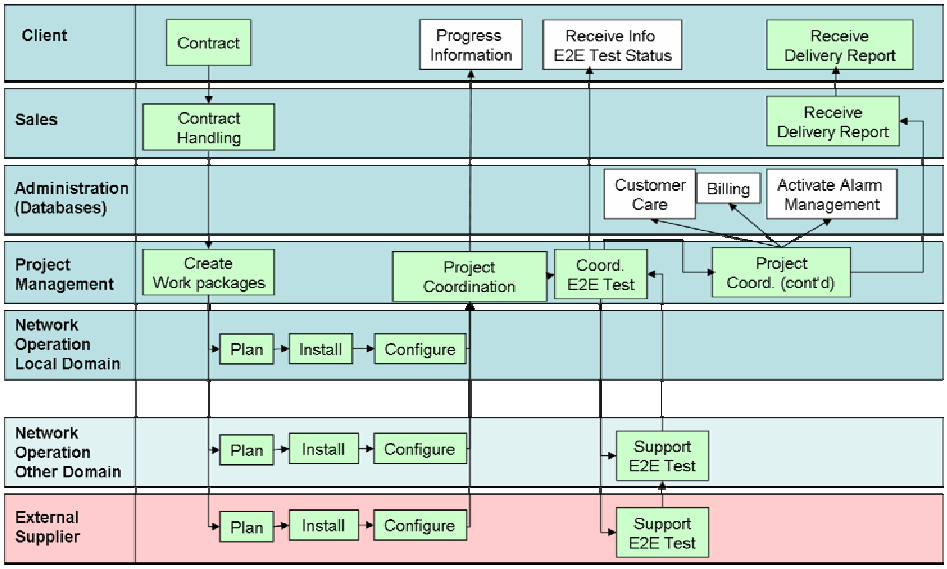

Fig. 1. Generic service delivery process

This process has then been modified taking advantage of the standardised interfaces specified in ASON/ASTN, as shown in Fig. 2. The modified process begins by signalling from the customer to the operator's control plane, asking for a connection. The signalling is done automatically over the User Network Interface (UNI), which does not require manual intervention. At the project management level, the Call Control functionality checks for availability of resources. Then RSVP signalling is used between the Internal and External Network to Network Interfaces (I-NNI and E-NNI), all the way from the local domain to external domains and suppliers. In case the response coming back is not successful, manual intervention as in the traditional process is needed.

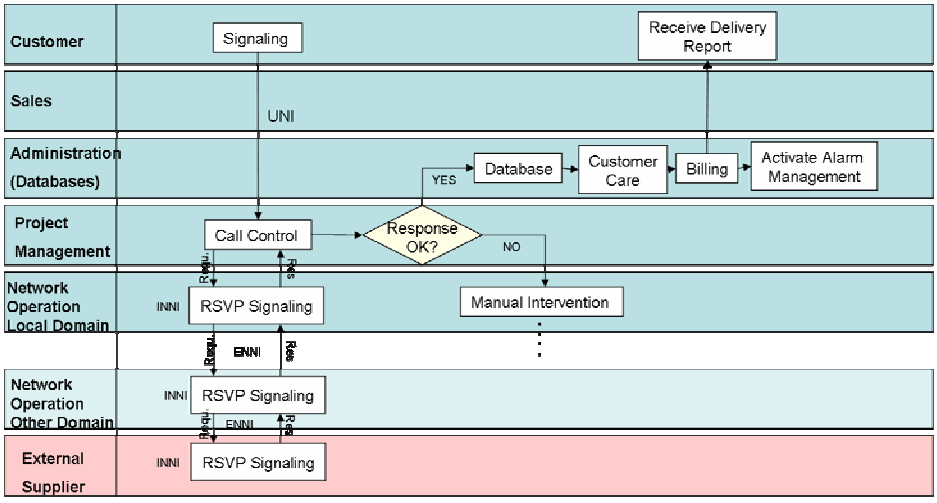

Fig. 2. Automated service delivery process

This automated process relies on the assumption that the external domains and suppliers also provide the required interfaces. If it is not the case, manual intervention is again necessary.

The cost for the previous two processes has been investigated, taking into account the amount of work, duration, required for each category of employee inside each department. The resulting values have been normalized (columns “Salary” and “Duration”) and are displayed in Table 1 and Table 2.

Table 1. Normalized cost for traditional service delivery process

Department	Employee	Salary	Main Functions	Duration	Cost
Sales	Sales person	1	Contract handling, administration	1	1
Administration	Employee	0.8	Customer care, Billing	0.25	0.2
Project Management	System Engineer	0.9	Create and coordinate work packages	2.5	2.25
Network Operation	Planning Engineer Field Technician NOC Technician	0.9 0.87 0.72	Coordinate network delivery Set up equipment at customer site Connect jumper cables, provision cross connects, circuit testing	0.12 0.37 0.12	0.11 0.32 0.09
Normalized Cost per Service					3.97

Table 2. Normalized cost for automated service delivery process

Department	Employee	Salary	Main Functions	Duration	Cost
Administration	Employee	0.8	Customer care, billing, update databases	1	0.8
Normalized Cost per Service					0.8

Of course, one cannot compare only these two processes to estimate the OPEX savings for service provisioning. Some of the network operation tasks still have to be carried out manually (set up equipment at the customer site and connect jumper cables for instance). But these are done before, during the SLA establishment (equivalent to the Service offer process mentioned). To get a meaningful result one should compare the association of service offer and service delivery for both sets of processes, which leads to an overall 51% savings per service.

5. Conclusion

With this study we were able to evaluate the operational cost savings allowed by ASON/ASTN. OPEX savings from 51% to 81% can be reached for the different processes. Therefore ASON/ASTN could be the next technology network operators are looking for. As for future work, we will continue meeting with network operators to get more accurate figures. We will also study the costs and savings when the network is not 100% ASON and finally we will investigate the migration costs needed to introduce ASON/ASTN in transport networks.

6. Acknowledgments

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7. References

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