

# Comparative Analysis of Service Level Agreement Monitoring Methods

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**Abstract** - In this paper the comparative analysis of Service Level Agreement (SLA) monitoring methods in order to avoid web-service violations is given.

**Keywords** – Service Level Agreement, Service Oriented Architecture, Web-service, Network Monitoring.

## I. INTRODUCTION

In order to achieve the required quality of provided service SLA is concluded between the service provider and service consumer. Parameters of quality, which were previously negotiated in SLA, must be fulfilled in order to provide this service properly. For such purpose different types of monitoring are used. Comparative analysis of these methods is essential for developing a qualitative web-service oriented system.

## II. MAIN PART

SLA is a formal negotiated agreement between two parties, the service provider and a subscriber, or between two service providers, that specifies, in terms of metrics, the type and level of service that can be obtained from the service provider. SLA addresses five key aspects:

- What the provider is promising.
- How the provider will deliver on those promises.
- Who will measure delivery, and how.
- What happens if the provider fails to deliver as promised.
- How the SLA will change over time.

Service Level Management is the integrated method to manage various SLAs during its lifecycles from creation to assessment. For maintenance of appropriate level of service SLA monitoring is the most important. It demands two types of input data:

- Information about parameters of SLA contract.
- Active network parameters.

Measurement of these parameters is performed in Network Management Layer (according to Telecommunications management network model) by the Network Monitoring System, and measurement data is transferred to SLA monitoring system.

We exploited three approaches of Network Monitoring (NM) [1] in our analysis, which differs from each other by the manner of capturing target data. The active monitoring approach generates test traffic periodically or on-demand, and then measures performance of test packet or response. Passive monitoring approach captures the traffic by mirroring or splitting and analyzes the captured packets. Approach with using of SNMP agents is essentially an improved and

expanded passive monitoring.

We compared three methods of SLA monitoring, which use different approaches of NM. For comparison four criteria were proposed, which are relevant to each of methods. They are:

1. Monitoring approach.
2. Point of measurement.
3. Used parameters.
4. Network overload.

The decision of measurement point choice was made in three ways: from provider's perspective, from client's perspective and by the third entity. Used parameters were measured and computed by different algorithms. We detect, that network overload can be caused by two types of overabundant data: test data and measurement data. TABLE 1 contains the summary of comparison, presented in conformity with criteria.

TABLE 1

RESULTS OF THE METHODS COMPARISON

Method A [2]	1. Active approach. 2. End-to-end measurement. Any point of network. 3. Delay, Delay Variation, Packet Loss Rate. 4. Test traffic and measurement traffic.
Method B [3]	1. Passive approach. 2. One or two network nodes, which usually are not an endpoints. 3. Inter Packet Arrival Time (mapped with Delay, Delay Variation, and Packet Loss Rate). 4. Slight amount of measurement data.
Method C [4]	1. Using agents. 2. Multiply network nodes. Monitoring by the third entity. 3. Packet Loss Rate, Delay. 4. Amount of measurement data is reduced as much as possible.

## III. CONCLUSION

Methods comparison allows to make a generic conclusion for all types of SLA monitoring. Result of this work gives an opportunity to choose most optimal method for SLA monitoring for any network in consideration of its architecture, hardware and type of service with the purpose of reducing the network overburden, saving computational resources and providing the required level of service quality.

## REFERENCES

- [1] Hyo-Jin Lee, Myung-Sup Kim and James W. Hong, Gil-Haeng Lee, "QoS Parameters to Network Performance Metrics Mapping for SLA Monitoring".
- [2] Joel Sommers, Paul Barford, Nick Duffield, Amos Ron, "Accurate and Efficient SLA Compliance Monitoring".
- [3] Rene Serral-Gracia, Yann Labit, Jordi Domingo-Pascual, Philippe Owezarski, "Towards an efficient SLA assessment".
- [4] Mun Choon Chan, Yow-Jian Lin, Xin Wang, "A Scalable Monitoring Approach for SLA Validation".

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