Metrics for Service Availability and Service Reliability in Service-oriented Intelligence Information System

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Abstract. This paper gives contribution in definition of metrics for service reliability and service availability in terms of their usage by the end-user.

Keywords: SOA, metrics, service availability, service reliability, information system, Intelligence, QoS.

1 Introduction

Contemporary Intelligence models should be based on information-commutation systems. Usage of contemporary ICT technology gives opportunity for more effective implementation of Intelligence function in terms of collecting information, planning information, analyzing information and dissemination.

2 Service Availability

Availability is service attribute, whether or not service is active or available after received request by a user.

  Presumption that information system or services in certain period of time are founded in one of numerous service states whether or not services are unavailable or available allows implementing Markov' models.

  Function for service availability in certain time moment is presented by following equation:

$$A(t) = \left(1 - \frac{\lambda_{iz}\lambda_{jz}}{r_2 r_1} \right) - \frac{\lambda_{iz}\lambda_{jz}}{r_1 - r_2} \left(\frac{e^{r_1 t}}{r_1} - \frac{e^{r_2 t}}{r_2} \right) \tag{1}$$

3   Service Reliability

Function of service reliability represents probability of service processing in certain time interval [0,t]. Intensity when service is not available for using can be presented with constant value λ=const.

Function for service reliability in certain time is presented by following equation:

$$R(t) = \frac{r_1 + \mu_{zi} + \lambda_{zj} + \lambda_{iz}}{(r_1 - r_2)} e^{r_1 t} - \frac{\mu_{zi} + \lambda_{zj} + r_2 + \lambda_{iz}}{(r_1 - r_2)} e^{r_2 t} \qquad (2)$$

Common characteristic for previously mentioned services is probability that refers to service availability in certain time during Intelligence operation. Also, zones (green, yellow, red) for determining functions of probability can be introduced (see figure 1).

Service availability	Zones
service is available for using	
service can be available for using	
service cannot be available for using	

Fig. 1. Service availability that is related to appropriate zones

Probability value of service availability allows selecting services that can be exploited in certain Intelligence operation in certain time. Introduced zones contribute to select services that can respond on the most appropriate manner.

4   Conclusion

In this paper we present estimation of probability for services in certain time moment by determination of service reliability and service availability.

References

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