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THE METHOD OF THE TRUST EVALUATION IN A COALITION OF THE INTERNET OF THINGS OBJECTS

Turkina Victoriia, EA of 602dep.,
Software Engineering and Business Faculty, National Aerospace University - Kharkov Aviation Institute.

The Internet of Things (IoT) is defined by the International Telecommunication Union and the IoT European Research Cluster as a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes and virtual personalities.

Trust management in IoT networks is important due to dynamically changing network environments and the lack of centralized authority. A mobile network is vulnerable to many attacks. Trust and reputation determining in a coalition of the IoT objects is the main part of ensure network functioning.

As the main definitions, we take the following:

1) trust (or, symmetrically, distrust) is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action, both before he can monitor such action (or independently of his capacity ever to be able to monitor it) and in a context in which it affects his own action.

2) reputation in general is an estimation how an agent will behave in the future based on observations of its past behavior.

The method of trust determinating in a coalition of the IoT objects taking into account their reputation is motivated by the two problems:

1) the coalition members need the reliability connections, which is achieved through the delegating of providing own traffic to other IoT objects,

2) the rapidly changing IoT network needs to estimate trust and reputation on small-scale statistical sampling.

The purpose of the method is to determine the mathematical background for transforming subjective trust assessments (both own and accessible nodes) into the overall trust assessment for the interaction object. A decision on the interaction mode is made taking into account the received reputation assessment and a priori subjective assessment, and then, a priori estimates taking into account the results of the interaction.

A detailed mathematical description of the method of decentralized assessment of trust to the object of interaction taking into account its reputation is set forth in the work [1].

As experimental evaluation of the effectiveness of the proposed method was used Trust and Reputation Models Simulator for Wireless Sensor Networks (TRMSim-WSN0.5 emulator) as instrumental means.

There are results of the simulation.

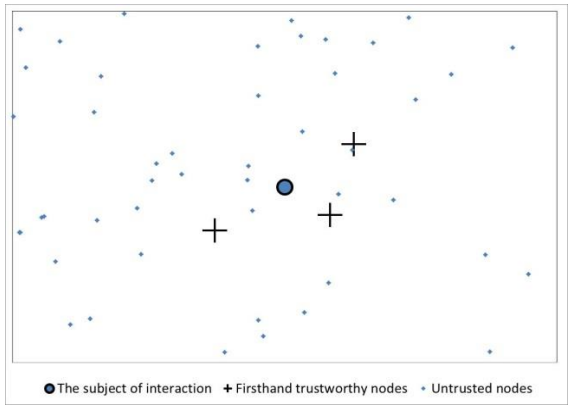

Fig. 1. The subject of interaction and its firsthand trustworthy nodes.

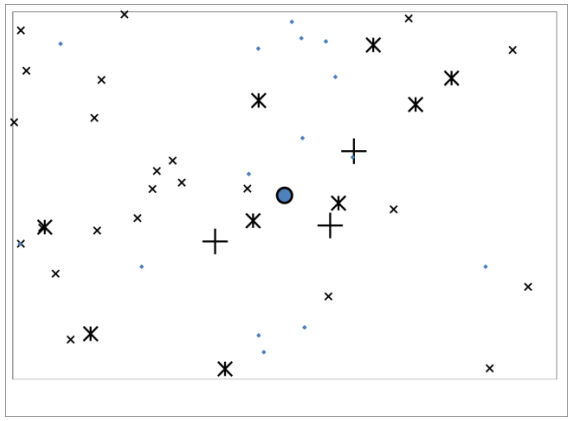

Fig. 2. Extending trust across the network, taking into account the recommendations.

It has been presented in the stable system developed mechanism can provide a good level of network objects satisfaction. In networks with a high number of malicious virtual objects, customer satisfaction is reduced significantly (to 96%). In general, the developed mechanism provides a higher level of satisfaction than conventional methods.

References

1. Vartanian V. M., Turkina V. V. Interval method of estimating the trust and reputation of mobile subscribers in the social network [Text] // Radioelectronic and computer systems. – 2017 – №1. – P. 76-83.

**Scientific advisor – Vartanian V.M., Dr.Sc., Prof., Head of department 602.*