

# Semantic Service Composition based on Social Network

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## ABSTRACT

This paper describes the research issues on semantic service composition based on social network. And our solution framework is given also.

## Keywords

Service Composition, Social Network, Trust Semantics

## 1. INTRODUCTION

Service-oriented computing (SOC) has changed the way of building software in last few years [1]. Service composition has been a research focus. In the process of service composition, we have to consider not only the service function matching but also the trustworthy semantic relationships among different services. Hence, it is very meaningful to study how to annotate or expand the trustworthy semantic in service composition and establish the corresponding modeling tools for achieving automatic and effective service composition.

The idea of Social Network (SW) can be applied into semantic service composition for the following reasons. Firstly, trust has become an important research issue in social network. For example, Jennifer et al. used trust concept in web-based social network, and mined the trust information[2]. Secondly, semantic web is close to social network. In one hand, semantic web stores and presents the social information. In the other hand, social network transforms the trust information through semantic relationship. So the ideas and methods of social network can be used to realize the semantic service composition. The service providers, service consumers and services themselves can be managed in a special social network. A service composition social network can be constructed to help implement the semantic trustworthy service composition.

## 2. Service Composition Based on SW

The requirements in service composition propose many new research issues to the application of SN. By integrating the social network and service composition, we sum up the following research issues on semantic service composition based on social network.

### 2.1 Model of Service Composition Social Network (SCSN)

Tradition social network (SN) cannot be used directly in service composition. Firstly, the node types are different. Service composition procedure involves at least three roles such as service

consumer, service provider and domain experts. Even the service itself can be thought as one kind of roles. While the nodes in traditional SN just mean the person. Secondly, the node properties must concern more service and composition elements instead of just the person attributes. Thirdly, the network relations in service composition are more complex than traditional SN. The latter may be a single network, while the former involves the relationships between networks. Thus how to model and infer these kinds of relationships are difficult works. Finally, although there exist many online social networks at present, there do not exist any practical social networks for service search, to say nothing of service composition. So how to construct and extract the special social network for service composition is also a hard nut. The traditional SN model should be improved and expanded to meet the requirement of semantic service composition.

### 2.2 Establishment of SCSN

The information including service providing and service consuming is distributed loosely. How to organize and manage these data in order to extract the SCSN is the first thing in service composition. In addition, how to extract the sub network from existing social network to form SCSN is another work should be thought about.

In terms of different roles in service composition, different sub social network can be defined. Each kind of roles can refer to one sub network. According to different composition relations, the relationships between sub networks should be defined also. Moreover, how to infer the ulterior relation should also be given.

### 2.3 Storage of SCSN

For the large number of services, service provides and service consumers in internet, how to store such numerous data is a difficult problem. Moreover, the domain requirements are variable and changed. It is necessary to provide an effective and efficient storage method in current open, dynamic and evolutive environment.

### 2.4 Trust Semantic Annotation in SCSN

For achieving automatic service composition, to study how to annotate or expand the trustworthy semantic in service composition and establish the corresponding modeling tools is necessary. Current service semantic model such as OWL-s ignore the trust attributes. No matter the trust semantics defined in SCSN are extrinsic or intrinsic, an annotation tool is requisite to setup the trust semantic in SCSN. All kinds of trust tags and their attributes should be defined. And corresponding grammar specification may need to be proposed.

## 2.5 Trust Calculation in SCSN

The purpose of SCSN is for service composition procedure which includes the following steps: service search, service evaluation, service composition and service execution. It is the semantic relationships defined in SCSN that help to select the demanded services or composition plans. How to use these kinds of information? It is just the trust calculation problem. The trust calculation can be classified into the following kinds. 1) trust in single network, for example, trust of user, trust of provider or trust of services. 2) trust between different network, for example, trust between provider and user or between provider and service.

## 3. Solution Framework

Based on the above discussions, we design the SCSN prototype system for service composition as depicted in figure 1.

The semantic extraction and social network construction module extract the trust semantic and construct the SCSN, including the following tasks: 1) definition and presentation of trust concepts and trust properties; 2) extraction of association relation such as using, providing, evaluating and recommending relationships in service composition.

Social network storage module uses the store method to store the SCSN.

Trust computing module makes use of the trust relation to calculate the trust ranking of services, including the following tasks: 1) calculation of intrinsic trust ranking; 2) calculation of extrinsic trust ranking; 3) synthetical calculation of service trust.

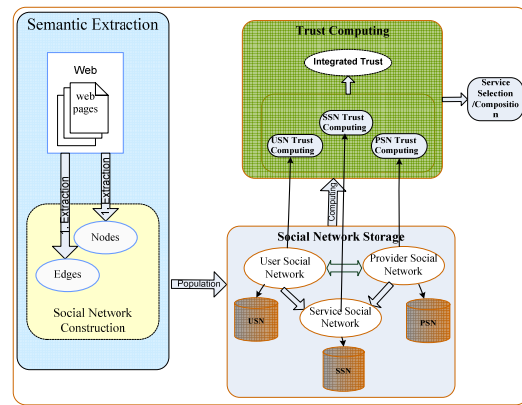


Figure 1. SCSN Solution Framework.

## 4. Conclusions

This paper proposes a semantic service composition technology based on Social Network. The research issues on semantic service composition based on social network are described. And our solution framework is given also.

## 5. REFERENCES

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