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Enhancing Privacy Preservation of Web Service through Negotiation Mechanism

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ABSTRACT: Web service composition is a web technology which is use for combining the information from multiple sources into single application. With the help of this web service we can collected the large amount of data. Web Service is a technique provides a special type of composition application that aims at integrating data from multiple data provider depending on user request. DaaS depend on the specified useful data can be supplied according to the user demand. The main use of DaaS is eliminating redundancy and reduces associated expenditures. It modifies the data via single update point for multiple users. This paper proposes a formal privacy model in order to extend DaaS description with privacy capabilities. DaaS composition approach allowing verifying the compatibilities between privacy requirements and policies in DaaS composition.

KEYWORDS: SERVICE COMPOSITION, DAAS SERVICE, PRIVACY, NEGOTIATION, SERVICE ORIENTED ARCHITECTURE

I. INTRODUCTION

There is a growing interest in using Web services as a reliable medium for data sharing among different data providers and users. Recently, enterprises are using service oriented architecture for data sharing in Web by putting data sources behind web services instead of creating database applications. These types of web services are called as Data-providing (DP) Web services. In DP web services there is a challenge to provide a broad spectrum of enterprises the capability to exploit the data and information that is normally stored in distributed and heterogeneous information systems. Also introduces a model of web service system that integrates distributed data sources and facilitates sharing of data through web services. The web services are built on top of existing data sources and the system enables the exchange of data through services. We also discuss service selection and query rewriting techniques for processing queries over data providing web systems.

The term “Web Service” was and still is quite a buzzword. The definition ranges from the quite loose “any services that is available over the web” to the more concrete. The World Wide Web Consortium (W3C) defines a web service as the following. The World Wide Web is more and more used for application to application communication. The programmatic interfaces made available are referred to as Web services. The “Web” in web services is actually a misuse: the term “Internet Services” would be more appropriate. Web refers to Hyper Text Transfer Protocol (HTTP) and the World Wide Web, whereas the word “Internet” refers to the larger network of computers on multiple protocols. A web service can use any of these protocols to pass a message, not just HTTP. Web services have been around since at least 1999, making them a relatively new technology that has gotten lots of press and praise. There is no secret behind web services that will instantly make everything better or work together.

Web services have recently emerged as a popular medium for data publishing and sharing on the Web [8]. Modern enterprises across all spectra are moving towards a service-oriented architecture by putting their databases behind Web services, thereby providing a well-documented, platform independent and interoperable method of interacting with their data. A web service is a software function provided at a network address over the web or the cloud, it is a service that is "always on" as in the concept of utility computing. DaaS (Data-as-a-Service) Services where services correspond to calls over the data sources. It is a cousin of software as a service. DaaS have started to be popular medium for the data publishing and sharing on the web. Most of the enterprises across all spectra are moving towards service oriented architecture by wrapping their data source in DaaS services. It is use for Business to Business (B2B) interaction. This

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new type of services is known as DaaS (Data-as-a- Service) services [1] where services correspond to calls over the data sources. DaaS sits between services-based applications (i.e., SOA-based business process) and an enterprise's heterogeneous data sources. They shield applications developers from having to directly interact with the various data sources that give access to business objects, thus enabling them to focus on the business logic only. While individual services may provide interesting formation or functionality alone in most cases, user queries require the combination of several Web services through service composition. In spite of the large body of research devoted to service composition over the last years [4]. Service composition remains a challenging task in particular regarding privacy. In a nutshell, privacy is the right of an entity to determine when, how and to what extent it will release private information [6]. Privacy relates to numerous domains of life and has raised particular concerns in the medical field, where personal data, increasingly being released for research, can be or have been, subject to several abuses, compromising the privacy of individuals [3]. Web service composition is a web technology that combines information from more than one source into a single web application. This technique provides a special type of composition application that aims at integrating data from multiple data providers depending on the user's request. The automatic selection, composition, and interoperation of Web services to perform some task, given a high-level description of an objective. A web service is any piece of software that makes itself available over the internet and uses a standardized XML messaging system. XML is used to encode all communications to a web service.

II. OBJECTIVE

Data as a Service (DaaS) builds on service-oriented technologies to enable fast access to data resources on the Web. However, this paradigm raises several new privacy concerns that traditional privacy models do not handle.
In addition, DaaS composition may reveal privacy-sensitive information. In this a formal privacy model in order to extend DaaS descriptions with privacy capabilities.

The privacy model allows a service to define a privacy policy and a set of privacy requirements. A privacy-preserving DaaS composition approach allowing verifying the compatibility between privacy requirements and policies in DaaS composition.

A negotiation mechanism that makes it possible to dynamically reconcile the privacy capabilities of services when incompatibilities arise in a composition validate the applicability of proposal through a prototype implementation and a set of experiments.

III. LITERATURE SURVEY

The term Web service has been around since SOAP protocol was introduced in the late 1990s. With SOAP, a standard messaging format was born for exchanging messages between applications exposed to the Internet. An accompanying standard, Web Service Description Language (WSDL), made it possible to describe a list of operations exposed by a particular Web service, and associate an XML schema for operation messages. SOAP and WSDL were the first widely adopted standards geared toward interoperability between operating and technology platforms. Very soon after their introduction a slew of extended standards began to surface all with the goal of enhancing distributed and interoperable communications.

The term "Web Services" is generally used to describe a collection of protocols and standards that are used to facilitate interoperability between applications. One of the major factors for their success is the fact that they are built upon existing Internet standards such as XML [3] and HTTP . This allows for high levels of scalability and interoperability that previous distributed architectures could not provide. One of the main enabling technologies for performing remote procedure calls (RPCs) using Web Services is SOAP, the Simple Object Access Protocol. SOAP is an XML-based protocol for packaging messages and facilitating RPC-style communication between clients and servers (and is capable of performing many other tasks as well). For a full description of SOAP, see [5]. SOAP's use in STMS [8] is to provide a protocol- and platform-agnostic format for encoding objects in RPC-style communication.

In 2014, Salah-Eddine and Michale Mrissa has proposed a paper "Privacy-Enhanced Web Service Composition", they proposed a dynamic privacy model for Web Services. This model deal with the privacy at the

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data and operational level. This paper proposed a Negotiation approach to tackle the incompatibilities between privacy policies and the requirements. For the specific purpose privacy polices is provided for the data and operational level. Privacy policies are used only for the private data. According to the user demand the negotiation privacy policies is provided to the data. Privacy policies always reflect the usage of private data as a specifies or agreed upon by service provider [1].

In 2014 Ms.M.Sabrabeebe and Ms.C.Nancy Nightingale has proposed a paper "Protecting Web Service Composition From Privacy Attacks Using Dynamic Privacy Model" they proposed Web service composition is a web technology that combines information from more than one source into a single web application. This technique provides a special type of composition application that aims at integrating data from multiple data providers depending on the user's request. In addition, DaaS (Data as a Service) composition may reveal privacy sensitive information. When enforcing a traditional privacy preserving model, such as privacy model and negotiation, the composed data would suffer from the problem known as the curse of privacy attacks. This paper is used to propose a new dynamic privacy model in order to extend DaaS composition with privacy capabilities and to enable fast access to data resources on the Web. This dynamic privacy model makes it possible to dynamically reconcile the privacy capabilities of services when incompatibilities arise in DaaS composition [2].

In 2012 Omid Banaei and Siavash Khorsandi they proposed the work on "A New Quantitative Model for Web Service Security" with the help of this model, they provided the sercurity for the web services. Security is one of important QoS properties of web services that need to be quantified. Quantifying Security can help both in selecting among published web services and also in assessing security weaknesses of services by service providers. In this paper they propose a three level hierarchical architecture for web service security. In this architecture they consider all of important aspects of security that they are: authentication, integrity, authorization, confidentiality, availability and non repudiation. For each aspect is considered the most important web service threats. Furthermore they consider likelihood and impact factor for each threat. Then they compute weight of each impact with using AHP and finally total security index is computed with weighted averaging. They propose a framework for assessing web service security. This framework considers top 10 web service security threats and their impacts on above security services. Also popular web service security scanners are introduced for discovering vulnerabilities [3].

In 2012, Rui André Oliveira, Nuno Laranjeiro, Marco Vieira proposed a paper, "Experimental Evaluation of Web Service Frameworks in the Presence of Security Attacks", In this paper they studied the behavior of well-known web services frameworks in the presence of security attacks targeting the core web services specifications, i.e., those enabling basic message exchange functionalities. Results show that frameworks are quite resistant to attacks. However, they also indicate that even very popular and highly tested frameworks can be vulnerable to attacks, with potentially catastrophic consequences for the services being deployed. In this paper, they proposed an experimental approach to evaluate the security of well-known and widely used web service stacks, namely: Metro 2.1.1, Apache CXF 2.5.1, Apache Axis 2 version 1.6.1, and Apache Axis 1 version. The approach is based on a set of attacks that have been compiled from diverse security research studies, current security tools, and field experience, and that target core WS messaging features . The compiled attacks are used in a set of runtime tests performed to assess the behavior of the frameworks in presence of malicious requests. Frameworks are then classified with the use of an adaptation of the CRASH scale [4].

In 2011, Chi Po Cheong, Chris Chatwin, Rupert Young presented a paper on , "A New Secure Token For Enhancing Web Service Security", This paper proposes a new secure token for improving the existing Web Service Security standards which provide message integrity and message confidentiality. Service Oriented Architecture (SOA) is widely adopted and most of them use Web Services implemented using a Simple Object Access Protocol (SOAP), an XML document or message exchanges between sender and receiver using HTTP protocol. Security is critical because the message is transferred around a public network, the Internet. Whilst current Web Service Security Standards protect the message; the location of the message sender is not authenticated, this can be provided using the proposed token. This paper presents a brief introduction to XML and Web Services security standards and their relationship. A new secure token has been proposed and it can be used for the authentication of a remote client location [5].

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In 2011 Tristan Lavarack and Marijke Coetzee they proposed work on "Web services security policy assertion trade-offs" with the help of this work they provided security polices for the web services. Web services security requirements and capabilities are described in security policies. To enable the seamless interoperation between services, security policy intersection aims to provide a security policy that will satisfy both the service provider and consumer. Not only are there numerous problems with this approach, but is it also difficult for administrators to evaluate the resultant security level supported by such a policy. In contrast to this approach, security policy trade-off analysis can allow parties to make compromises to accommodate each other, while still achieving a satisfactory security level. This paper focuses on modeling the decisions and compromises to be made by web services providers or consumers to be able to interact with each other securely. The security policy support system built to model this problem employs domain vocabularies, fuzzy techniques and domain-specific preferences. This research introduces the use of fuzzy techniques for trade-off analysis for web services security policies. Administrators specify an initial set of security preferences and security goals using fuzzy linguistic terms to make it easier to express themselves and understand the results of the analysis. The system supports an operational security level, to alert administrators of changes [6].

In 2010 Farhan Hassan Khan, M.Younus Javed and Saba Bashir has proposed a paper "QoS Based Dynamic Web Services Composition &Execution" they proposed web services for the industrial purpose. Existing technologies of web services are extended to give value added customized services to customers through composition. Automated web service composition is a very challenging task. This paper proposed the solution of existing problems and proposed a technique by combination of interface based and functionality based rules. The proposed framework also solves the issues related to unavailability of updated information and inaccessibility of web services from repository/databases due to any fault/failure. It provides updated information problem by adding aging factor in repository/WSDB (Web Services Database) and inaccessibility is solved by replication of WSDB. We discussed data distribution techniques and proposed our framework by using one of these strategies by considering quality of service issues. Finally, our algorithm eliminates the dynamic service composition and execution issues, supports web service composition considering QoS (Quality of Service), efficient data retrieval and updating, fast service distribution and fault tolerance execution issues, supports web service composition considering QoS (Quality of Service), efficient data retrieval and updating, fast service distribution and fault tolerance. The research lies in the field of dynamic web services composition selection. In this paper they discussed the main problems faced by dynamic web services composition. This paper proposed the dynamic web services composition algorithm to solve the composition issues related to data distribution, reliability, availability and QoS. It presented a framework in which multiple repositories and WSDBs have been introduced in order to make system more reliable and ensure data availability [7].

In 2015 Prof.Amit Sahu and Ms.Ankita Datir they proposed a paper " A Review on Enhancing Privacy Preservation of Web Service through Negotiation Mechanism" they proposed the work on Data As A service. In this paper they proposed a number of techniques for enhancing the privacy. DAAS is use for collecting the large amount of information. With the help of that web services it collect the large amount of data. Web service composition is a web technology which is use for combining the information from multiple sources into single application. This technique provides a special type of composition application that aims at integrating data from multiple data provider depending on user request. DaaS depend on the specified useful data can be supplied according to the user demand. The main use of DaaS is eliminating redundancy and reduces associated expenditures. It modifies the data via single update point for multiple users. This paper proposes a formal privacy model in order to extend DaaS description with privacy capabilities. DaaS composition approach allowing verifying the compatibilities between privacy requirements and policies in DaaS composition. This paper proposed different types of binding mechanism and dynamic privacy model on web service [8]. Proposed system design

In this work propose a compatibility matching algorithm to check privacy compatibility between component services within a composition. The compatibility matching is based on the notion of privacy subsumption and on a cost model. A matching threshold is set up by services to cater for partial and total privacy compatibility. The result of a composition is a set of component DaaS services which must be composed in a particular order depending on their access patterns (i.e., the ordering of their inputs and outputs parameters), to check the privacy compatibility within composite services. In a web services environment a provider supplies a set of services to consumers . The

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Simple Object Access Protocol (SOAP) is used for exchanging XML-based messages between the consumer and the provider over the network (usually using HTTP). In a typical web services interaction the consumer (client) sends a request SOAP message to the provider (the server). After processing the request, the server sends a response message to the client with the results. A service may include several operations and is described using WSDL (Web services Description Language) . As shown in Figure 1, the core software components supporting this scenario and allowing end-to-end communication between clients and servers are: 1) a web services framework (such as Apache Axis or Metro); 2) a web server (e.g., Apache Tomcat), in a typical interaction, a client sends a SOAP message via HTTP. When it reaches the server, the HTTP connector handles and processes the incoming HTTP request, retrieves the SOAP message and delivers it to the web service framework. The framework then processes and delivers the SOAP message to the actual service implementation (i.e., the application). In short, the framework validates each message and transforms it in an object that can be handled by the application. After this object is processed by the application, the reverse path is taken, with the return object being serialized into a SOAP response that is sent via HTTP to the client . A study is presented in with the goal of characterizing the performance of SOAP frameworks. The work uses distinct arrays to study the cost of the serialization and deserialization processes of XML parsers. Memory footprint is seen as crucial factor for deploying web services. The causes of low performance observed in many XML-based applications (e.g., XML parsers and web services) are discussed in. The authors conclude that parsing XML documents frequently generates intensive memory allocation operations with typically long-lived objects. Arrays occupy large portions of space during regular XML processing, thus being a key element in security attacks that target memory depletion. Memory is again seen as a key factor for deploying services.

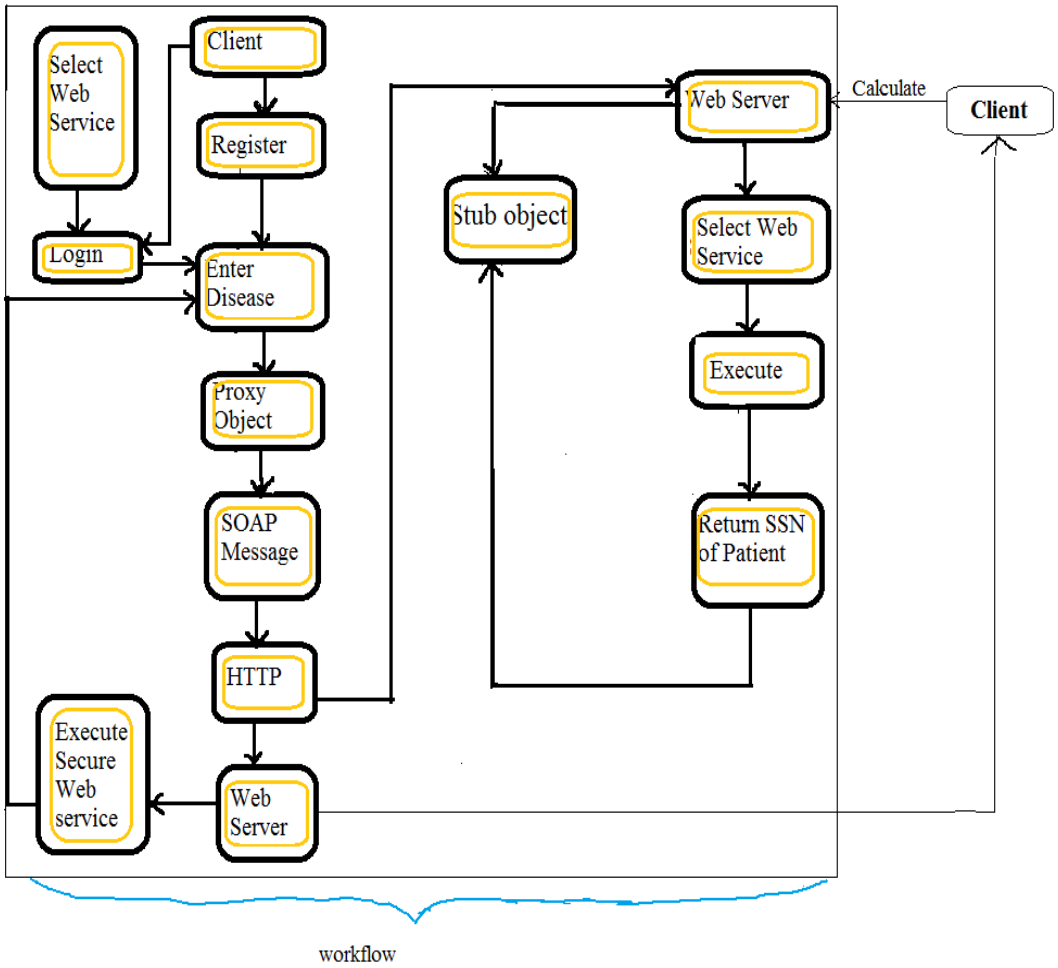

Figure 1. DFD of System Design

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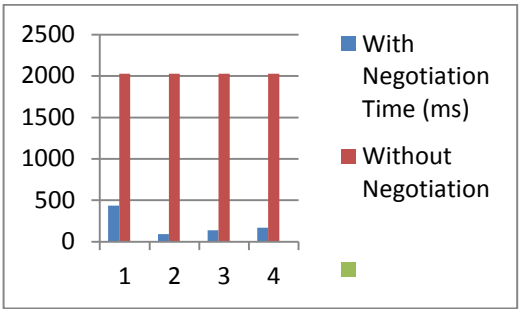
IV. EXPERIMENTAL RESULT

Comparison Between Negotiation and Without Negotiation Mechanisms

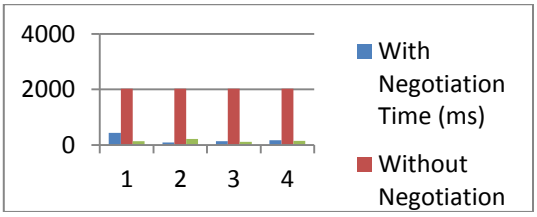
Below graph indicate the comparison between negotiation and without negotiation mechanism for the data set depending upon existing and proposed approach. From the below graph we can analyzed that time required for the data set using proposed system significantly reduce over existing approach.



Graph 1:Comparsion between with negotiation and without negotiation

Comparison Between Negotiation, without Negotiation Mechanisms and encryption

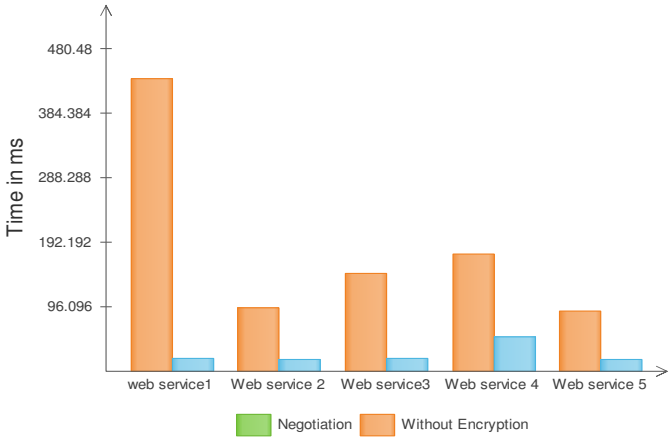
Below graph indicate the comparison between negotiation, without negotiation mechanism and encryption for the data set depending upon existing and proposed approach. From the below graph we can analyzed that time required for the data set using proposed system significantly reduce over existing approach.



Graph 2: Time comparison graph between Negotiations, without Negotiation Mechanism encryption

Comparison between negotiation and without encryption for the data set

Below graph indicate the comparison between without negotiation and encryption for the data sets depending upon existing and proposed approach. From the below graph can analyzed for data set using proposed system is less thanexisting approach.



Graph: 3 Time comparisons between negotiation and without encryption

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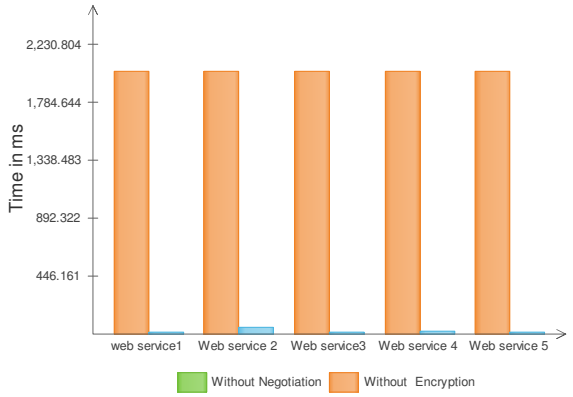
Comparison between without negotiation and without encryption

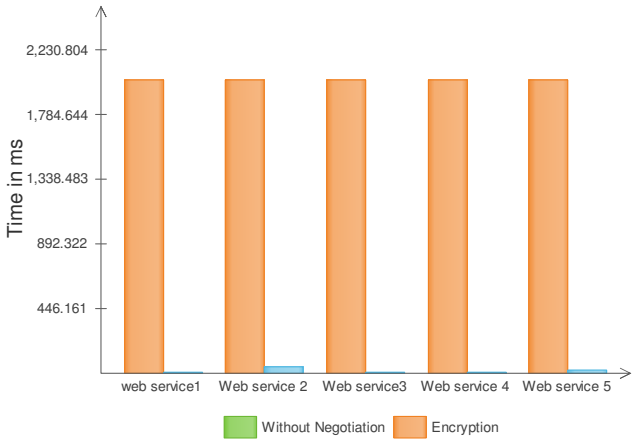
Below graph indicate the comparison between without negotiation and without encryption for the data sets depending upon existing and proposed approach. From the below graph can analyzed for data set using proposed system is less than existing approach.



Graph: 4 Time Comparison between without negotiation and without encryption

Comparison between without negotiation and encryption

Below graph indicate the comparison between without negotiation and encryption for the data sets depending upon existing and proposed approach. From the below graph can analyzed for data set using proposed system is less than existing approach.



Graph: 5 Time Comparison between without negotiation and encryption

V. CONCLUSION

In this work implementing a Data as a service dynamic privacy model for Web services. The model with privacy at the data and operation levels. Provide data Encryption with WCF binding. In any case, privacy policies always reflect the usage of private data as specified or agreed upon by service providers. The Web Services interface provides a standard framework for performing queries on authenticated dictionaries over the Internet. Additionally, it allows clients to spend less code dealing with the serialization, canonicalization, and communication of data by delegating those tasks to already implemented standards. This, in turn, motivates smaller, simpler clients on many different possible platforms.

In this work, presented literature review considering the area of web services supply chains and the need for QoS optimization in such supply chains. The gaps in various dimensions such as conceptual gap, QoS gap and the method

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gap are identified and pointed out. The current methods used, the QoS attributes considered and various other dimensions of the literature are classified and presented clearly for understanding the need for considering this new area of research.

Also proposed a negotiation approach to tackle the incompatibilities between privacy policies and requirements. Although privacy cannot be carelessly negotiated as typical data, it is still possible to negotiate a part of privacy policy for specific purposes. In any case, privacy policies always reflect the usage of private data as specified or agreed upon by service providers. As a future work, we aim at designing techniques for protecting the composition results from privacy attacks before the final result is returned by the mediator.

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BIOGRAPHY

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