Abstract

WEB SERVICE

2011 - 2012

01

A distributed and Dynamic System for Detecting Malware

Web-based malware is becoming a more serious security issue every day as web services become a bigger part of the Internet. The cost of detecting malware based on web page crawling increases exponentially the more pages beneath the main page are scanned. In this paper, we propose a dynamic method to detect malware when a user connects to a web page infected by malware. Then, we also devise a server-based system which consists of the proposed method and a server which maintains lists of web sites that contain malware. By giving these tools to many distributed web browser users, all those users get to participate in malicious web site detection and feedback. As a result, we can dynamically detect a lower link level of web sites in a distributed manner.

02

A Flexible Data and Sensor Planning Service for Virtual Sensors Based on Web Service

How to achieve a flexible data and sensor planning service to schedule, plan, and empower diverse sensors and heterogeneous data ordering systems is a big challenge. In this paper, a service-oriented framework of data and sensor planning service for virtual sensors is proposed. The framework includes an Open Geospatial Consortium (OGC)-compliant Sensor Planning Service (SPS), a Web Notification Service (WNS), a Sensor Observation Service (SOS), and virtual sensors. There are two important key technologies in this framework, namely a flexible SPS middleware and an asynchronous message notification mechanism. The flexible SPS middleware, based on a configuration file and standard interfaces, is adopted to integrate virtual sensors into a sensor Web. A WNS-based asynchronous notification middleware is used to inform the user of the status of a task that may need midterm or long-term actions. The framework has been successfully demonstrated in application scenarios for Simplified General Perturbations Satellite Orbit Model 4 (SGP4) and Earth Observation System Clearing House (ECHO). The results show that the proposed method has the following improvements over the existing SPS implementation: a uniform planning service for more satellites, a seamless connection with data order systems, and a flexible service-oriented framework for virtual sensors.

03

A New Security Model Based on Fingerprint Recognition for Personal Learning

The current practice of password-based security for PLEs in general and the Internet in particular is inadequate. The widespread authentication mechanism of username and password is out-dated, and does not meet current needs. Intruders and hackers have also learnt, and become more tech-savvy. Besides, remembering a plethora of long passwords and passphrases, sometimes as many as 15 or 20, is cumbersome. This raises the need to introduce a better and more reliable authentication mechanism which is not dependent on a series of characters, but rather on a technology that is unique and only possessed by the individual. Similar services already exist, and they are good in some situations, but prove to be inadequate under other circumstances. In this paper, we propose a one-stop solution to eliminate all these problems, named FingerID. This solution will make the experience of access to distributed web accounts a more secure, accessible and usable one. This solution has been developed, tested, and proven. The findings of this paper will revolutionise the entire authentication mechanism on the web, and thereby enable the user access to distributed accounts at a single point.

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A Petri Net Approach to Analyzing Behavioral Compatibility and Similarity of Web Services

Web services have become the technology of choice for service-oriented computing implementation, where Web services can be composed in response to some users’ needs. It is critical to verify the compatibility of component Web services to ensure the correctness of the whole composition in which these components participate. Traditionally, two conditions need to be satisfied during the verification of compatibility: reachable termination and proper termination. Unfortunately, it is complex and time consuming to verify those two conditions. To reduce the complexity of this verification, we model Web services using colored Petri nets (PNs) so that a specific property of their structures is looked into, namely, well-structuredness. We prove that only reachable termination needs to be satisfied when verifying behavioral compatibility among well-structured Web services. When a composition is declared as valid and in the case where one of its component Web services fails at run time, an alternative one with similar behavior needs to come into play as a substitute. Thus, it is important to develop effective approaches that permit one to analyze the similarity of Web services. Although many existing approaches utilize PNs to analyze behavioral compatibility, few of them explore further appropriate definitions of behavioral similarity and provide a user-friendly tool with automatic verification. In this paper, we introduce a formal definition of context-independent similarity and show that a Web service can be substituted by an alternative peer of similar behavior without intervening other Web services in the composition. Therefore, the cost of verifying service substitutability is largely reduced. We also provide an algorithm for the verification and implement it in a tool. Using the tool, the verification of behavioral similarity of Web services can be performed in an automatic way.

A Research of On-Line Static Security Analysis Based on WEB Services

The constantly improvement of communication help the technology of WEB services find its way to the power dispatching system. Given WEB services are actively popularized and applied in this field, it is necessary to develop a series of application softwares for power system analysis based on WEB platform. Static security analysis plays an important role in power grid’s security analysis. However, with the proceeding of Intelligent Grid construction and the completion of connections between regional grids, it is a huge amount of data that operators have to deal with during their work. Now how to evaluate the fluency of any contingency to grid’s operation, quickly and precisely, has become a hot issue. This paper proposes an efficient algorithm of power flow calculation based on WEB services, which could decrease the time and memory calculation takes. Then give an detailed program of on-line static security analysis. Finally take an EPRI 36 system for example to verify the program’s feasibility. As the presentation shows in this paper, it proves that the algorithm and program are reliable and precise.

A Web services and agents-based approach for a better interoperability of enterprises

The interoperability of enterprises is a challenging goal that could be achieved by different approaches and among them the federated ones where different enterprises can interoperate without any particular effort and where the dynamism and the autonomy aspects are supported. In the same time, many technologies have known a considerable success these few years. In one hand, the Web service technology is used to support interoperability but it is still not able to support the dynamism and the autonomy aspects. In the other hand, the agent technology is strongly recommended to support these aspects. In this paper, we propose a novel approach that combines these two technologies for a better interoperability of enterprises. Our approach includes a process that allows Web services, which represent the business functionalities of
enterprises, to be discovered, invoked, and composed by agents representing these enterprises. The interoperability mechanism is based on the negotiation on these services. Our approach includes also an architecture supporting this process.

Data mashup is a web technology that combines information from multiple sources into a single web application. Mashup applications create a new horizon for different services like real estate services, financial services and others. The ability to preserve privacy in mashuped datasets and in the same time provide accurate recommendations becomes a key success for the experiment results.

Therefore, intrusion detection systems, which can effectively detect intrusion accesses, have attracted attention. This paper describes a novel fuzzy class-association-rule mining method based on genetic network programming (GNP) for detecting network intrusions. GNP is an evolutionary optimization technique, which uses directed graph structures instead of strings in genetic algorithm or trees in genetic programming, which leads to enhancing the representation ability with compact programs derived from the reusability of nodes in a graph structure. By combining fuzzy set theory with GNP, the proposed method can deal with the mixed database that contains both discrete and continuous attributes and also extract many important class-association rules that contribute to enhancing detection ability. Therefore, the proposed method can be flexibly applied to both misuse and anomaly detection in network-intrusion-detection problems. Experimental results with KDD99 Cup and DARPA98 databases from MIT Lincoln Laboratory show that the proposed method provides competitively high detection rates compared with other machine-learning techniques and GNP with crisp data mining.

This paper proposes an integration platform for mobile services, based on Service Oriented Architecture (SOA) and Semantic Web technologies. With the rapid growth in number of mobile services there is a genuine need for a common platform to allow interoperability and reusability regardless of the underlying structure of each service. We have introduced an ontological approach to designing a platform which enables registration of mobile service providers and users as semantic web services. A meta-ontology has been designed as the core element of the platform to coordinate the overall process of registration and discovery and to enable interoperability between heterogeneous services. The meta-ontology supports the SOA concept and makes the process of service discovery robust by serving as a structuring basis and central reference point. The ultimate objective is to provide an integration platform to allow interoperability of heterogeneous applications operating in a mobile environment with a
view to enhance service discovery considering mobile, domain and environmental attributes of the services and users. As at present, parts of the meta-ontology have been implemented and the process of registration verified, together with concomitant service discovery. Setting the scene for verifying interoperability of mobile services is taking place using “Mobile Telemedicine” as a use case.

### 10 Building Association Link Network for Semantic Link on Web Resources

Association Link Network (ALN) aims to establish associated relations among various resources. By extending the hyperlink network World Wide Web to an association-rich network, ALN is able to effectively support Web intelligence activities such as Web browsing, Web knowledge discovery, and publishing, etc. Since existing methods for building semantic link on Web resources cannot effectively and automatically organize loose Web resources, effective Web intelligence activities are still challenging. In this paper, a discovery algorithm of associated resources is first proposed to build original ALN for organizing loose Web resources. Second, three schemas for constructing kernel ALN and connection-rich ALN (C-ALN) are developed gradually to optimize the organizing of Web resources. After that, properties of different types of ALN are discussed, which show that C-ALN has good performances to support Web intelligence activities. Moreover, an evaluation method is presented to verify the correctness of C-ALN for semantic link on documents. Finally, an application using C-ALN to organize Web services is presented, which shows that C-ALN is an effective and efficient tool for building semantic link on the resources of Web services.

### 11 Employing Collective Intelligence for User Driven Service Creation

With advances in computing technologies and active user participation through smart devices such as the iPhone and Android, user needs are becoming varied and complex. It is quite natural, then, that a single Web service may not be sufficient to fully satisfy the diverse goals of users in their daily lives. A set of cohesively connected Web services/mashups may be able to deal with these goals. An increasing number of open APIs can facilitate various types of service compositions with users as the service creators. Recently, Internet, telecommunications, and third-party providers have opened their services to the public in the form of open APIs, a trend following the Web 2.0 paradigm. However, most service creation environments do not have sufficient knowledge (particularly, available services and their functionality) to support service creation by users. The problem of knowledge scarcity is that users may have difficulty in finding relevant open APIs for a given situation, finally resulting in rather straightforward types of service. In this article we present two kinds of collective intelligence for user-driven service creation: the user’s own experiences in service composition, and activity knowledge from the web. These collective intelligence types will aid in creating enduser service compositions by enforcing knowledge support in terms of user experiences and activity-aware functional semantics, and will finally accelerate the development of various kinds of converged applications. Using the beneficial roles of collective intelligence as key enablers of future service creation environments, this article also shows a new potential for user-driven composite services within the next few years.

### 12 Geospatial Web Service for Remote Sensing data visualization

The widely used geospatial web services technology has provided a new means for geospatial data interoperability. Web Map Service (WMS) is a standardized geospatial web service from the Open Geospatial Consortium (OGC). WMSs can be used for requesting and producing maps on the Internet, and have been widely adopted in the Geographic Information System (GIS) community. These WMSs make remote sensing data available to a wider range of public users than ever before. However, the performance of current OGC-Compatible WMS servers can not satisfy the need of massive remote sensing data visualization. To implement a performance-optimized WMS server, we propose a global remote sensing data...
hierarchical model based on tile imagery pyramid and quadtree techniques for data organization and index, and adopt

Integartion Platform for Home and Building Automation Systems

In future buildings, all devices will be connected directly to the Internet, surrounding people with aWeb of Things.

Measuring Client-Perceived Pageview Response Time of Internet Services

As e-commerce services are exponentially growing, businesses need quantitative estimates of client-perceived response
times to continuously improve the quality of their services. Current server-side nonintrusive measurement techniques are
limited to nonsecured HTTP traffic. In this paper, we present the design and evaluation a monitor, namely sMonitor, which is
able to measure client-perceived response times for both HTTP and HTTPS traffic. At the heart of sMonitor is a novel
size-based analysis method that parses live packets to delimit different webpages and to infer their response times. The
method is based on the observation that most HTTP(S)-compatible browsers send significantly larger requests for
container objects than those for embedded objects. sMonitor is designed to operate accurately in the presence of
complicated browser behaviors, such as parallel downloading of multiple webpages and HTTP pipelining, as well as packet
losses and delays. It requires only to passively collect network traffic in and out of the monitored secured services. We
conduct comprehensive experiments across a wide range of operating conditions using live secured Internet services, on
the PlanetLab, and on controlled networks. The experimental results demonstrate that sMonitor is able to control the
estimation error within 6.7 percent, in comparison with the actual measured time at the client side.

Ontology-Based Business Process Customization for Composite Web Services

A key goal of the Semantic Web is to shift social interaction patterns from a producer-centric paradigm to a
consumer-centric one. Treating customers as the most valuable assets and making the business models work better
for them are at the core of building successful consumer-centric business models. It follows that customizing
business processes constitutes a major concern in the realm of a knowledge-pull-based human semantic Web. This
paper conceptualizes the customization of service-based business processes leveraging the existing knowledge of
Web services and business processes. We represent this conceptualization as a new Extensible Markup Language
(XML) markup language Web Ontology Language-Business Process Customization (OWL-BPC), based on the de
facto semantic markup language for Web-based information [Web Ontology Language (OWL)]. Furthermore, we
report a framework, built on OWL-BPC, for customizing service-based business processes, which supports
customization detection and enactment. Customization detection is enabled by a business-goal analysis, and
customization enactment is enabled via event-condition-action rule inference. Our solution and framework have the
following capabilities in dealing with inconsistencies and misalignments in business process interactions:

1) resolve
semantic mismatch of process parameters; 2) handle behavioral mismatches which may or may not be compatible; and 3) process misaligned rendezvous requirements. Such capabilities are applicable to business processes with heterogeneous domain ontology. We present an architectural description of the implementation and a walk-through of an example of solving a customization problem as a validation of the proposed approach.

### Reformulating user’s queries for Intentional Services Discovery using an Ontology-based Approach

The increasing growth in popularity of Web services has made it difficult for business users to fully benefit from these services if they remain specified at the software level. The introduction of intentional services is an alternative for bridging the gap between low level, technical software-service descriptions and high level, strategic expressions of business needs for services. The current Web services technology based on UDDI and WSDL does not reflect this “business intention”, and therefore fails to address the problem of matching between capabilities of services and business user needs. The work presented in this paper is built on earlier research in which the Intentional Services Model (ISM) has been developed for modeling and describing services in business terms. In this paper, we present an ontological based solution to help matching user’s needs formulated in business terms as goals with the intentions of services published in an extended registry. The idea is simple: reformulating the user queries using ontologies to enrich them with more concepts, which will increase the possibility of matching relevant intentional services that could satisfy user’s business needs.

### Separating Operational and Control Behaviors: A New Approach to Web Services Modeling

Developing flexible business applications is one of the ultimate objectives behind the use of Web services. Before taking part in such applications (sometimes critical), each Web service should be modeled so that its execution can be monitored and design problems can be early identified and addressed. In this article, we propose a novel approach for modeling Web services by distinguishing two types of behavior, namely operational and control. The operational behavior defines the business logic, which underpins the functioning of a Web service, and the control behavior guides the execution progress of this operational behavior by identifying the actions to take and enforcing the constraints to satisfy. This guidance takes place through conversational messages that these behaviors exchange. We developed a prototype system that assists service engineers in specifying, enforcing, and monitoring these behaviors, thereby achieving a better design of Web services.

### The Design and Implementation of Civil Aviation Electronic Government System Based on SOA

Electronic government system of civil aviation is a complex project, involving multiple e-government application modules of construction. It’s beneficial for the e-government system integration to establish the unity basic framework. Therefore, this paper analyzes the media, events, information flow, capital flow in civil aviation e-government, according to the different application environment to establish the framework, and then combined with the aviation operation characteristics to construct a integrated aviation e-government information interaction application platform based on SOA. This platform using XML, component technology, Web service technology and workflow technology, civil aviation B2B scheme to analysis the goal of civil aviation e-government, design the whole system framework, and discusses the realization and main technology of civil aviation e-government system furtherly.

### Towards a Self-Healing Approach to Sustain Web Services Reliability

Towards a Self-Healing Approach to Sustain Web Services Reliability
Web service technology expands the role of the Web from a simple data carrier to a service provider. To sustain this role, some issues such as reliability continue to hurdle Web services widespread use, and thus need to be addressed. Autonomic computing seems offering solutions to the specific issue of reliability. These solutions let Web services self-heal in response to the errors that are detected and then fixed. Self-healing is simply defined as the capacity of a system to restore itself to a normal state without human intervention. In this paper, we design and implement a selfhealing approach to achieve Web services reliability. Two steps are identified in this approach: (1) model a Web service using two behaviors known as operational and control; and (2) monitor the execution of a Web service using a control interface that sits between these two behaviors. This control interface is implemented in compliance with the principles of aspect-oriented programming and case-based reasoning.

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**20 Using Web - Developer Technologies for Building an Academic Service.**

With the use of web developer technologies such as PHP we can build efficient Internet service, which can be used for example in the students houses. The main point of the system is to integrate, informate and help. It is build with 3 modules: CMS, forum and the auction system. That Academic system and the process of building

**21 An Enterprise Ontology-Based Approach to Service Specification**

In recent years, the WSDL and UDDI standards arose as ad-hoc standards for the definition of service interfaces and service registries. However, even together these standards do not provide enough basis for a service consumer to get a full understanding of the behavior of a service. In practice this often leads to a serious mismatch between the provider’s intent and the consumer’s expectations concerning the functionality of the corresponding service. Though additional standards have been proposed, a holistic view of what aspects of a service need to be specified is still lacking. This paper proposes a service definition, a service classification, and service specification framework, all based on a founded theory, the Ψ-theory. The Ψ-theory originates from the scientific fields of Language Philosophy and Systemic Ontology. According to this theory, the operation of organizations is all about communication between and production by social actors. The service specification framework can be applied both for specifying human services, i.e. services executed by human beings, and IT services, i.e. services executed by IT systems.

**22 An Integrated Approach to Automated Semantic Web Service Composition through Planning**

The paper presents an integrated approach for automated semantic web service composition using AI planning techniques. An important advantage of this approach is that the composition process, as well as the discovery of the atomic services that take part in the composition, are significantly facilitated by the incorporation of semantic information. OWL-S web service descriptions are transformed into a planning problem described in a standardized fashion using PDDL, while semantic information is used for the enhancement of the composition process as well as for approximating the optimal composite service when exact solutions are not found. Solving, visualization, manipulation and evaluation of the produced composite services are accomplished, while, unlike other systems, independence from specific planners is maintained. Implementation was performed through the development and integration of two software systems, namely PORSCE II and VLEPPO. PORSCE II is responsible for the transformation process, semantic enhancement and management of the results. VLEPPO is a general-purpose planning system used to automatically acquire solutions for the problem by invoking external planners. A case study is also presented to demonstrate the functionality, performance and potential of the approach.

| 23 Expert Discovery and Interactions in Mixed Service-Oriented Systems |
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Web-based collaborations and processes have become essential in today’s business environments. Such processes typically span interactions between people and services across globally distributed companies. Web services and SOA are the de facto technology to implement compositions of humans and services. The increasing complexity of compositions and the distribution of people and services require adaptive and context-aware interaction models. To support complex interaction scenarios, we introduce a mixed service-oriented system composed of both human-provided and software-based services interacting to perform joint activities or to solve emerging problems. However, competencies of people evolve over time, thereby requiring approaches for the automated management of actor skills, reputation, and trust. Discovering the right actor in mixed service-oriented systems is challenging due to scale and temporary nature of collaborations. We present a novel approach addressing the need for flexible involvement of experts and knowledge workers in distributed collaborations. We argue that the automated inference of trust between members is a key factor for successful collaborations. Instead of following a security perspective on trust, we focus on dynamic trust in collaborative networks. We discuss Human-Provided Services (HPS) and an approach for managing user preferences and network structures. HPS allows experts to offer their skills and capabilities as services that can be requested on demand. Our main contributions center around a context-sensitive trust-based algorithm called ExpertHITS inspired by the concept of hubs and authorities in Web-based environments. ExpertHITS takes trust-relations and link properties in social networks into account to estimate the reputation of users.

24

IDMS: an Information Discovery and Monitoring System for Web Services on Grid

To ensure web service tasks can be accomplished successfully in grid environment, this paper designed and implemented an information discovery and monitoring system (IDMS) to manage information of web services, discover and monitor resource and tasks in grid environment. This paper mainly introduced the structure and implementation technical detail of IDMS. We also embedded it into a distributed data mining web service platform which is called BillionGrid to verify the effectiveness and practicality of IDMS.

25

Locating Ontologies for Web Services Annotation

The need for services discovery constitutes an important challenge for service-centric software engineering. In this paper, the idea of classification is brought in to solve the problem of ontology discovery, which has some aspects in common with general text classification and outstanding differences at the same time. An algorithm has been presented to implement automatic ontology discovery for services annotation. Preliminary experiments on a real-world services corpus show that the approach is practical and can be complementary to existing services annotation approaches.

26

Seeking Quality of Web Service Composition in a Semantic Dimension

Ranking and optimization of web service compositions represent challenging areas of research with significant implications for the realization of the “Web of Services” vision. “Semantic web services” use formal semantic descriptions of web service functionality and interface to enable automated reasoning over web service compositions. To judge the quality of the overall composition, for example, we can start by calculating the semantic similarities between outputs and inputs of connected constituent services, and aggregate these values into a measure of semantic quality for the composition. This paper takes a specific interest in combining semantic and nonfunctional criteria such as quality of service (QoS) to evaluate quality in web services composition. It proposes a novel and extensible model balancing the new

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dimension of semantic quality (as a functional quality metric) with a QoS metric, and using them together as ranking and optimization criteria. It also demonstrates the utility of Genetic Algorithms to allow optimization within the context of a large number of services foreseen by the “Web of Services” vision. We test the performance of the overall approach using a set of simulation experiments, and discuss its advantages and weaknesses.

27 Semantic information integration for electronic patient records using ontology and web services model

Electronic Patient Records (EPR) systems are developed proprietarily and often only serve one specific requirement within a healthcare institute. Heterogeneous EPR platforms introduce a problem in cross-system patient information exchange due to the lack of a uniform system and an accepted standard. This makes it very difficult for clinicians to capture the complete clinical history of a patient that may be spread out over a number of different healthcare institutes. This research proposes an architecture of semantic information integration for electronic patient records using ontology and Web Services models. The research exploits Web services to enable dynamic interoperability between different EPR systems. In order to enrich service discovery and solve semantic service discrepancies the concepts of service descriptions are semantically mapped with the Semantic Bridge Ontology (or SBO) expressed in OWL. Moreover, patient information obtained from each Web service is thus modeled onto domain ontology and integrated with the SBO to form the Ontology-based Patient Record Metadata. The proposed Ontology-based Patient Record Metadata provides a means for coping with the semantic service discrepancies and enables an inference engine to discover patient information dispersed over different healthcare systems.

28 Semantic Service Discovery based on Parametric Dependency Relations

As the number of Web services has increased, how to locate services becomes an important research issue. Previous works for semantic Web services discovery have been proposed. Since they lack a sophisticated scheme of specifying services’ advertisements and users’ requirements, they may not discover services, which satisfy the intention of service requesters. To resolve this problem, we propose a noble scheme to represent and utilize the dependency between I/O parameters. In addition to the conventional semantic matchmaking of I/O parameters, the dependency relations among them are also considered. From experimental results we can find that the proposed method based on the parametric dependency relations performs better than previous works.

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