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On Demand Web Services with Quality of Service

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Abstract
The increasing usage of smart embedded devices in business blurs the line between the virtual and real worlds. This creates new opportunities to build applications that better integrate real-time state of the physical world, and hence, provides enterprise services that are highly dynamic, more diverse, and efficient. Service-Oriented Architecture (SOA) approaches traditionally used to couple functionality of heavyweight corporate IT systems, are becoming applicable to embedded real-world devices, i.e., objects of the physical world that feature embedded processing and communication.

Keywords: - Time synchronization, sensor networks

1. Introduction

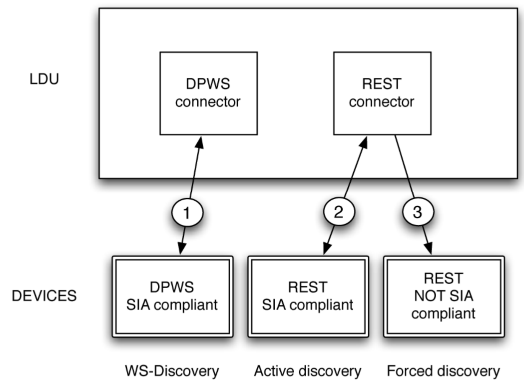
The process described in this project has been developed and implemented as part of the Integrated Architecture (SIA). The role of IA is to enable the ubiquitous integration of real world services running on embedded devices with enterprise services. WS web service standards constitute the de facto communication method used by the components of enterprise-level applications, and for this reason IA is fully based on them. In this manner, business applications can access near real-time data from a wide range of networked devices through a high-level, abstract interface based on web services. Furthermore, the IA also supports RESTful services in order to be able to communicate with many emerging Web 2.0 services. This enables any networked device that is connected to the SIA to directly participate in business processes while neither requiring the process modeler, nor the process execution engine to know about the exact details of the underlying hardware.

1.1 Previous Work

In recent years, the use of services to compose new applications from existing modules has gained momentum. Web services are autonomous units of code, independently developed and evolved. The Web Service Description Language (WSDL) is used as the defacto standard for service providers to describe the interface of the Web services, i.e., their operations and input and output parameters. Therefore, Web services lack homogeneous structure beyond that of their interface. Heterogeneity stems from different ways to name parameters, define parameters, and describe internal processing. This heterogeneity encumbers straightforward integration between Web services. Web service registries such as Universal Description, Discovery, and Integration (UDDI) were created to encourage interoperability and adoption of Web services. However, UDDI registries have some major flaws. UDDI registries either are made publicly available and contain many obsolete entries or require registration. In either case, a registry stores only a limited description of the available services. Semantic Web services were proposed to overcome interface heterogeneity. Using languages such as Ontology Web Language for Services (OWL-S) and WSDL Semantics (WSDL-S), Web services are extended with an unambiguous description by relating properties such as input and output parameters to common concepts and by defining the execution characteristics of the service.

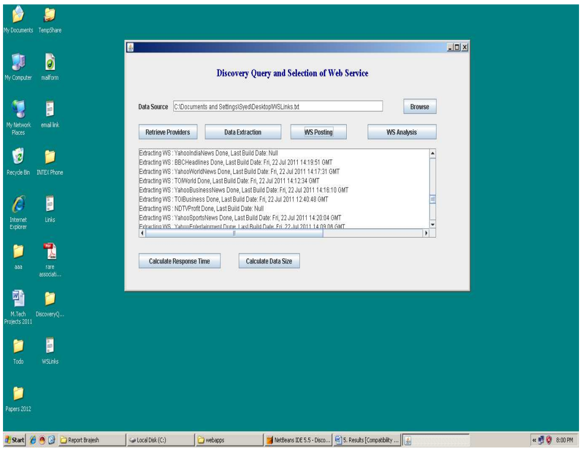
The concepts are defined in Web ontologies, which serve as the key mechanism to globally define and reference concepts. Formal languages enable service composition, in which a developer uses automatic or semiautomatic tools to create a integrated business process from a set of independent Web services. Service composition in a heterogeneous environment immediately raises issues of evaluating the accuracy of the mapping. As an example, consider three real-world Web services, as illustrated in Fig. 1. The three services distance between zip codes (A), store IT contracts (B), and translation into any language (C) share some common concepts, such as the code concept. However, these three services originate from very different domains. Service A is concerned with distance calculation and uses the zip codes as input, service B defines CurrencyCode as part of the IT contract information to be stored, and service C uses a Client Code as an access key for users. It is unlikely that any of the services will be combined into a meaningful composition. This example illustrates that methods based solely on the concepts mapped to the service's parameters may yield inaccurate results. We aim at analyzing different methods for automatically identifying possible semantic composition. We explore two sources for service analysis: WSDL description files and free textual descriptors, which are commonly used in service repositories. We investigate two methods for Web service classification for each type of descriptor: Term Frequency/ Inverse Document Frequency (TF/IDF) and context based analysis, and a baseline method. We define contexts as a model of a domain for a given term, which is automatically extracted from a fragment of text. In this work, contexts are created by finding-related terms from the Web. Unlike ontologies, which are considered shared models of a domain, we define contexts as local views of [1]

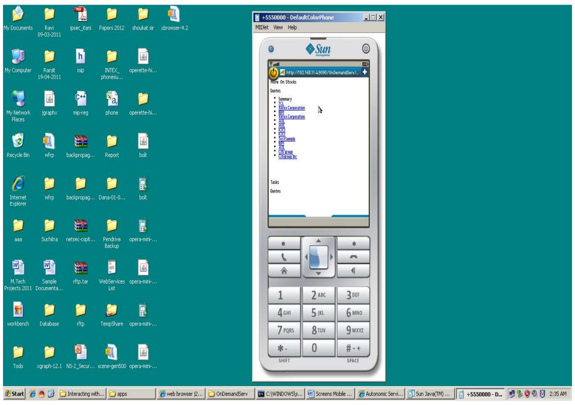
2. System Architecture



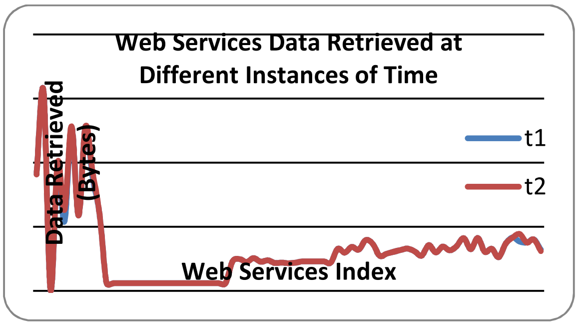
3. Results

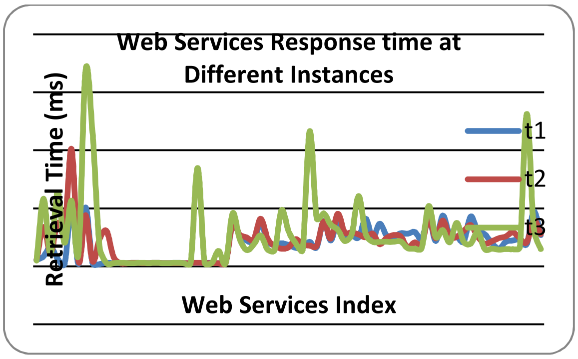
The concept of this paper is implemented and different results are shown below


Discovery Query and Selection of Web Service
Data Source
Browse
Retrieve Providers
Data Extraction
WS Posting
WS Analysis
Calculate Response Time
Calculate Data Size



3.1 Graphs


Web Services Data Retrieved at Different Instances of Time
Data Retrieved (Bytes)
t1
t2
Web Services Index



3.2 Performance Analysis

The proposed paper is implemented in Java technology on a Pentium-IV PC with 20 GB hard-disk and 256 MB RAM. The propose paper's concepts shows efficient results of retrieving data from web services and has been efficiently tested on different systems.

4. Conclusion

The future Internet will be highly populated by heterogeneous networked embedded devices that will further blur the borders of real and virtual world, empowering us with new capabilities in creating real-world aware business applications. For this to happen, it is of high importance to be able to find real-world services that can be dynamically included in enterprise applications a quite challenging task considering the application requirements, technologies, and heterogeneity of devices. In that line of thought, we have presented here an approach that would facilitate this task for developers, allowing them not only to search efficiently for services running on embedded devices, but also to deploy missing functionalities on-demand.

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