Towards an Efficient usage of UbiSOAP Middleware for Ubiquitous Networks

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Abstract— With the drastic evolution of wireless technologies, software services can become truly ubiquitous, being not solely accesses but also hosted by wirelessly networked portable gadgets. As a result, legacy applications can be ubiquitous. However the ubiSOAP middleware, which strives to provide ubiquitous networking to services. Specifically, ubiSOAP defines a two-layer architecture which, respectively, contrivances network-agnostic connectivity and WS-oriented communication in ubiquitous networking ambiences. The network-agnostic connectivity layer leverages multiradio networking by means of a special addressing contrivance for networked   services, namely MRN@, a QoS-aware network selection mechanism and both unicast and multicast communication dexterities. WS oriented communication contrivances   the ubiSOAP communication layer which   contrivances two different SOAP transports, namely ubiSOAP point-to-point and ubiSOAP group, which leverage network-agnostic connectivity to enable the ubiquitous networking of WS deployed on various gadgets—e.g., PDAs and smart phones—embedding multiple radio interfaces. The inception of lightweight middleware enables base WSoriented communication archetypes among wireless portable gadgets. DPWS extends WS technology allowing for impeccable integration of gadget-provided services. Hence to achieve ubiquitous networking of services a network agnostic connectivity is enabled.

Index Terms—Service oriented architecture, web services, middleware, networking, advanced services innovation framework, service delivery platform.

I. INTRODUCTION

SOAP (Simple Object Access Protocol) that defines a lightweight protocol for information exchange. The Web services architecture is further competently complemented by UDDI (Universal Description, Discovery and Integration) that is a compendium of a registry for dynamically locating and advertising Web services. With network connectivity being embedded in most computing gadgets, any networked gadget may impeccably devour but also provide software applications over the network. Service-Oriented Computing (SOC) then acquaints natural archetype abstractions to deal with ubiquitous networking ambiences. Veritably, networked software applications may conveniently be engrossed as autonomous loosely coupled services, which may be allied to accomplish intricate tasks. The concrete embody of SOC paradigms provided by Web Services (WS) technologies by means of Web-based/XML-based open paradigms may be oppressed for concrete contrivancing of ubiquitous services. However, while WS paradigms and contrivancing targeting wide-area domains are effective technologies, supporting WS access in ubiquitous networking ambiences is still confronting [1].

In fact, in such kind of networking ambiences both service consumers and providers often run on resource-scarce platforms (e.g., personal digital assistants and mobile phones), which have limited CPU power, memory, and battery life. Besides, these gadgets are usually interconnected through one or more heterogeneous wireless links, which compared to wired networks, are delineated by lower bandwidth, higher error rates, and frequent disconnections. The former issue has led to the acquaint of lightweight middleware enabling base WS oriented communication archetypes among wireless portable gadgets (i.e., SOAP-based messaging and dynamic service discovery) .The latter issue has further led to examine specific SOAP transports.

However, a key feature of ubiquitous networking ambiences is the assortment of radio links available on portable gadgets, which may be oppressed toward ubiquitous connectivity. Specifically, as nodes get directly connected via multiple radio links, thorough scheduling and handover across those links allow reinforcing overall connectivity and actually making it ubiquitous. This calls for making services network agnostic ,so that the underlying middleware takes care of scheduling exchanged messages over the embedded links in a way that best matches Quality of Service (QoS) requirements ,and further ensures service continuity through vertical handover[1] .In this setting, a primary requirement for supporting service-oriented middleware is to provide a comprehensive networking abstraction that allows applications to be unaware of the actual underlying networks while oppressing their assortments in terms of both functional and extra-functional properties.

REST attempts to describe architectures that use HTTP or similar protocols by constraining the interface to a set of well-known, paradigm operations (like GET, POST, PUT, DELETE for HTTP). Here, the focus is on interacting with stateless resources,

rather than messages or operations. Clean URLs are tightly associated with the REST concept. An architecture based on REST can use WSDL to describe SOAP messaging over HTTP, can be implemented as an abstraction purely on top of SOAP (e.g., WS-Transfer), or can be created without using SOAP at all.

II. ᴜʙɪSOAP METHODOLOGY

Two wireless portable gadgets with the radio interface will be created, radio interface is nothing but how many network connectivity available for the gadget. For each radio interface have to assign the ID. Network agnostic connectivity provided to manage the multiradio networking. UbiLET layer is registered with Wi-Fi and Bluetooth multiradio networking. Network agnostic connectivity layer offers two types of communication asynchronous multicast and synchronous unicast between UbiSOAP sender and receiver. Consider the two wireless gadgets; A gadget can access the services hosted only in the networks it belongs to (service provider and consumer should be directly reachable to each other). If the gadget wants to access the services hosted in other network (to which it does not belong to). In order to access the service hosted in other network, overlay network concept is acquainted in UbiSOAP, which is able to bridge the heterogeneous network .A bridge gadget is found, which is present in both the networks. The ubiSOAP point-to-point transport is a connection-oriented transport for supporting communication between a service consumer and a service provider. The ubiSOAP group transport is a connectionless transport for one-way communication between multiple peers in multinetwork configurations. The ubiSOAP group transport interacts with the network-agnostic connectivity layer to send group messages based on an MRN addressing identifying the group, and with the SOAP engine to deliver the group's messages to the registered services When both the client and the service simultaneously change the complete set of IP address associated to their MRN addressing (and no direct link exists) the session will break and the client needs to perform a service discovery.

Various SOAP engines have been implemented to improve memory and CPU usage of resource-constrained gadgets. SOAP message compression improves the bandwidth requirement of SOAP communication by compressing the XML text in binary data at the expense of CPU usage and latency. The processing overhead of SOAP messages, associated with the handling of header and body parts, still affects performance of resource-scarce gadgets and unaware of the actual underlying networks application with less performance on QoS.

To effectively enable mobile WS and related wireless SOAP, ubiSOAP comprehensively oppresses the ubiquitous networking ambience by dealing with multiradio networking on the mobile gadget. A feature actually enables ubiquitous networking and in particular overcoming the nodes mobility through vertical handover across networks. This allows for tuning network usage according to application requirements. Reinforcing overall QoS by enabling the ubiquitous networking of WS deployed on various gadgets—e.g., PDAs and smart phones—embedding multiple radio interfaces.

III. ᴜʙɪSOAP ARCHITECTURE
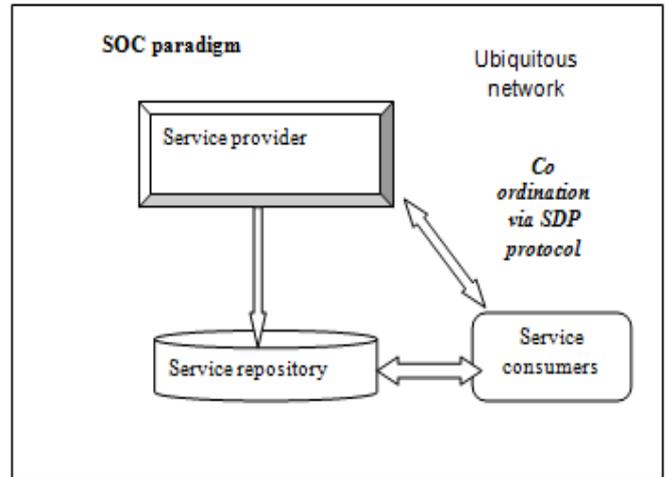
The ubiSOAP communication middleware aims at effectively oppressing the diverse network technologies at once in order to create an integrated multiradio networking ambience, hence offering network-agnostic connectivity to services [1].
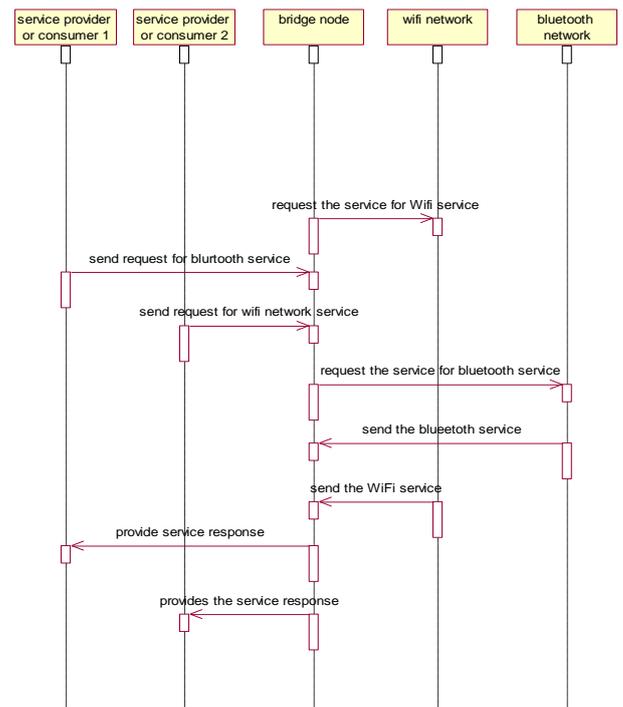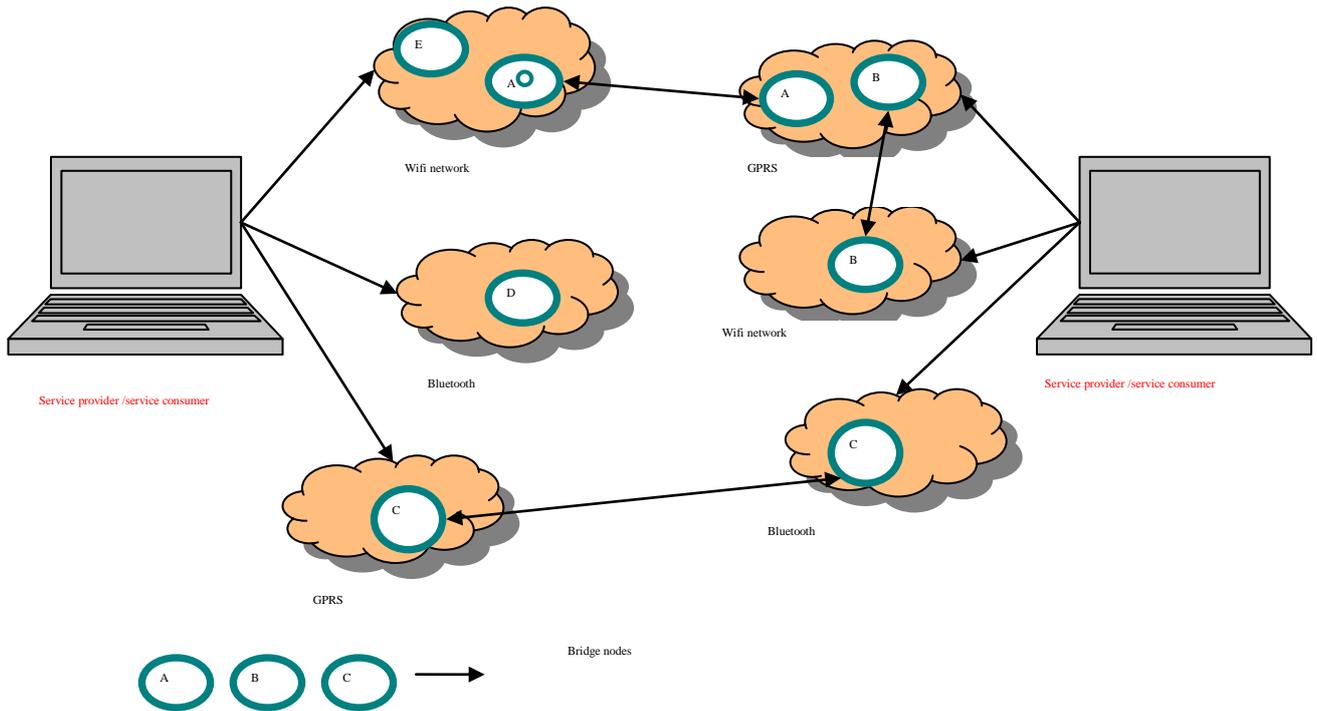
Fig. 1 ubiSOAP service oriented middleware in ubiquitous networking

Fig. 2 ubiSOAP communication performance evaluation and the QOS

IV. RELATED WORK

Jens Schmutzler1, Ulrich Bieker2, Christian Wietfeld1" Network-centric Middleware supporting dynamic Web Service Deployment on heterogeneous Embedded Systems:", [2] The main emphasis on middleware functionality is kind of different. Prevailing points in this scenario are set around reliability and security issues of the chosen communication channel and additionally around dynamicity and mobility of all involved end-users. In order to respect the mobility of the diabetes patients the middleware has to handle interface handovers depending on the currently available network types and depending on customized interface metrics. The dynamicity of this scenario refers to the possible churn rate of mobile gadgets and their services. Service discovery mechanisms ensure that all information regarding a joining or leaving gadget is properly propagated within the entire network. All these requirements are met by the MORE middleware by offering a base level of generic services, which help to counter those issues in an efficient way from the developer's perspective.

Deploying DPWS on top of an OSGi platform is a feasible approach in order to bring the Web Services world to the embedded systems domain in an efficient manner. Both time and effort needed for development and deployment of services on embedded platforms are significantly reduced. Besides the dynamic management of services through the OSGi platform contrivance a profound basis for resource management reinforcements on Java-based embedded gadgets which still needs some more elaboration. Future work will focus on this topic and further reinforcements for the developer's perspective are planned which shall
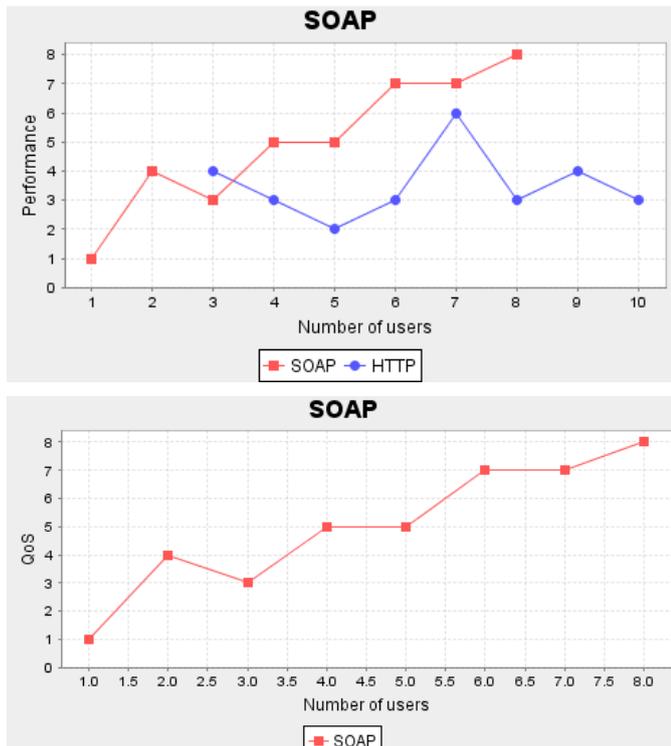
simplify the integration and chaining of the generic set of base level services provided by the middleware.

Mauro Caporuscio, Damien Charlet ,Valerie Issarny," Energetic Performance of Service oriented Multiradio Networks: Issues and Perspectives":Still, network connection on the terminal should not only be entrenched according to local network quality and bandwidth requirement for the specific connection. Performance of networked software usage, in terms of energy consumption, depends on the set of local connections already open due to the non-negligible base energy cost associated with network interfaces [6]. Obviously, the energetic performance of the multi-radio network evolves as network connections are entrenched and closed on the terminal, possibly requiring adaptation over time. Also this does not solely concern the energetic performance on the given terminal but also the energetic performance of the wireless nodes in communication range. Furthermore, networking capabilities vary among nodes, as it cannot be assumed that all networked nodes embed the very same set of network interfaces and even if they do, they must agree on the networking mode and possibly network channel [1]. As a result, energy-efficient multi-radio network management is still in its infancy, with several issues to be solved before it can be effectively deployed.

B3G networks combine multiple wireless networking technologies in order to benefit from their respective advantages and specifics. The increase in computing and communication capacities of portable gadgets, as well as their mass marketing, further allow envisaging the widespread deployment of multi-radio pervasive networks that compose the functionalities of the networked nodes, which range from base sensors/actuators to Internet servers. A user having a multi-radio capable gadget benefits from such a pervasive network by increasing the perimeter of reachable service providers, but this is at the expense of a higher network management complexity. This complexity, induced by the heterogeneity of the wireless technologies, should be hidden to the user and, to be effective, to the application (e.g., by a middleware solution).Veritably, making the network energy efficient is a key requirement of the pervasive computing vision since this increases the autonomy of nodes and thus services availability. This paper has more specifically focused on service-oriented multi-radio networks, as we consider service-orientation as a prime enabler of the pervasive computing vision due to the openness of the computing ambience that it enables. The energetic performance of multi-radio networks is dependent upon the respective energetic performance of its constituting radio networks. Then, a trivial approach to making the network energy-efficient is to choose the most energy-efficient radio link for each service session, provided the radio link meets the session's bandwidth requirements. However, such a solution does not account for the global energetic performance of the network, considering both concurrent network accesses on the terminal and network usage on peers. Formal modeling of the properties of energy efficient service-oriented multi-radio networks enables us to show that the problem is NP-hard and thus requires a careful approximation. Dynamic configuration of energy-efficient service-oriented multi-radio networks is part of future work in the context of the PLASTIC project. We specifically aim at developing a middleware-layer solution, closely coupled with the lower network layers for the sake of effectiveness. We further aim at a decentralized solution due to the high dynamics of the networking ambience.

Guido Gehlen, Fahad Aijaz, Bernhard Walke," Mobile Web Service Communication over UDP" [4]. A Web Service based Middleware for mobile application is a promising platform to enable a platform independent way of distributed computing and to accelerate the application development for mobile gadgets. Acquaint the overall architecture of the developed Web Services based middleware. Fundamental features of this middleware are additional protocol bindings, policy driven object monitors, and support for future Plug-and-Play services in ad-hoc networks. In all three extensions, the use of UDP is a natural choice. UDP contrivances an unreliable transmission of message, which is used to send out real time data, such as real-time events, or probe messages. Real time messages have to be transmitted as fast as possible to ensure their relevance at receive time. A retransmission of such messages would be unnecessary, since they get obsolete in the meanwhile. Probe messages have to be sent to a broadcast address or to a multicast group. UDP enables broadcast and multicast communication.

Robert A. van Engelen and Kyle A. Gallivany, "The gSOAP Toolkit for Web Services and Peer-To-Peer Computing Networks:", [5] A number of distributed computing infrastructures embraced Java as the programming language of choice. Java has many features that make it desirable for distributed computing. Java's low performance can sometimes be increased through proprietary packages and compilation techniques. SOAP applications exploit a wire-protocol (typically HTTP) to communicate with Web Services to retrieve dynamic content. For example, real-time stock quote information of a stock portfolio can be graphed on the display of a cell phone or can be analyzed within a spreadsheet program running on a desktop computer. This allows real-time "what-if" scenarios and enables the development of agents that access real-time information. Other examples are the visualization of factory processes on PDAs, control and visualization of large-scale simulations from a desktop computer, the sharing of laboratory results using cell phones, remote database access, and science portals.

Stephen Paul Wade, "An Investigation into the use of the Tuple Space Paradigm in Mobile Computing Ambiences" Portable and hand-held computers have

become increasingly financially viable and popular, now accounting for a significant proportion of total computer sales. Recently, low bandwidth wide area wireless communications have emerged and, in the shape of mobile telephony, become an inexpensive service in widespread se. The fusion of these advances in computing and communication technologies gave rise to the field of mobile computing which has stimulated a significant body of research. In parallel with these developments, desktop computing solutions have also progressed. Wired networks have become both faster and more reliable while distributed software technology has become increasingly complex and network intensive. Mobile computing research is largely concerned with addressing the mismatch between wired and wireless computing worlds. A major goal of the field is to build applications and support platforms which can operate effectively in, and move as impeccably as possible between, both these domains. The issue of providing suitable distributed systems support for mobile applications functioning in such heterogeneous ambiences is examined by this. Mobile computing ambiences consist of an increasing range of heterogeneous technologies which offer an assortment of service capabilities to applications and systems.

Recent work has shown that, in order to continue operating effectively in these ambiences, applications need to adapt to the rapid and significant changes in the available Quality of Service that are symptomatic of these domains. In order to facilitate this adaptation, applications require specialist distributed systems support. To date, such mobile support platforms have been largely based on middleware paradigms developed for fixed networking domains which have vastly different symptomatic to modern heterogeneous mobile ambiences. Because of this heritage, there are a number of aspects of the resultant platforms which can be identified as being fundamentally unsuited to mobile domains.

V. CONCLUSION

A lightweight service oriented middleware efficiently empowered the ubiquitous networking of services. An integrated multiradio network which offer a network agonistic connectivity is been contrivance. The tuning of network usage according to application requirements thus reinforced overall QoS and complemented with middleware services. Accoutrements the ubiquitous networking of Web service deployed on various devices. Our current work on further evolution is contrivancing reliability and privacy on top of the **ubiSOAP** network agnostic connectivity layer.

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