



Testing the E-Business Infrastructure: Expanding into the Wireless/Mobile Environments

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Abstract. This paper describes the necessity of the third-party testing and monitoring in the field of e-business infrastructure, with the emphasis on expanding into the wireless environments for improvement of the quality of service. Outlining the purpose for monitoring and testing, this paper shows the methods of overwhelming the current problems in the wireless computing, giving statistical and anticipated references for devices that have an active role in mobile environments.

Keywords: biopop, testing, monitoring, wireless, QoS

Introduction

Important role of the information has always been to help predicting events of significance, and, for sure, there were always more or less useful ways to transmit it. Had the citizens of Troya a forehand information about the inside of the horse they moved into the town, they would had escaped the catastrophe.

The end of 20th and the beginning of the 21st century have brought many new problems considering information reliability and the assessment of devices that are transmitting information. Therefore, the indispensability of the new technologies and services, which would monitor performances and report to the user, is occurring. This would bring facilitation to service providers and users in order to make the communication (i.e., information exchange) more reliable and secure.

In order to make the presentation of the issues more practice-oriented, the rest of this paper treats the problem using one specific example: the Biopop's *isitworking.com*, its infrastructure and major services.

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1. Biopop has redefined the concept of integration

Today's business services are migrating across telecommunications and information services, from hard-wired telephone and fax-machine, to the interactivity and customizable interfacing of data. E-commerce and automated services occurring on the Internet spread the use of portable information systems. These information systems, widely distributed, are driving the demand for integration with zero fault tolerance.

As business and communication services are spread out across increasingly vast information networks, the potential loss of transaction increases exponentially. Disconnected phone lines, broken links, reconfiguration of routers, out of range cellular contacts are among the increasing host of problems that can arise suddenly to inhibit an e-transaction. Biopop's isitworking.com gives a solution for insurance that dispersed systems will have the immediate, critical acuity to reshape and adapt themselves using proactive monitoring and reporting.

Isitworking.com's services are useful to organizations and individuals that rely on multiple forms of e-communication. Observing from the point of view of provider and opposite of user two main concepts are denoted. Providers of all kind of e-services frequently fail to report such outages to end-users and the main thing of interest for a user is cognition of the completing launching service.

Enterprise solutions for service monitoring are already available. These services are complex internal server-based solutions handling traffic monitoring and reporting, service failure and risk analysis but are expensive. Moreover, the majority of large enterprise-based monitoring and testing systems rely on the same systems they are testing.

The second group, comprised of web-based site and e-commerce performance monitoring tools and services, are largely concerned with packet monitoring, performance metrics, URL availability and reporting on-site traffic. They fail to address the full range of office communication tools. This is exactly where isitworking.com will launch requirements for comprehensive and unified communication.

Thus, isitworking.com is the first comprehensive technology monitoring service.

The high-priority direction for Biopop's isitworking.com is testing the sites for vulnerability of hackers.

The Software and Information Industry Association reports that 25% of software being used in North America is not licensed. Isitworking.com will help software vendors reduce the piracy rate by allowing for two-way communication between the vendor and each instance of its applications, allowing real-time verification of license usage, version currency, etc.

2. Description of current services

Isitworking.com provides, even in sense of anticipation, by the Internet technology, reliable and auditable third-party monitoring and reporting of statistics with immediately notification of failures including:

- Communication services (e.g., phone lines, answering services, voice mail, web sites, email services, Internet connectivity);
- Devices (e.g., fax machines, servers, phone switches, routers, home security systems), and
- Installed software, network and desktop applications, verifying version, availability, number of users, and *in-license* date.

At launch isitworking.com offers next five services:

- E-mail testing;
- URL testing;
- Voice telephony testing;
- Fax telephony testing;
- Program state testing.

Users of isitworking.com are granted access to a personalized web site showing current performance levels and acceptable ranges of the services and devices monitored. Service levels that fall outside of user-defined limits of performance levels result in instant notification via user specified way of communication like e-mail, paging, phone or fax.

The usage scenario is simple. User affecting to register will pay a one-time \$100 fee for registration. Following payment, the licensee will be issued a unique username and password for granted access. Logging on, user will then use the test-scheduling section of the site, to subscribe to verification tests. Frequency of tests, number of devices, services, and applications to check can be programmed at the site, giving the user monthly or daily cost analysis, and prompting them for agreement. Through real-time interfaces via wireless devices, such web-ready cell phones, the user can see at a glance, the condition of all services being monitored. The concept is depicted in figure 1.

The clients can benefit from timely performance statistics, provided by isitworking.com. In sense of prediction users will experience a reduction in downtime as result of instantaneous notification of any failed service and should encounter fewer failures as result of notification of impending failures. In the broadest sense isitworking.com will increase the overall performance of all service providers across all market spaces. Prediction is that some companies will wrap isitworking.com into their own service catalogue for their products. For example, a device manufacturer may offer performance monitoring of its products through isitworking.com as its own service plan.

Isitworking.com offers, as an example of synergy between the automation and monitoring, services not necessarily related to failure. For instance, while testing network connected printers, or other devices with consumable resources like paper and toner, it is possible to interrogate for the level of consumables. Relationships with office supply chains creating automated order fulfillment processes bring great additional value to the customer, to the supplier and ultimately to isitworking.com.

Isitworking.com is planned to offer *prior notification* rights to such companies. Companies purchasing this service will be warned of potential service or product issues

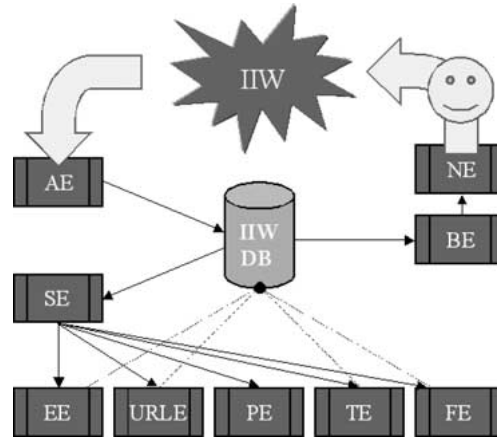


Figure 1. Architecture of Internet based applications: the isitworking.com point-of-view. Legend: AE – Account Engine, SE – Scheduling Engine, EE – E-mail Engine, URLE – URL Engine, PE – Program Engine, TE – Telephone Engine, FE – Fax Engine, BE – Billing Engine, NE – Notice Engine, IIW DB – Isitworking.com Database. Description: user contacts the isitworking.com and requests the service; before responding to the request, the account of the requester is checked for its status and the details of the specified services. Explanation: the billing is based on the number and type of testing. Implications: this infrastructure enables one to easily increase the quality and quantity of the testing service.

as a result of predictive failure analysis and prior to notification of their customers. For example, if a set of tests predicts the potential loss of a user's e-mail service and their service provider has purchased *prior notification* rights, isitworking.com will notify the service provider in advance of the service reaching the failure limits defined by user [Darnell, 1].

This will enable a service provider to receive notification of a failing service typically before the service fails completely, and more importantly in advance of the user being notified, thus allowing the failing service to be corrected prior to becoming a problem for the service provider's user.

3. Description of future services in wireless/mobile computing

Mobility of clients/hosts attaches the newest dimension to distributed computing, which has seen massive growth in recent past. The importance of mobile computing is rapidly increasing with the current trend of globalization of computer networking and wireless communication.

Alan A. Reiter, president of Wireless Internet & Mobile Computing pointed up "broken links and badly coded sites" [Reiter, 6], as one of the top problems for network operators and service providers worldwide.

Moreover, a study by AnywhereYouGo.com found that 19.2% of wireless entries contained broken links; subsequently isitworking.com will offer exhaustive site testing as crucial to the success of wireless computing services. For more de-

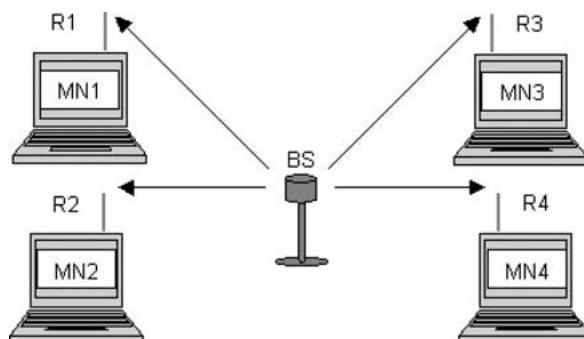


Figure 2. Example of an architecture of a Wireless Area Network. Legend: BS – Base Station (Wireless access point), MN1 – Mobile Node 1, MN2 – Mobile Node 2, MN3 – Mobile Node 3, MN4 – Mobile Node 4, R1 – Receiver 1, R2 – Receiver 2, R3 – Receiver 3, and R4 – Receiver 4. Description: simplified architecture of a Wireless Area Network. Explanation: Isitworking.com will test bandwidth, throughput, base stations, receivers, functionality of mobile nodes, etc. Implications: by testing all of the important parts of Wireless Area Network, isitworking.com provides equality between mobile and desktop computing in sense of reliability.

tails, interested readers are referred to the WWW site of AnywhereYouGo.com (<http://AnywhereYouGo.com>).

Current wireless communications are just too slow. As the number of wireless handheld devices designed to access the Internet increases, there's a serious need for a faster and better wireless communication technology.

Isitworking.com's service of monitoring, testing and reporting of current communication technology bandwidth, throughput and noise level will improve present quality and reliability of services in the wireless computing.

Including testing and monitoring of receiver and transmitter in WLAN (Wireless Local Area Network), isitworking.com will provide equality between mobile and desktop computing in sense of reliability and validity of network connection. See figure 2.

Also, the high-priority direction for Biopop's isitworking.com is testing and monitoring base stations (its transmitting frequency, up-time, ...) in order to minimize out-of-range contacts for cellular, microwave, satellite, packet radio and the other wireless devices.

Holding in mind technical issues in designing WLANs, isitworking.com provides testing and monitoring the following items:

- Number of active mobile users during the peak period;
- WLAN applications accessed by the mobile users;
- Security design reliability, since radio signals travel through the open atmosphere where they can be intercepted by individuals who are constantly on the move – and therefore difficult to track down.

Prediction in the wireless networking shows trends that no base station (i.e., Wireless access points) exists and each mobile host is smart enough to act as a router to

forward packets from one to the other until the packet reaches its destination. The intelligent communications software enables these mobile computers to form and deform networks on-the-fly, in real-time. Isitworking.com in desktop computing and networking provides services of testing and monitoring of the routers and servers and in the sense of parallelism testing and monitoring of that intelligent communication software are issuing.

4. Cost–benefit implications

For one-time license fee of \$100 and a cost of one penny per test, isitworking.com provides reliable and auditable third-party monitoring and reporting of service levels of communication services, devices, and software applications. As the licensee population grows, isitworking.com's revenue base will sequentially shift from licensee fees, to testing fees, to permission marketing fees and finally to prior notification rights fees.

For service providers, employing isitworking.com will be cheaper, faster, and more reliable process for quality control, than building these measures internally. Bearing in mind quality of service as the most important item in providing of service, isitworking.com will become associate part of all kind of e-services.

In order to improve its services and benefits to final customer, Biopop invested in several research projects:

- Using statistics for more efficient testing. A survey, in an attempt to collect information on various topics of interest for Biopop, was done in [Milutinovic et al., 5]. Data were collected by means of the Internet. When offering services to potential customers, Biopop presents a return-on-investment analysis that shows not only how, but also how much, the customer will benefit from the Biopop service.
- Using event correlation for more economic testing. The theory of mathematical statistics says that there is a way of learning something without actually checking it. Ways of computing pieces of information, discovering connections between events, making assumptions without having to check every instance of the tested item, and means of simulation were presented in [Milutinovic et al., 4].
- Using Biopop services in the Internet automation domain. Internet automation systems are extremely sensitive on failure, and therefore in need of constant monitoring. Biopop developed the concept of Technology Performance Monitoring (TPM), described in [Milutinovic et al., 3]. This concept can be used in a number of different areas, like: medical protection, lifestyle support, home security, city utilities, etc.

For details and results of all these research topics, see the references listed at the end of this paper.

5. Conclusion

This paper explains the rationales and describes the basic concepts of a new Internet service aimed at the inauguration the category of technologies monitoring for both users and vendors of technology products and services. In the widest sense, the main influence will be achieved in the improving in users services as the most important thing for vendors, too.

The backbone of isitworking.com is Internet service. In the future all devices for home, office, industry and public usage will have IP address. Discovering and producing universal piece of hardware for connection to Internet will multiply capability of expansion and usage of isitworking.com.

On the other side that peace of hardware will spread the influence of hackers and probability of making massive upset.

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Milan Simic. Biography not available at time of publication.



Nebojsa Uskokovic. Biography not available at time of publication.

D.J. Velickovic. Photo and biography not available at time of publication.

F. Darnell. Photo and biography not available at time of publication.



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