METHOD AND SYSTEM FOR SOFTWARE SYSTEM PERFORMANCE TESTING

TECHNICAL FIELD

The present invention relates to cross-system testing for software system, in particular relates to a simulation system.

BACKGROUND OF THE INVENTION

When performing cross-system testing, in order to accurately positioning quality problem, a testing simulator (or called baffle program, baffle) is usually used to simulate or isolate a peripheral system because of limitation of hardware resource. Therefore, it needs development, maintenance, testing and deployment of the testing simulator of the relative peripheral system for each testing, which costs a great deal of time and energy of testing. The interfaces of some systems provide no user interface, so common business personnel cannot perform a function testing. In order to enable the testing of this portion, it needs to provide the relative testing simulation system to perform an initiative simulation testing. Regarding the testing environment, some systems can only realize complete business logic by using the external system, and as some external systems are difficult to be prepared or cannot be prepared, it needs baffle to perform the simulation of the system, which is relative difficult for the preparation of the testing environment. The generic testing simulator meets the requirements of these two aspects professionally and meets higher requirements for management, efficiency and quality of testing.

As there is coupled structure among the projects, so the system developed by each project depends upon each other, the testing of the system of one project usually requires the support from the testing environment of the system developed by other projects. As each project has different device and personnel resource, it renders that the requirement for the testing environment usually cannot be met effectively, or is met temporarily, but the stability of the environment cannot be ensured either; the problem found in the testing process can be solved with the cooperation of the project providing the testing environment, the low efficiency of the communication between the projects will influence the progress of the testing development strongly; as each project group is developed simultaneously, the logic of the system of the testing environment may not be checked strictly according to the requirement of documents for interface such that there is a hidden defect for debugging and testing; the testing environment of one project usually provide testing support for a plurality of projects, so the maintenance of testing data becomes extremely difficult and the data requirements of each project testing may not be met simultaneously; the unit testing of the project cannot be performed sufficiently because of the testing environment, which will renders that the system enters into the debugging and testing too early such that the progress of the debugging and testing will be affected in some extent. The existing problems and dangers are generalized as follows:

Each project of the group of projects shall provide support of testing environment for other projects;

The stability of the testing environment shall be ensured effectively, including in development phase, personnel support, and network environment etc.

It needs effective communication between projects because of the complexity of progress of solving the testing problem;

It needs more effective insurance to abide by the documents of interface;

It needs more effective testing data maintenance for testing environment;

The unit testing needs support from the testing environment to perform testing sufficiently;

The progress of the debugging and testing shall be ensured effectively.

The generic testing simulator product can be provided to solve the aforesaid problems about the testing environment effectively, improve the testing efficiency and ensure the testing quality simultaneously.

The generic testing simulator product shall meet the requirements of the function and performance testing. As two main parts of the system verification, the function testing and the technology testing have relative big difference in progress and requirements of testing, so they have different requirements for the testing simulator product.

As requirements for generality, the product shall be in a position to support and easy to support the common testing, thus the product must achieve generic support of function and technical framework.

BRIEF SUMMARY OF THE INVENTION

Whereas one or more aforesaid problems, the present invention proposes a simulation system, aiming to provide a generic testing simulation system that can be configured flexibly according to the simulated system and the tested system.

The simulation system according to the present invention comprises: configuration device, for configuring the execution device according to testing environment necessary for testing the tested system; execution device, for simulating the testing environment under the configuration performed by the configuration device to test the tested system.

Wherein, the configuration device comprises: interface configuration module, for

configuring the interface module of the execution device according to testing environment necessary for testing the tested system; scheduling configuration module, for receiving transaction request from the tested system and configuring the scheduling module of the execution device according to the transaction request; process simulation configuration module, for configuring the process simulation module of the execution device; and output configuration module, for configuring the output module of the execution device according to testing environment necessary for testing the tested system.

The execution device comprises: interface module, for receiving a transaction request from the scheduling configuration module under the configuration performed by the interface configuration module and sending the transaction request to a scheduling module; the scheduling module, for scheduling a process simulation module under the configuration performed by the scheduling configuration module; the process simulation module, for simulating the simulated system under the configuration performed by the process simulation configuration module to get the simulation result; and output module, for organizing the simulation result under the configuration performed by the output configuration module and sending the organized simulation result to the tested system.

The scheduling configuration module comprises: transaction determining module, for receiving the transaction request from the tested system and determining the relative information corresponded by the transaction request; and service configuration module, for configuring the scheduling module of the execution device according to the relative information.

The process simulation configuration module comprises: process configuration module, for configuring the executing process of the process simulation module of the execution device; and result management module, for managing the executing result of the process simulation module of the execution device.

Wherein, the process simulation module is further provided with a switch, by turning off the switch to close the process simulation processing performed by the process simulation module. The process simulation processing includes at least one of balance processing, account state changing processing, data transfer processing, and time delay processing.

The simulation system may also comprise: backup module, for make a backup of data that are relative to the testing simulation system; and recovery module, for recovering the testing simulation system.

Through the present invention, a generic testing simulation system that can be configured flexibly according to the simulated system and the tested system is provided.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawing here provides a further understanding of the present

invention, composes one portion of the present application. The illustrative embodiments and the explanation thereof are used to explain the present invention instead of composing the inappropriate limitation to the present invention. In the accompanying drawing:

Figure 1 is a block diagram of the testing simulation system according to one embodiment of the present invention.

DETAILDED DESCRIPTION OF THE INVENTION

The specific embodiments of the present invention are described in detail referring to the drawing.

Figure 1 is a block diagram of the testing simulation system according to one embodiment of the present invention. As shown in figure 1, the simulation system according to one embodiment of the present invention comprises: configuration device **102**, for configuring an execution device according to testing environment necessary for testing the tested system; execution device **104**, for simulating the testing environment under the configuration performed by the configuration device to testing the tested system.

Wherein, the configuration device comprises: interface configuration module (interface configuration management) **102-2**, for configuring the interface module of the execution device according to testing environment necessary for testing the tested system; scheduling configuration module **102-4**, for receiving transaction request from the tested system and configuring the scheduling module of the execution device according to the transaction request; process simulation configuration module **102-6**, for configuring the process simulation module of the execution device; and output configuration module (data organizing management) **102-8**, for configuring the output module of the execution device according to testing environment necessary for testing the tested system.

The execution device comprises: interface module (access interface) **104-2**, for receiving transaction request from the scheduling configuration module under the configuration performed by the interface configuration module and sending transaction request to a scheduling module; the scheduling module (service scheduling) **104-4**, for scheduling a process simulation module under the configuration performed by the scheduling configuration module; the process simulation module **104-6**, for simulating the the simulated system under the configuration performed by the process simulation configuration module to get the simulation result; and output module (output data organizing) **104-8**, for organizing the simulation result under the configuration performed by the output configuration module and sending the organized simulation result to the tested system.

The scheduling configuration module **102-4** comprises: transaction determining module (transaction identification), for receiving the transaction request from the

tested system and determining the relative information corresponded by the transaction request; and service configuration module (service configuration), for configuring the scheduling module of the execution device according to the relative information.

The process simulation configuration module **102-6** comprises: process configuration module (service process configuration), for configuring the executing process of the process simulation module of the execution device; and result management module (result management), for managing the executing result of the process simulation module of the execution device.

Wherein, the process simulation module is further provided with a switch, by turning off the switch to close the process simulation processing performed by the process simulation module. The process simulation processing includes at least one of the balance processing, account state changing processing, data transfer processing, and time delay processing.

The simulation system may also comprise: backup module (not shown), for make a backup of data that are relative to the testing simulation system; and recovery module (not shown), for recovering the testing simulation system.

The embodiment of the present invention is further described in detail referring to figure 1.

The generic testing simulator (that is, testing simulation system) covers the scope of the performance and function testing. It provides interaction to the simulated system, message simulation, and can realize data simulation required by the function testing, and provides functions of testing simulation as well as testing support for the requirement of the testing.

The testing simulator can simulate the mode of the simulated system to initiate the function testing based on the message interaction. And it can provide support for the account testing. The testing modulator is standard, generic performance testing simulation system, can be used as basis facilities for testing work, supports testing of the cross-system testing project and provides debugging and testing service for the development project. In general, the testing modulator needs to support multiple communication forms, can configure the input and output data format flexibly and easily, customize and management communication message, and can partially simulate the business processing process. In detail, the generic testing simulator has the following functions:

The testing simulator system, as the simulation system of various kinds of service systems, performs functional organization based on the flexible framework, can simulate external transaction interface of various common service systems and customize simple business processing logic.

It has the function of simulating multiple communication protocols, and support multiple access modes, such as common used TCP/IP, MQ, Tuxedo, HTTP, WebService etc. In order to simulate secure communication, communication

security components can be added to realize the required secure processing ability, and process data transfer of the messages of multiple formats, including ISO8583, XML, FML(tuxedo), Binary, Text, etc.

The framework of the testing simulator has high scalability, may provide extended functions in multiple aspects, including communication protocol, message format, business process simulation, data access and data processing etc.

As a system facing the performance testing, the testing simulator system provides statistic function about the testing relative instances. The accurate information relative to the test can be known by the statistic of the correct and failure instance and the statistic of the testing coverage during the testing process.

The testing simulator provides convenient tools for management and maintenance, with which various kinds of functions and the properties of the system can be managed and maintained more directly.

The testing simulator provides means for the backup and recovery of the entire system so as to enable the recovery of the testing environment to be accomplished quickly.

The testing simulator can be deployed on different hardware platforms.

The testing simulator has good processing performance and shall not become the performance bottleneck of the system. The performance of the testing simulator is not worse than that of the simulated service system.

The testing simulator supports interconnection between each kinds of communication protocols and message formats, and can be configured and defined flexibly according to the property of the system to be simulated, has uniform data bus in the system such that the data of the communication interface will be transferred to data on the inner data bus no matter by which means it is accessed, and obtain the corresponding data from the inner data bus according to the defined output format, and organize data according to the required communication protocol and message format to send the data back to the opposite system. The overall framework is shown in figure 1.

The testing simulator system may be divided into two parts, server side and management client side. The server side can be deployed on the PC, PC Server, Unix server and minicomputer platform, and comprise functions, such as access interface, interface check, service scheduling, process simulation, output data organization, basic components, data access interface etc.; the management client side is deployed on the PC with Windows series operation system, and comprises functions, such as interface configuration management, transaction recognition management, service configuration management, business process configuration management, service result management, data organization management and backup recovery management etc.

Access interface

As the access modes and data structure of the service system are various, the generic

testing simulator system realize an access interface layer in order to prevent the core function of the system from the influence of the access mode and data structure.

The access interface layer can be accessed by socket communication connection based on TCP/IP protocols, supports two types of connections, long and short connections, and can process communication message including data formats such as ISO8583, XML, Binary, Text etc. It supports communication access mode based on MQ, and can process communication message including data formats such as ISO8583, XML, Binary, Text etc. through performing data interaction by bi-channels. It supports communication assess mode based on Tuxedo middleware, and can process communication message of data formats including ISO8583, XML, FML, Binary, Text etc. It supports request based on HTTP and process communication message based on XML and Text. It supports WebService call and performs data interaction through SOAP protocol.

The access interface layer (interface module) will recognize the service, determine the service name of the testing request, and obtain configuration information of the relative tested service from the service name.

Whereas the requirement for simulating the communication security service system, it may process the security encryption and decryption function of the overall message as well as the encryption and decryption function of PIN field by realization of the appropriate security components.

The access interface layer also provides function of checking the data contents, realizing the functions of must-input item, format check, data range check etc.

For some problems appearing in the interface layer, it may choose to perform error return or ignore the error to meet all kinds of requirements of the external testing.

The access interface layer realizes three kinds of response modes for the request, namely successful response processing, failed response processing and abnormal response processing, which can be customized flexibly according to different service systems.

Service scheduling module (Scheduling module)

After the testing request entering the system, the service scheduling will choose appropriate simulation service model to perform service. The basic service model is scheduled generally. But for the testing service having special requirements, the extended service model will be scheduled for service.

The service model is an effective combination of the process simulation function, output data organization and basic components etc. The service model integrates these functions to provide appropriate simulation service to the external system.

Process simulation module

The introduction of the process simulation module meets more requirements for the

simulation testing, including the functions of simple business logic and response time simulation. In consideration of the requirements of some types of testings, the process simulation module has a switch, it enables the testing not to perform process simulation any more, to directly perform output data organization and to return to call side by turning off the process simulation switch.

The process simulation module may realize the simple business logical functions, such as balance, account state change, data transfer, and time delay etc., which enables the response to the request to be more in accordance with the business logic, at the request side, the normal business logic, such as increase/decrease of the balance, change of the state and dynamic change of information can be seen. The process simulation module may also simulate the fixed time delay to enable the test to reflect the real situation more accurately.

For the result of the process simulation, it can be determined by three means, random select, conditional judgment and fixed result whether the simulation service performs a successful response or a failed response.

If it is a failed response, appropriate failure information prompt of the simulated service system can be obtained according to the response result, which enables the simulation of the failed response to be seemed more vivid for the request side.

Output data organization module (that is, output module)

Before performing the return of the simulation service, the organization of output data must be performed, each simulated service has two different output data organization processing, successful output data organization and failed output data organization, respectively according to the success or failure of the response result.

With the output data organization processing, the date select will be performed in the manner of data resource or default value according to the data structure to be returned. The default value may be a fixed value or a result generated by the order number; and the select of the data resource may be random, or based on simple condition; after determining the date select, the function of performing corresponding format transfer is provided according to the format of the output data.

Basic components

In order to support the function of the overall testing simulator, it needs a great deal of basic functional components having strong function as support. Wherein the basic functional components include a series of basic components, such as interactive tracking, testing statistic, data source access, data processing function, order number service, failure information management, backup recovery and components management etc.

Interactive tracking provides tracking record information for all testing request information and processing progress information thereof to provide basic data support for the problem analysis in the testing.

Testing statistic function records the situation of the simulation testing, makes statistic of testing information on the testing simulator from the aspects of time, success rate and coverage rate and provides basis based on the testing for the project decision.

The data source access packages the access to the database and documents so as to make the data source based on configuration in the data organization of the simulation testing system possible.

The data processing provides strong data format transfer function and data processing function based on formulation, which provides sufficient insurance for the data processing ability in the test simulator system.

Order number service and failure information management provide more data processing ability for the testing simulator system.

The backup recovery function (backup module and recovery module) enables the backup and recovery processing to be easier.

Components management realizes the scalability based on the components and provides technical basis for the extended function of each module of the testing simulator.

Data access interface

The data access interface of the testing simulator system is just limited to the access interface based on JDBC (database access protocol of java) and documents. The testing simulator system realizes the acquirement and management of the configuration information, parameter information, and data information etc.

Interface configuration module (that is, interface configuration module)

Interface configuration module provides maintenance function for the service interface information of service system. All service interface contents described by the access interface will be managed and maintained by interface configuration function.

Transaction recognition module (that is, transaction determining module)

Transaction recognition module is called service recognition module as well, for determining the service system service corresponded by the testing request. Transaction recognition module as entrance to the service system is maintained by the transaction recognition management function. The transaction recognition methods are different for different service systems. All functional configurations of the transaction recognition of the simulation service system are maintained in the transaction recognition management.

Service configuration module

Service configuration module determines the simulation service model adopted by some service. For the service with special requirement, the extended simulation service model may be selected to provide simulation service.

Business process configuration module

The customization of the business process simulation is realized by the business process configuration module. The customized contents of the business process simulation of the service can be adjusted flexibly by the business process configuration module. The state of the switch of the business process simulation will be also controlled by the business process configuration management.

Service result management module

The customization of the service structure is performed by the service result management module, and the response of the service can be adjusted flexibly by the service result management.

Data organization management module (that is, output configuration module)

All customized information of the output data organization function is performed by the data organization management and the contents of the service return information can be adjusted flexibly by the data organization management.

Backup recovery management module (backup module and management module)

Through backup and recovery management, the backup of the system information of the testing simulator can be accomplished by a simple click, or recover the testing simulator system to a required state so as to make the management of the testing environment easier.

The aforesaid are just preferred embodiments for the present invention, which are not used as limitation to the present invention. For those skilled in the art, the present invention can have all kinds of modifications and variations. All modifications, equivalent substitutions and improvements etc. within the spirit and principle of the present invention are included in the scope of protection of the present invention.

What is claimed is:

1. A simulation system comprising:

   a configuration device, for configuring an execution device according to testing environment necessary for testing a tested system;

   the execution device, for simulating the testing environment under the configuration performed by the configuration device to test the tested system.

2. The simulation system as in claim 1, which is characterized in that the configuration device comprises:

   an interface configuration module, for configuring an interface module of the execution device according to the testing environment necessary for testing the tested system;

   a scheduling configuration module, for receiving a transaction request from the tested system and configuring a scheduling module of the execution device according to the transaction request;

   a process simulation configuration module, for configuring a process simulation module of the execution device; and

   an output configuration module, for configuring an output module of the execution device according to the testing environment necessary for testing the tested system.

3. The simulation system as in claim 2, which is characterized in that the execution device comprises:

   the interface module, for receiving the transaction request from the scheduling configuration module under the configuration performed by the interface configuration module and sending the transaction request to the scheduling module;

   the scheduling module, for scheduling the process simulation module under the configuration performed by the scheduling configuration module;

   the process simulation module, for simulating the simulated system under the configuration performed by the process simulation configuration module to get a simulation result; and

   the output module, for organizing the simulation result under the configuration performed by the output configuration module and sending the organized simulation result to the tested system.

4. The simulation system as in claim 2, which is characterized in that the scheduling configuration module comprises:

   a transaction determining module, for receiving the transaction request from the tested system and determining relative information corresponded by the transaction request; and

a service configuration module, for configuring the scheduling module of the execution device according to the relative information.

5. The simulation system as in claim 2, which is characterized in that the process simulation configuration module comprises:

   a process configuration module, for configuring an executing process of the process simulation module of the execution device; and

   a result management module, for managing an executing result of the process simulation module of the execution device.

6. The simulation system as in claim 3, which is characterized in that the process simulation module is further provided with a switch, by turning off the switch to close a process simulation processing performed by the process simulation module.

7. The simulation system as in claim 6, which is characterized in that the process simulation processing comprises at least one of balance processing, account state changing processing, data transfer processing, and time delay processing.

8. The simulation system as any of the claims 1 to 7, which is characterized in further comprising:

   a backup module, for making a backup of data that is relative to the testing simulation system.

9. The simulation system as any of the claims 1 to 7, which is characterized in further comprising:

   a recovery module, for recovering the testing simulation system.