Fig. 5. Major components of a web-based referral information system.

with a user account, the password associated with the account, and the URL of the web server into an e-mail, which is then sent to the accepting hospital over the Internet. Therefore, an authorized person of the accepting hospital can log in to the web server with the URL, the user account, and the password for reporting the referral's medical records back to the referring hospital. The user account and the password are assigned dynamically when the e-mail is generated to protect the patients' care records from unauthorized access.

The authorized user of the accepting hospital can report the care plans, the progress, and the details of the referral's treatment by directly filling in forms as shown in Figs. 6 and 7 when she/he logs in to the web server using the user account and password. In contrast to the referring process, the acquisition integrator analyzes the items of the form-based RIF received from the accepting hospital, and initiates requests to the gateway server for restoring the data items back to the hospital's information systems. Thus, the referring physician can review the referral's RIF, which has been received from the accepting hospital, at his/her computer for follow-up or other purposes.

Workflow of the Referral Information System

The proposed system can easily be adapted into existing systems. It works as follows.

1. A physician prepares a patient's chart summary using the form-based interface shown in Fig. 3 when he/she decides to refer (or emergency transport) a patient to an accepting hospital.

2. The summary of the patient's medical care information can be collected automatically if the information is already stored in the hospital's information systems. The form-based interface also assists users to manually input the required information for compiling the chart summary.

3. After the physician has completed the chart summary, it is automatically sent to the referral service center.

4. When the patient comes to the desk of the referral service center, the center can access the patient's chart summary, and fill in the accepting hospital and other information required for referral management. The chart summary and other information are packed into the patient's RIF. The RIF can be transformed into the corresponding XML document, the