such as event massages, data in RFID tags, results of the data analysis can be storage in database.. In addition, the database or database server provides all kind of query or analysis capabilities with the record information of RFID systems. By using the Query/Analysis , different query functions such as query the location of product can be chosen by users.

To reduce the storage cost and to communicate with different third party applications that unify data storage format is necessary. In this proposal system, the eXtensible Markup Language (XML) is used as a data exchange standard. The structure is presented as follows Fig.6.

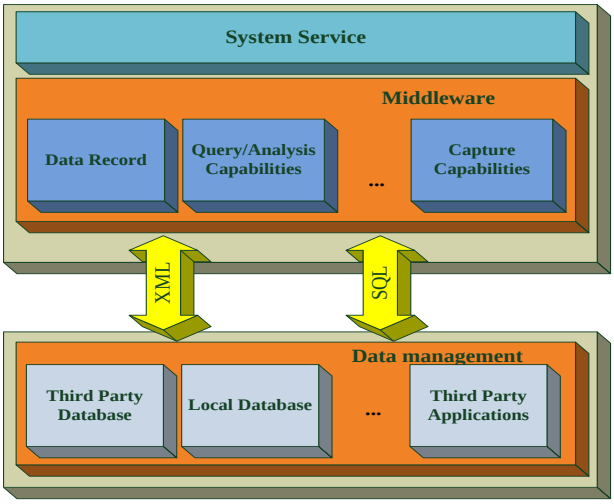


Fig.6. The structure chart of data exchange in Database management

### 3.4 Environmental Affection Estimation

To prevent and predict disease, several environmental factors have been studied [12-18] that provided some factors or functions which support our research. In this paper, considering the environmental affection estimation, five common factors are chosen in our studied, which are the temperature, humidity, wind, water, and history record. Due to that these five factors will change all the time and the environment of the objects with RFID embedded may be different, different weight value of affection estimation of these five factors are given during the calculation.

Temperature and humidity are local elements that affect disease infection directly of item (product or material). Temperature and humidity may cause disease or not according to kinds of pathogeny. Also, temperature and humidity are important factors for the spread of pathogens and the infection rate. Therefore, this paper takes these two factors into consideration and as the control condition. Since the temperature and humidity are not always the same at different location and time, the temperature and humidity should be observed with loction and time periodically.

When users input data obtained from RFID systems, the system starts to capture the environment data of product. Then system functions begin to compute with *Environmental Affection Estimation*.

In *Environmental Affection Estimation*, the probability of (shown in Table.1) objects affected by common factors such as the temperature, humidity, wind, soil, and history record may be different. Suppose that $P_i^d(t)$ is the predicted or estimated probability of specific object affected by disease via considering the environmental factos. $E_i^r(t)$ indicates the affected areas range of the $i^{th}$place or location at time t. The individual environmental affection factor is denoted as $F_i^{cd}$, and the prediction function of current affected area is denoted as $L_i^{occur}$, and the entire journey is denoted as $L_i^{entire}$. Then, the predicted probability and areas range can be defined as:

$$\mathrm{P_i^d(t) = \sum_{c=1}^{5} W_i^c(t-1) F_i^{cd}}$$
$$\text{where} \quad \mathrm{\sum_{c=1}^{5} W_i^c(t-1) = 1} \quad \text{and} \quad 0 < F_i^{cd} < 1 \tag{1}$$

and

$$E_i^r(t) = L_i^{occur}(t) \cap L_i^{entire\ journey} \tag{2}$$

where $W_i^c$ is the weight of each prediction function of individual environmental affection factor and C is a total number of reference factors. To enhance the degree of prediction accuracy, the weight values are dynamically changed according to the following functions:

$$\mathrm{W_i^c(t) = W_i^c(t-1) + \Delta W_i^c} \tag{3}$$

According to the individual disease occur or not, with the weight of the major factor $j$ ($j \subset C$) which affect the accuracy of the disease prediction will be adaptively re-given according to the function as follows:

$$\mathrm{\Delta W_i^j = X^{def} - \frac{X^{def}}{|c|}} \tag{4}$$

and the weight value of other factors will be

$$\mathrm{\Delta W_i^k = -\frac{X^{def}}{|c|}} \quad \text{where} \quad \mathrm{k \ni c \text{ and } k \neq j} \tag{5}$$