Analysis The child nodes dependence coefficient to parent node in tree structure services

[*]1-Mostafa Borouomand zadeh ,Faculty Member, Department of ICT, Payam Noor University, Khuzestan of IRAN,{mostafaboroumandzadeh@gamil.com}
2-Sayed Mohsen Hashemi, Young Researchers Club, maybood Branch, Islamic Azad University, maybood, Iran,{sayedmohsenhashemi@yahoo.com}

Abstract:

Nowadays , service providers in their services, in addition to the quality and service assurance have high focus on reduce the cost of services and acceleration in offering them .To a chive this , defining the quality and performance indicators modeling service , analysis service layers and relevant substrate are the most important operating and applied procedure .So in this paper ,mathematics and statistics and finally MATLAB software ,effectiveness rate ,efficiency and the importance of elements related to mother service has been challenged by definition of subservices relations (child nodes) with mother service (parent node) and manual and systematic sampling from it in a network or mail service . This process will be extended to all service and their related structures.

Key words:

Service Assurance, modeling service, random variables, tree structure, key performance indicator (KPI)

1- Introduction :

Cost reduction, time and improving the error detecting (debugging) mechanism in the process of offering service to customers, is the basic structural aspect of under discuss assurance service and also is an incentives and expressive introduction to this research paper and checking the relations in layers and the same service infrastructures and also, discuss the influence of effective factors when we offering service or where the server will offered.

In order to making integrated analysis from fundamental component's and constituent service and their relations .it's required to be aware of concepts and service modeling methods now if network will be the main bed (platform) to offering this service ,understanding and performance of the platform components will be equally has special importance . We can design a model of noted service by using precise and comprehensive identification of all mentioned component and understanding the modeling mechanisms sampling functional scenarios in different periods of time can be an appropriate tool for analysis and checking positive and negative effectiveness of various components related to the noted service.

Therefore, in order to weaken and reinforce the device that special component must be offered to the analyst .for instance, the rate and error number's which each service components will represent it by themselves in the process of offering it to the customer.
So in this paper, the noted process will be checked based a mail server and in a real network platform with 850 users .To go on this and before the main calculations , we will describing prerequisite concepts that a major share of them will concepts that a major share of them will be devoted to the system modeling

2- data and material

2-1- modeling

Service management is based modeling and there are different ways of modeling and depending an type and service approach the best method will be choose by the modeler .In describing service structure we mainly focuses on a particular aspect of service management such as (analysis, error controlling) Modeling is detailed oriented and highly specialized mechanism, that whatever be focused on deeper layers and system dimensions, results will provide the analyst ideas and more realistic practical solutions to make the final decision. Follow we refer to number of modeling methods

2-1-1- smart in charge model:

This model is an event correlation system (ECS) that supporting an object – oriented modeling language and also an engine correlation based on approach by using one code book.

2-1-2- measurement navigation graph model

Another example is a modeling method based on directed graph and spiral .whose nodes are variables measuring and its main purpose is to attain meant evaluation framework to identify the major problems of functional service.

2-1-3- Internet service model

Another example is the internet service model on which a service model whom the internet was it's internet purpose has been offered.

The mentioned models will define the required variables for alarms of service health.

3- Research methodology Basis modeling of services;

However ,the first step to building a service model as displayed in figure 1, is a sample analysis of the other hand each subservices can be separately depended to the other sub services and also will be divided into them.so it becomes very important to identify the subservice at this stage .

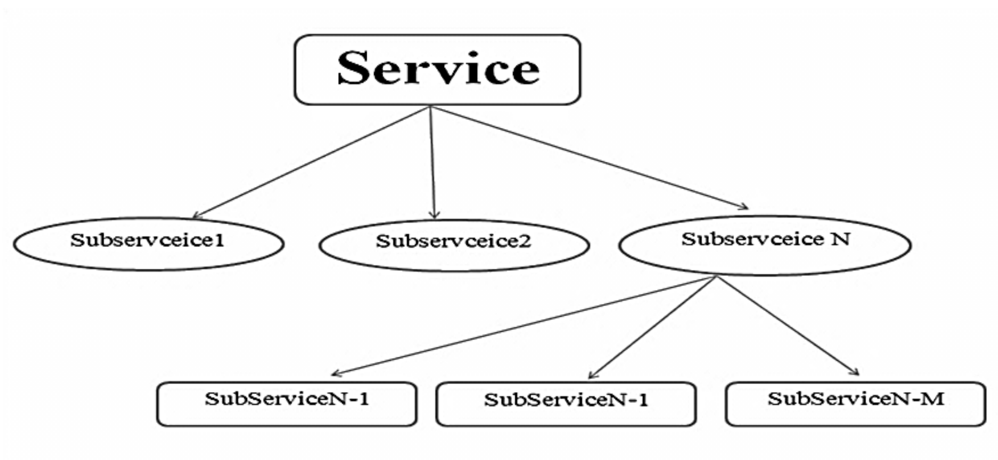

Figure 1 illustrate one service and divided it to subservice

3-2 KPI and KQI

3-2-1- introducing key performance indicator (KPI) and key quality indicator (KQI)key performance and quality indicators will be used in order to analyze the service model specially by using accounting technic to facilitate the weakness and strength points Parameters related to service .

In this section we will focus on KPI and also representing their categories:

3-2-1- three main groups of (KPI)

Existence function and advantage that each group solely will have three levels

3-2-1-1- three levels of existence

- Component is available
- The performance of component is poor but the is available
- Component is completely broken

3-2-2- three level of performance

- Normal
- Reduced
- Severally degraded and with nearly zero performance

The main point about key performance indicators (KPI) to modeling desired service is that information exchange between parent and child (nodes) must be considered just in a vital time to reduce the complexity of its calculations and relationships and also the key performance indicator (KPI) .Information's must be applied in modeling process and computing only when the child (node) is more alert and warning.

The purpose of it to prioritize the main parameters during the service error and also this case make it's examination faster .Figure 2 show the correlation between certain service component to (KPI) related services.

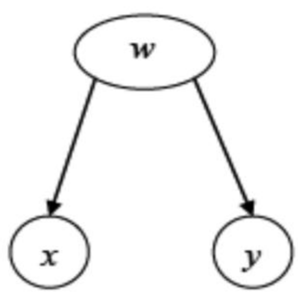

Figure 2 Analysis w component in two child node KPI

Based on fundamental definitions of variables and their statistical characteristics we can represent how the (KPI) and (KQI) will be modeled as random variables and sampled processing.

Many (KPI) and (KQI) can be considered and modeling as random variables or time serves and also random processes in a best way.

A random process is a sequence of variables $(X_0, X_1, X_2, \dots X_n)$where n indicator be considered as a separate time variable.

$$X = (X_0, X_1, X_2, \dots X_n) \quad (1)$$

x can also be considered as a random vector in which each member is a random variable due to the sampling from a continuous signal x also be called a separate random process

Since each $X_n$sample is a random variable, therefore, the average and auto – correlation of the random process is defined as follow:

$$X_n = E[X_n] \quad (2)$$

$$R(m,n) = E[X(m)X(n)] \quad (3)$$

On the other hand if the average of a random process is constant auto – correlation is only dependent on the time delay, it definitely be settled.

Namely:

$$E(X_n) = \text{Cons tant} \quad (4)$$

$$R(t) = E[X(n+t)X(n)] \quad (5)$$

We also have

$$\text{Mean}(x) = E(x) = \int xP(x)dx \quad (6)$$

And

$$\text{Variance}(x) = E[(x-mx)^2] = \int (x-mx)^2 \times P(m)dx \quad (7)$$

When δ is standard deviation, E(x) is expected value x and P(x) is density function. Density function is directly calculating the x probability by assuming, that the rang of probability in output between a and b are valued by function.

$$\text{Pr oability}[a < x < b] = \int P(x)dx \quad (8)$$

4- Results and analysis:

4-1- statistical analysis of key performance indicators (KPI) in service mode

According to service model we assume that child w –KPI with child x –y – z KPI have a relationship as this from:

$$W = f(x, y, z, \ldots) \quad (9)$$

Now, if only three child (KPI) will be apply for the mentioned relation .we have

$$W = a + bx + cy + dz + u \quad (10)$$

Means we have a linear relation from child (KPI) when (a,b,c,d) are constant and u is an indefinite variable .

Now, by assuming the child (KPIs) as non-correlation (w) Variance will be calculated by this function:

$$\delta^2 w = b^2\delta^2 x + c^2\delta^2 y + d^2\delta^2 z + \delta^2 u \qquad (11)$$

Therefore, by accumulating statistical information such as average and standard deviation from all of the mentioned materials, we can describe the impact of x, y and z (KPIs) on w variance.

To check and calculate the coefficients given we'll have assumptions such as u – uncertain variable that has zero average and u – is non - correlation for child (KPIs)[7].

$$(E(ku) = 0), \text{where } k = x, y \text{ or } z \qquad (11)$$

We have the following equations from two mentioned conditions

$$E(w) = a + bE(x) + cE(y) + dE(z)$$
$$E(xw) = aE(x) + bE(x2) + cE(xy) + dE(xz)$$
$$E(yw) = aE(y) + bE(yx) + cE(y2) + dE(yz)$$
$$E(zw) = aE(z) + bE(zx) + cE(zy) + dE(z2)$$

The mentioned equations are called normal equations and can be written in matrix

Form as $MV = C$

$$M = \begin{bmatrix} 1 & E(x) & E(y) & E(z) \\ E(x) & E(x^2) & E(xy) & E(xz) \\ E(y) & E(xy) & E(y^2) & E(yz) \\ E(z) & E(xz) & E(yz) & E(z^2) \end{bmatrix} \qquad V = \begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} \qquad c = \begin{bmatrix} E(w) \\ E(xw) \\ E(yw) \\ E(zw) \end{bmatrix}$$

Obviously to reach the desired v matrix that is the considered coefficient's .we have

$$V = M^{-1}C$$

4-2 structural adjustment studied with part method

The studied network platform comprises several departments such as:

Cable and wireless connections and data center DNS and DHCP servers, several types of core switches, Distributed and Access, net Dial up system (E1 Liners and analog).Mail service and ... Etc. that among other services that mail server was chosen, due to the integrity and log files clearness and the numbers of values were applied statistical methods. In figure 3, service constituent and nodes can be seen in a tree graph.Furthermore, the resulting log file in xi form derived from different parts of mail server is described. According to table 1 x_i sampling form users accomplished by questionnaire or taking log file from server in fact. The resultant values will represent the child node error numbers.

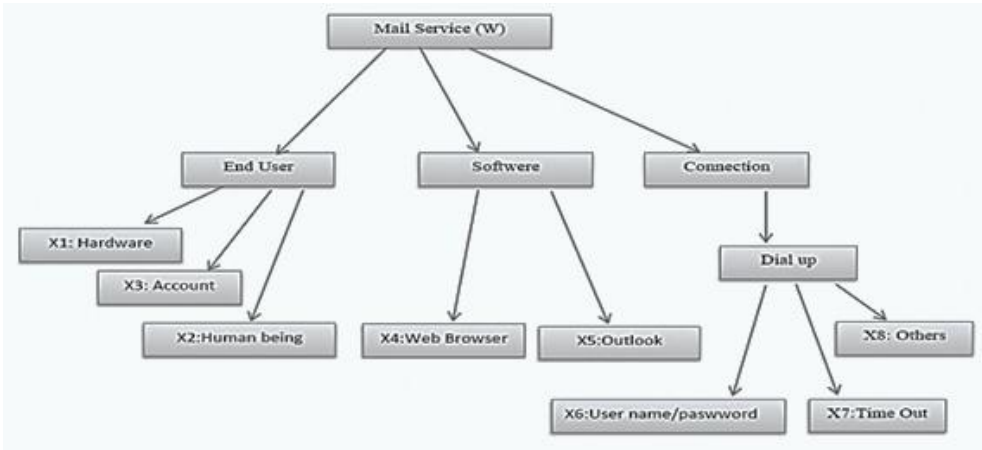

Figure 3 is a mail service decompostion graph to child nodes

4-3- Defining errors in x_i's format

1-(x1:hardware) this is variable represent the number of computer systems that had hardware problems in (n)days (from 1 to 3 days) and when the users want to connect to the mail server and using the mail service in this case they could not get the service that will describe in section (4-4).

2- (x2: human being):this is variable represent the number of human errors from using hardware and software in cycle and entering the required information to connect to the mail server in (n)days for example, the dictation error typing of U/P or performance errors during the communication and … etc.

3-(x3: account): this is variable represent the number of users errors in entering their **account and** connecting to the mail server in (n) days.

4-(x4:web browser):this variable represent the number of computer systems that had a software problems or disorder in (n)days (in the web browser) and if the users want to connect to the mail server to using the mail service they do not able to get the service .

5-(x5: outlook express) : this is variable represent the number of computer systems that had a software disorders in (n)days in this case if the users want to connect to the mail server and to use the mail service they do not be able to get this service .

6-(x6: U/P) : this is variable represent the number of human (users) errors in entering the U/P in order to connect to the Dial Up System and eventually connecting to the mail server in (n)days .

7-(x7: time out) : this is variable represent the number of errors due to the time out given from the center to users in order to connecting to network from outside the corporate to use the service .

8-(x8: others): this is variable represent the number of errors for various reasons such as : lock of user with valid profile to the mail server , error in enter communications after the connection and etc.

9-(w: mail service fails): this is variable represent the number of logged errors in mail server. For instance, W=50 for different reasons means the inability of 50 users in using the mail service. Clearly the defined X_i will have more efficient in this parameters.

As already mentioned, the sampling of X_i that their values were shown in table1 has been collected during the 30 days. Should be noted in calculating the (w) addition to using the mail server's log files another factor also has been applied. This factor in the percentage of systems that had disorder (problem) and wanted to connect to the mail server in the same day. This percentage is gathered by taking the (w) from mail server's log file . The way of this impact percentage will be described in 4-4 section.

Table 1

days	۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵
X1	۴	۵	۶	۹	۳	۴	۲	۵	۶	۲	۴	۳	۷	۷	۶
X2	۱	۰	۰	۲	۱	۱	۰	۱	۰	۰	۰	۱	۰	۰	۱
X3	۰	۰	۱	۲	۰	۳	۱	۰	۱	۱	۰	۰	۰	۱	۰
X4	۲	۱	۰	۳	۱	۲	۱	۳	۰	۱	۱	۲	۱	۳	۱
X5	۱	۲	۰	۰	۳	۲	۲	۱	۰	۱	۱	۰	۰	۰	۱
X6	۳۴	۱۸	۲۸	۲۰	۴۱	۳۶	۱۳	۳۲	۳۰	۳۱	۳۷	۳۹	۲۷	۳۱	۳۰
X7	۱۵	۱۲	۱۱	۱۱	۱۲	۱۸	۱۸	۱۶	۱۷	۱۲	۱۰	۱۱	۲۰	۱۹	۱۷
X8	۳۳	۲۹	۳۶	۲۶	۲۷	۲۴	۲۸	۳۳	۳۷	۳۰	۳۰	۳۰	۳۳	۳۴	۳۵
W	۶۰/۷۱	۵۳/۱۰	۴۱/۲۱	۶۷/۷۷	۴۹/۱۱	۴۴/۵۲	۵۹/۸۶	۵۴/۷۵	۶۵/۶۵	۶۸/۹۳	۶۶/۳۱	۴۹/۳۷	۴۴/۶۲	۴۶/۱۰	۴۵/۷۲

Table 1

days	۱۶	۱۷	۱۸	۱۹	۲۰	۲۱	۲۲	۲۳	۲۴	۲۵	۲۶	۲۷	۲۸	۲۹	۳۰
X1	۶	۴	۹	۰	۱	۲	۰	۰	۳	۵	۴	۱	۲	۰	۷
X2	۰	۱	۰	۲	۱	۱	۱	۰	۳	۱	۰	۰	۱	۰	۰
X3	۱	۰	۱	۳	۲	۱	۱	۱	۲	۰	۱	۰	۱	۰	۲
X4	۰	۰	۰	۰	۰	۱	۰	۰	۱	۳	۱	۱	۰	۱	۲
X5	۳	۱	۲	۱	۱	۱	۲	۳	۰	۱	۱	۱	۱	۰	۰
X6	۳۳	۳۲	۲۸	۳۴	۲۹	۲۸	۳۷	۴۰	۳۶	۲۵	۲۲	۳۱	۳۶	۳۴	۳۵
X7	۲۶	۱۵	۱۴	۱۷	۱۴	۱۳	۲۳	۲۲	۲۷	۲۴	۲۹	۲۹	۲۴	۱۹	۱۵

X8	۲۴	۳۰	۳۶	۲۹	۲۶	۳۱	۲۹	۳۵	۲۸	۲۸	۳۸	۲۶	۲۶	۲۴	۲۵
W	77/55	۶۳/۲۲	۷۴/۲۷	۶۴/۰۳	۶۸/۵۹	۵۷/۸۱	۵۴/۵۷	۵۳/۰۵	۴۶/۵۸	۴۳/۵۵	۴۴/۹۰	۵۵/۴۷	۶۳/۵۰	۶۳/۸۸	۷۴/۸۸

4-4 error's analysis method for calculating (w) in sampling days.

4-4-1- the method of calculating the additional impact percentage of hardware errors in (w)

it was checked that in the first day 71 person of 850 person (the total number of people who was connected to the center network and were the users of the mail server)were used the mail service on the office time (at work) and obviously had no hard were problem . so 8/35 % of those people were from this category .on the other hand in x1 line from table 1 for the first day 4 computer's had a hard were problems and if it was not, generally 0/334 of them (4×8/35%) =0/334, also can used this mail service but they the first day of calculation and have been gathered with (w) in first day. (Received quantity from the mail server information files).

4-4-2 they way of calculating the additional impact percentage of software errors in (w)

In first day 3 person (total x4, x5) had software related to using the mail service therefore, 25.5% number of them (3×8/35=25.5%) in the absence of such problems they could use the service. so this impact percentage is calculated for all errors of the first day and gathered with (w) in first day .(Received quantity from the mail server information files of mail server).

4-4-3-the way of calculating the impact of additional percentage errors for Dial Up subscribers for (w)

According to a statistic taken from 42 person of 850 users (equivalent to 4/94%) by using the dial up system outside the office time they benefited from mail service. so about the first day sampling that 82 person (total x6, x7, x8) due to the dial up system disorder had problem in using the service. if this problems do not come in .(82×4/94%=4/0508)of them can use the mail service. however, according to the expectancy of mathematical and average concepts,

We have

$$E(xi) = \left(\sum xi, i = 1 \; to \; k\right)/k$$

$$E(xi^2) = \left(\sum (xi)^2, i = 1 \; to \; k\right)/k$$

$$E(xi.xj) = \left(\sum xi.xj, i = j = 1 \; to \; k\right)/k$$

$$E(w) = \left(\sum Fail \; in \; day \; (j), j = 1 \; to \; k\right)/k$$

$$E(xi.w) = \left(\sum \left(Fail \; in \; day \; (j)\right)xj, j = 1 \; to \; k\right)/k$$

K: the number of sampling days

So, according to 4-1 and calculation of all required quantity by using the MATLAB software simply we can building the matrix and sub squally we can get the inverse matrix M, that by multiply the matrix C. The (v) coefficient that the influenced coefficients of X_i in mother node can be seen in it was received.

4-5- analyzed samples by statistical relations and mathematical functions

According to the figure 3 will see that the mail servers errors are function of their child node errors that is the (End User), software and connection, that each one is a function of their child nodes. now by assuming that all defined function are linear function then we conclude that the (w) error, is a linear function of (x1 to x8) random variables , that will be demonstrated as follow.

$$W = a_0 + a_1 x1 + \ldots + a_8 x8 + b_0 u \qquad (12)$$

Here (u) is an unknown random variable that we consider it as noise and also omitted it from the subsequent equations ,in equation (12) there are (9)secret numbers and to resolving it (9) equations with non -random variable are required. But to achieve this we can calculate the both side of expectancy mathematical in a mentioned equation, but in this case just we have one equation too, to get the eight (8) equations we multiplying the both sides in equation (12) and multiply them from x1 to x8 means:

$$\mathrm{Wx1} = \mathrm{a0x1} + \mathrm{a1x1x1} + \cdots + \mathrm{a8x1x8} \qquad (13)$$

$$\mathrm{Wx8} = \mathrm{a0x8} + \mathrm{a1x1x8} + \cdots + \mathrm{a8x8x8} \qquad (14)$$

The matrixes from of mentioned equations are

$$x = \begin{vmatrix} 1 & x_1 & x_2 & x_3 & x_4 & x_5 & x_6 & x_7 & x_8 \\ x_1 & x_1x_1 & x_1x_2 & & & & & & x_1x_8 \\ x_2 & x_2x_1 & x_2x_2 & & & & & & \\ x_3 & & & & & & & & \\ x_4 & & & & & & & & \\ x_5 & & & & & & & & \\ x_6 & & & & & & & & \\ x_7 & & & & & & & & \\ x_8 & x_8x_1 & & & & & & & x_8x_8 \end{vmatrix} \begin{vmatrix} a_0 \\ a_1 \\ \\ \\ \\ \\ \\ \\ a_8 \end{vmatrix} = \begin{vmatrix} w \\ x_1w \\ \\ \\ \\ \\ \\ \\ x_8w \end{vmatrix}$$

If it taken from the mathematical expectancy we have:

$$E\{\underline{X}_1\}.V_1 = E\{\underline{C}_1\} \qquad (15)$$

That in this equations $\underline{X}_1$ equall:

$$\underline{X}_1 = \begin{vmatrix} 1 & x_1 & x_2 & x_3 & x_4 & x_5 & x_6 & x_7 & x_8 \\ x_1 & x_1x_1 & x_1x_2 & & & & & & x_1x_8 \\ x_2 & x_2x_1 & x_2x_2 & & & & & & \\ x_3 & & & & & & & & \\ x_4 & & & & & & & & \\ x_5 & & & & & & & & \\ x_6 & & & & & & & & \\ x_7 & & & & & & & & \\ x_8 & x_8x_1 & & & & & & & x_8x_8 \end{vmatrix}$$

$$\underline{V}_1 = [a_0\ a_1\ \dots\ a_8]^T \qquad (16)$$

$$\underline{C}_1 = [w\ wx_1 \dots wx_s]^T \qquad (17)$$

And the (T) mark on the top of the C and V

Vectors is a transposed sign of a vector or matrix, if we demonstrate the mathematical expectancy of this matrix and its vectors with $\underline{X}, \underline{v}, \underline{C}$

We have

$$\underline{X}.\underline{v} = \underline{C} \qquad (18)$$

Assuming that (x) has an inverse

$$v = \underline{X}^{-1}.\underline{C} \quad \text{OR} \quad \underline{X}^{-1}.\underline{X}.v = \underline{X}^{-1}.\underline{C} \qquad (19)$$

And we can obtain the matrix coefficient by this way.Precise calculations is important hear, because (w) have an unknown and approximated distributions from x1 to x8. if we can approximately assume x1 tox8 distributions normal with rang average of $\mu_1$to μ_8 and standard deviations of δ_1 to δ_8 in this case the distribution of the mean (average)sample X_i approximately of a normal distribution with an average of $\mu_{x_i} = \mu_i$and is standard deviations of $\delta_{x_i} = \delta_i \div \sqrt{k}$ here (k) is the number of selected sample to get the mentioned $\mu_{\bar{x}_i}$, $\delta_{\bar{x}_i}$and the $\underline{X}$, $\underline{C}$ matrix equations .like

$$Z_i = (X_i - \mu_i)/\sigma_i \qquad (20)$$

When (z) are normal standard variables, we have equation as follow

$$X_i = \delta_i.Z_i + \mu_i \qquad (21)$$

And if we replace this formula in (w) equation we have

$$W = a_0 + a_1x_1 + \cdots + a_8x_8 = a_0 + a_1(\delta_1Z_1 + \mu_1) + \cdots + a_1(\delta_8Z_8 + \mu_8) \qquad (22)$$

$$\Longrightarrow W = b_0 + b_1z_1 + \cdots + b_8z_8 \qquad (23)$$

That in it

$$b_0 = a_0 + \sum_1^8 a_i\mu_i \quad , \quad b_i = a_i\delta_i \qquad (24)$$

In fact, equation (23) is a new one that is obtained with replacing b1 with a1 and z1 with x1.In this study or (research) by the linear Tran formation we tried replaced the x1 to x8 variables to N (0,1)normal variables .(by finding δ_i and $\mu_i$and their interval confidence with MATLAB) and also by the linear replacement $y_i = (x_i - \mu_i)/\delta_i$ and again like the reasoning mentioned above we understanding that we can get the same equation of (23) namely :

$$W = d_0 + d_1 y_1 + \cdots + d_8 y_8 \tag{25}$$

$$d_0 = a_0 + \sum_1^8 a_i \mu_i \quad , \quad d_i = a_i \delta_i \tag{26}$$

To testing our hypothesis due to the excessive noise and unknown distribution of variables and also . according to the original data and numbers of variables lower them 30 , we must not expected a good and accurate prediction therefore , we set up tests in despite the existent of higher and lower numbers of (k) and adding the normal noises .

$N((\mu c_{i^{(2)}} - \mu c_{i^{(1)}}) \times \rho, (\delta c_{i^{(2)}} - \delta c_{i^{(1)}}) \times \rho)$ And the data were done by $\rho = 1$, $\rho = 0.5$

5- conclusions

In figures (4) and (5) we use 19 points for finding conversion parameters and we used the rest (11) points for prediction .in figure (10) this was done by 30 days and 150 points.

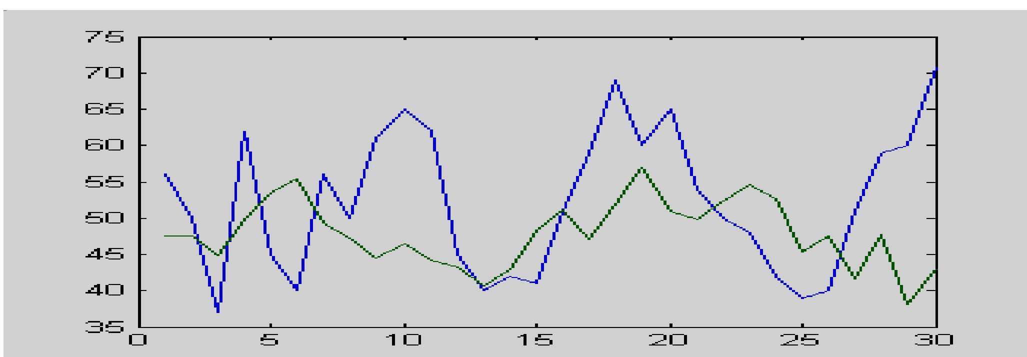

Figure 4 (w) using the lower interval return of confidence

Figure (4) demonstrate the result of changing and using the lower interval assurance output of δ and μ for parameters. Generally we can see that the prediction is lower than the actual number and changes is very slow in the prediction means that μ and δ (due to the change) are less.

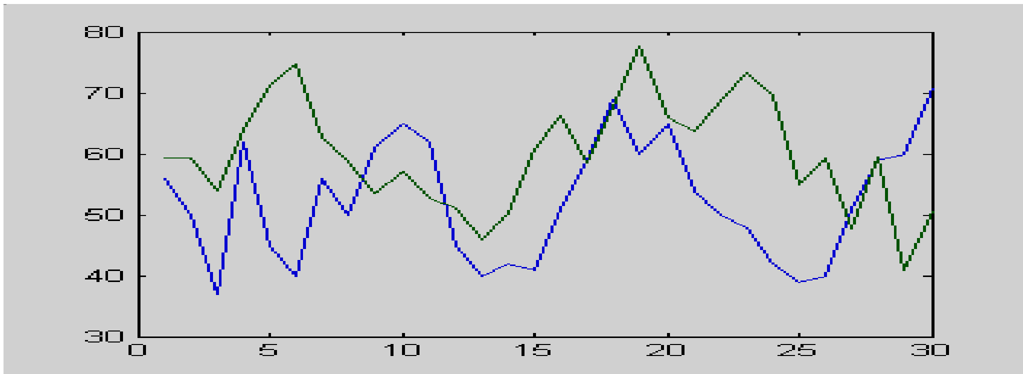

Figure 5 using the higher interval return of confidence

Figure (5) resulted from the change and using the high output interval of δ and μ . That in despite figure 4 predictions are higher and changes had done very quickly.

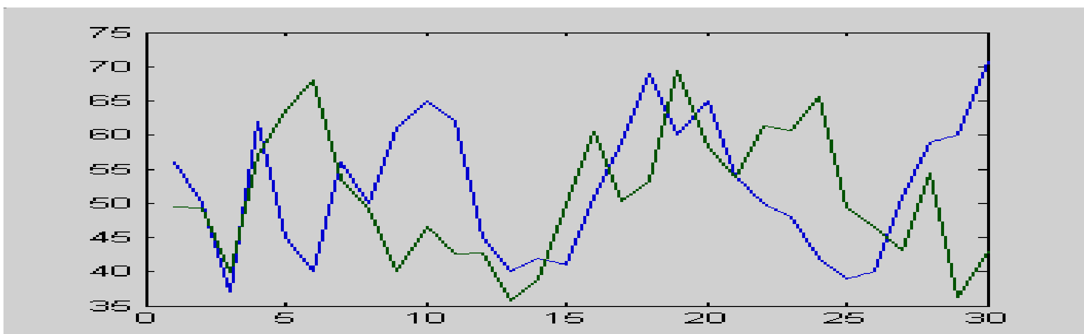

Figure 6 using the middle interval return of confidence

Figure (6) is resulted from change and using the original prediction parameters.so prediction will be the middle quantity for both of them.

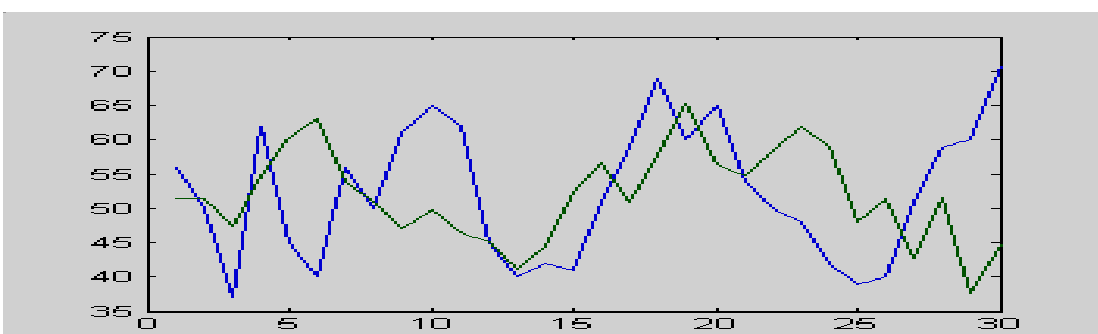

Figure 7 without using software

Figure (7) is the result of resolving the problem by using δ and μ parameters that they were calculated directly and without using software .namely

$\delta^2 = E\{(X_i - x_i)^2\}$ $E\{X_i\} = \frac{\sum X_i}{k} = x_i$ *i=1,…, 8*

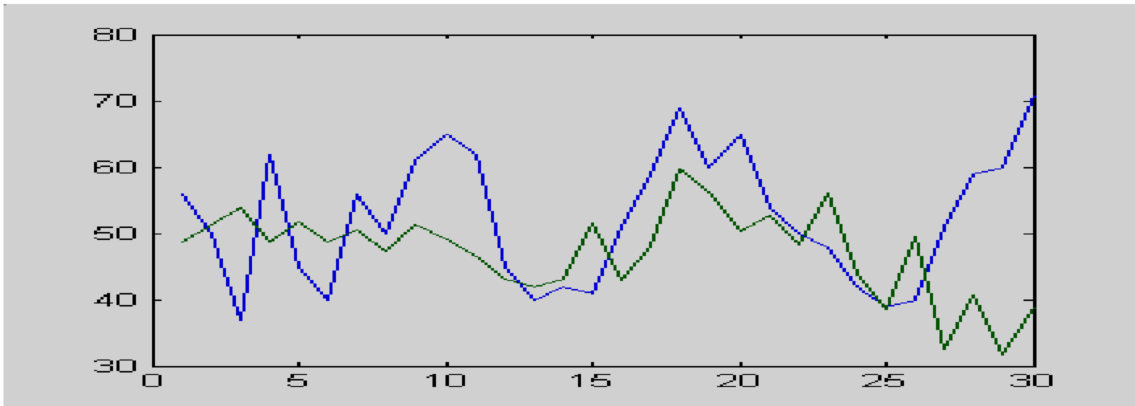

Figure 8 without using the transformation formula to normal standard

Figure 8 was made without using a linear transformation and data were directly applied in the calculation formula of vector V.

We find out that figure (7) and (8) are not much differ just only the prediction changes in figure (8) are made slowly.

In figure 4 to 8 and table 1 that show the confidence interval of data we see that relatively due to the high quantity of these returns. the output noise is high and also due to the number of lower points (data sampling) in this case we could not have an accurate prediction.to prove this hypothesis we generated attest sample consists of 180 lower points of y1 to y8 that it's parameters was equally to the x8 to x1 parameters but they subordinated from the normal distribution by normal noises with mean value equal 25% that is the length of output confidence (assurance)for and diffraction of 50 % the output confidence length for δ_i and also adding them to the original data of (x1 to x8) therefore , we produced a hypothetical input data and by estimated the parameters of data we could predict the changes . Examination was done by 15 and 19 points in figure (9) and (10) as we can see in both figures that the predictions are better but are not accurately. So, according to the presence of high noise we concluded that the implemented method had a good performance so .so assuming the (w) relationship to (xi) as linear is almost a correct hypothesis.

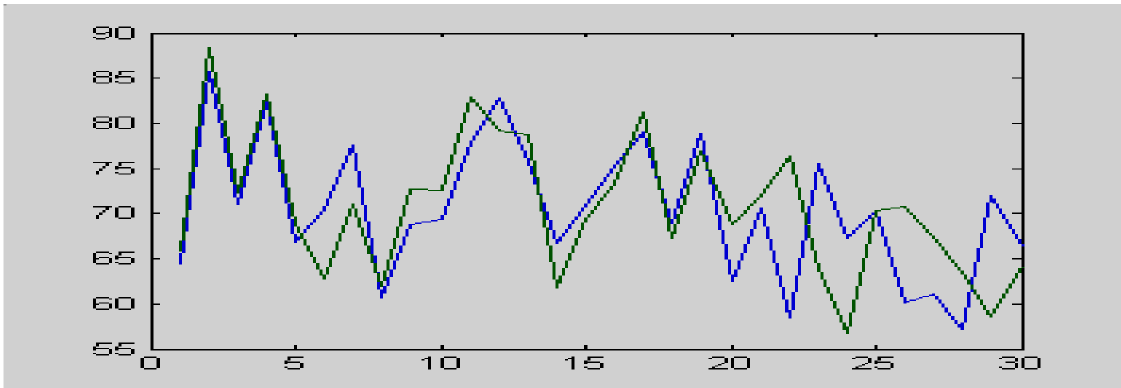

Figure 9 with artificial noise data and 19 test points

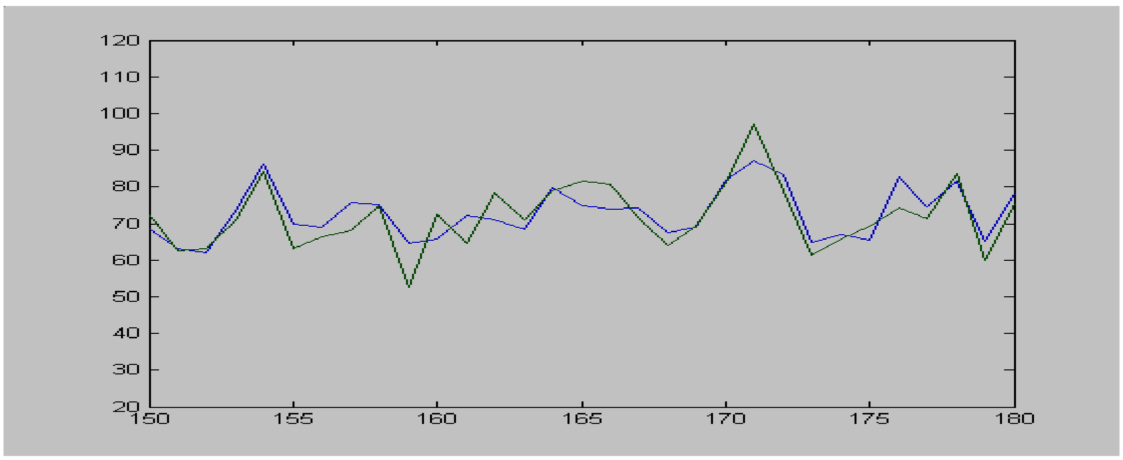

Figure 10 with artificial noise data and 150 experimental points

Assuming the xi's distribution as normal is almost correct.Although the noise was very high this method has a good reaction.One cause that the system has fault is the lower number of sampling points.The sophisticated generation experiment confirmed the hypothesis of mentioned data the represented method in (assurance service system) by assuming the dependences as linear and in order to find .the rate of service component's dependency KPI's and finally time and cost reduction in order to resolve the problem when the error is occur so this method it's a remarkable method. Such an analysis can be apply as a generalized analysis in connection with other service, and in the set of larger network and also in whole elements of the large network.
Hope that the results could be an incentive profound for people who are interested in the subject of assurance quality in offering the network services and also to flat the background for further research in this domain.

Acknowledgment:

This paper was organized based on the foundation research in Khuzestan PAYAM NOOR university of IRAN and Department of Computer Branch Maybod Islamic Azad university of Iran we should thanks the named organizations.

Reference:

[1] Berry, R., and J. Heller stein, “A Unified Approach to Interpreting Measurement Data in Performance Management Applications, “First IEEE Conference on Systems Management, University of California, Los Angeles, May 1993.

[2] Heller stein, J., et al., GAP: A General Approach to Quantitative Diagnosis of Performance Problems, IBM Research Report, December 16, 2002.

[3] Smith, M., D. Caswell, and S. Raman than, Modeling of Internet Services, Agilent Technologies, patent number 6138122, October 2000.

[4] “Automating Root Cause Analysis,” SMART white paper, 2004, http://www.smarts.com.

[5] Lau, R., and R. Khare , “Service Model and Its Application to Impact Analysis, First International Workshop, SAPIR, 2004.

[6] Sanders, G., et al., GPRS Networks, New York: John Wiley, 2003.

[7] Richard Lau , Ram Khare , William Y. Chang ; Service Assurance for Voice over WiFi and 3G Networks, 444 pages, Artech House (August 31, 2005)