Cloud Computing Intelligent Management to Improve Stability and Security

Mazin Haithem, RazukyAL Shaikhly
Baghdad College of Economic Sciences University

Abstract

Many changes have been occurrence in information Technology in the current century. but the great changes are associated with cloud computing. Cloud computing provides services for many users thus when traffic increases, cloud may be instable and may be unsecure. This paper attempt to find an intelligent system to improve stability and security by using genetic algorithm to calculate trusted and untrusted users from the specific list that register users behavior and service: IAAS , PAAS and SAAS .All information have been sent to intelligent firewall (GA firewall) as a first step to save cloud from attack and then distribute all the requests which depend on its types by using Round Robin scheduler algorithm to process the request. Implantation of system has shom good and encouraging result.

Key word: Cloud Computing, Schedule Process, Intelligent Management

المستخلص

لقد حدثت العديد من التغيرات في تكنولوجيا المعلومات خلال القرن الحالي ولكن التغيير الكبيرة يوصف مع الحوسبة السحابية. التي توفر خدمة لكثير من المستخدمين وبالتالي عندما تزيد حركة المرور سحابة قد تكون غير مستقرة وقد تكون غير آمنة, في هذه الورقة محاولة إيجاد نظام ذكي لتحسين الاستقرار والأمن باستخدام الخوارزمية الجينية لحساب المستخدمين الموثوق بهم وغير الموثوق بهم من قائمة تسجل المستخدم وسلوكة ضمن الخدمة , IAAS ,SAAS, PAAS جميع المعلومات ترسل لجدار الحماية الذكية . وهي خطوة أولى لحفظ سحابة من الهجوم ثم توزع الطلبات اعتمادا على نوع الخدمة باستخدام خوارزمية جدولة روبن لمعالجة الطلبات . بتنفيذ النظام تشير إلى نتيجة جيدة جدا.

1-Introduction

Cloud Computing is defined a convincing worldview for overseeing and conveying administrations over the web. The ascent of Cloud Computing is quickly changing the scene of information technology and etc. Many researches on cloud management and ideas for intelligent management[1], the main objective is to improve stability and security in all time of system online. Paper layout as is follos, section 2 cloud computing, section 3 intelligent management system, section 4 experimental result and section 5 conclusion

2-Cloud computing

The dynamic scalable and virtualized resources provider for services over the Internet become a significant technology trend, and many experts expect that cloud computing will reshape Information Technology (IT) processes and the IT marketplace.. [1][2]

2-1- Cloud Management

Cloud management and automation tools are coming into the market specifically to address these pain points; it enables the users and administrators to assemble and directly manage cloud service environments as shown in figure 1.[2][3][4][5]

Figure 1:Cloud Computing Management[3][4]

Cloud management refers to cloud computing products and services. Public clouds are managed by public cloud service providers, the environment of public cloud content servers, storage, networking and data center operations [2][6]. Public cloud user select service from three basic categories:

- **User self-provisioning:** (user/ clients) buy cloud services directly from the supplier through a web (form or console) interface. The user pays on a per-transaction basis.
- **Advance provisioning:** (user/ clients) contract in advance a predetermined amount of resources," which are prepared in advance of service. The customer pays a flat fee or a monthly fee".
- **Dynamic provisioning:** when the (user/ client) needs resources provider allocates, he decommissions them when they are no longer needed. The customer is charged on a pay-per-use basis. [3][6][7]

Administration apparatuses for private mists have a tendency to be benefit driven, instead of asset driven, in light of the fact that cloud conditions are regularly very virtualized and composed regarding compact workloads[8].

In half breed cloud conditions, process, system and capacity assets must be overseen over different spaces, so a decent administration methodology should begin by characterizing what should be overseen, and where and how to do it[2][7][9]. Strategies to help represent these areas ought to incorporate design and establishment of pictures, get to control, and planning and reporting ing. Access control regularly incorporates the utilization of Single sign-on (SSO), in which a client sign in once and accesses all frameworks without being incited to sign in again at each of them. [3][7][9]

2-2- System Stability Factor

When the system provides service without any delay of failure that refer to system stable and that many factor must exist such as:

1- The bility to improve control on resource and managing it without any problem.

2- Define re-ability rule for system .

3- Automatically correct error by defining safe mode for most expected error occurrence.

4- The bility to shutdown system if any "internal or external" event (effect) impales to system service failure "unable to provide service with stabile case" can't be corrected automatically.

And many factors can be defined and depend on system function, activity , service type that are provided (or needed by client) within crowding time [3][10]

2-3- Stability And Security

Cloud is described stable when it processes all jobs with an active queue without any crash [10]. Security of cloud refers to marriage between ' technologies and policies 'to protect information, data applications and infrastructure associated with cloud computing use.[11]

Any system if stable must be secure while it is designed to be a secure system. [3][12] [13]

2-4- Scheduling Algorithm and Stability

Cloud computing works as virtual resources provider for multi user with random selection for whom they need service. Thus to improve stability must use scheduler algorithm to avoid instability, it of system with crowded case. [3][12][13]

2-5 Intelligent Management

The process of managing and organizing the various sources collection of intelligence is a . basic validation of what it collects, but is not supposed to analyze its significance represent to the collection department of an intelligence organization. [14]

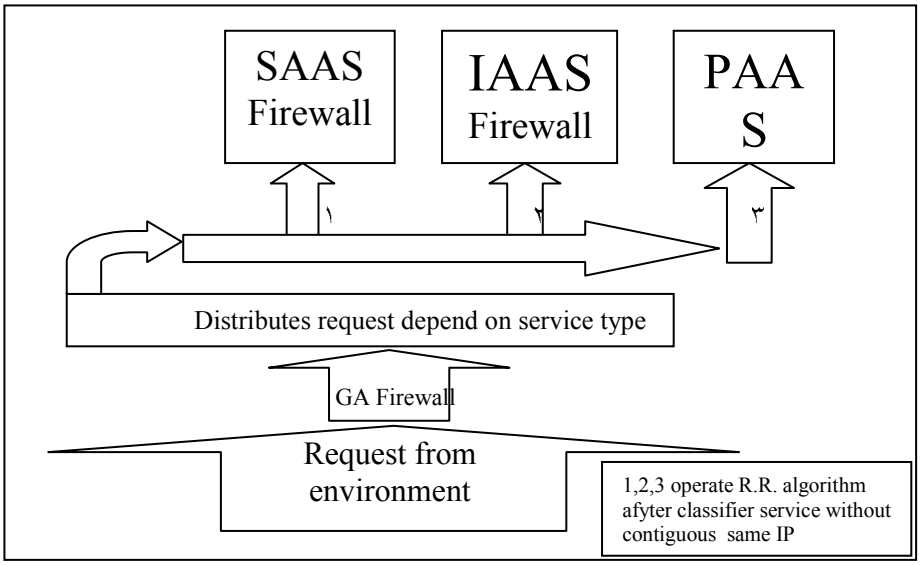
The set of processes and underlying technology solutions that enable organizations to understand, organize and manage all sorts of datat ypes (e.g., general files, databases and e-mails) I***ntelligent Information Management*** (IIM) includes:

1- Automated patching
2- Infrastructure database
3- Integrated IP device discovery
4- Alarms and events
5- Integration with third party applications
6- Data sharing. [3][13][15][16][17]

3-Intelligent Management System

This section explains main engine that processes request from e-environment .The following figure (2) illustrates the main item of candidate system with its main scope:

1-Reading request from e-environment and queue form inserting.
2-Fetching query to GA .
3-Operateing GA firewall to improve security polices remove and to special queue all unlike process depend on fitness value
4-distributed depend on service
5-Using Round Robin Algorithm as scheduler tools



3.1. Genetic Algorithm Coding And Firewall Log Record Design

This section gives an overview of all terms existing in the firewall record and **yes** marks to all terms needed with a proposal design shown in table 1 below.

Table 1 Firewall Record Terms

Term	Needed in Activities	
Time	Yes	4 bit
Action Firewall	-----	
Interface	--------	
Product	--------l	
Source	Yes	32 bit
Source Port	--------	
Destination	Yes	32 bit
Service	------	
Protocol	TCP	
Translation	------	

Byte send	Yes	Depend on

3.1.1 Converting Log To Genetic Chromosome

To convert firewall record as chromosome in general, it must select one or more terms as demonstrated in section 3.1. Table 2 gives an example of converting values.Thus needs 4bit for time , 64 bit for Source and destination and final 4 bit need 72 bit to represent log record.

Table 2 Convert Example

Term	Needed activity	As record	Binary value
Time	Yes	12:00	1100
Source	Yes	148:22:118:80	10010100000101100111011001010000
Destination	Yes	126:15:106:73	01111110000011110110101001001001
Protocol	TCP		
Byte send	Yes	4 bit	

- Within a manage based framework, the tenets put away in the govern base are generally in the accompanying structure: if <condition> then <action> as it is shown in this stuely case :
- On the off chance that {the association has taking after data: source IP is 209.11.1.155; goal IP address: 109.1.1.17 ~ 109.1.1.21; goal port number: 8184; the convention utilized is FTP; the originator sent more than 10,000 bytes of information; and the responder sent more than 250,000 bytes of data } **then** {stop the connection}

3.1.2 Fitness Function

The goal is to avoid intrusion to network from any outside attack as shown in algorithm below:

Algorithm 1

rem using IP length =32bit (binary convert)= chromosome-4bit

Chromosome 36 bit thus - 4 bit

rem fitness 30-1 refers to max value (block IP)

1-loop

- Check I/O port per time
- If IP[current] throughput > max_value then
  Fitness[current]++

2- until I/O port off

3.2. Management with(Genetic and Round Robin heduling)

The main item of algorithm is how to schedule requests without any deadlock "don't guide system to critical(instability) regain "Thus using slice time with download control cover by genetic firewall is to improve stability and security as shown with the algorithm bellow :

Algorithm 2

1-Start

2-Loop

-Read request from environment

-Feching request after GA firewall pass check with download / upload control if pass then start with slice time

3-Until no request

4-End

4-Experimental Result

Running of simulated system with Genetic feature (in traffic mode) saves the following values from system with fitness.

The following chart gives a sample fragment view, shown in table 3,whereas .

X axis = 1..75 sequence of IP

and Y axis =1..25 fitness value (threat degree)

if fitness value [current IP] = 29 ”30-1” (max threat) ***then*** put in critical queue IP[current],"using slice time schedule algorithm "

Where current= current I/O value

Figure 3 illustrates Segment of Results in Table 3

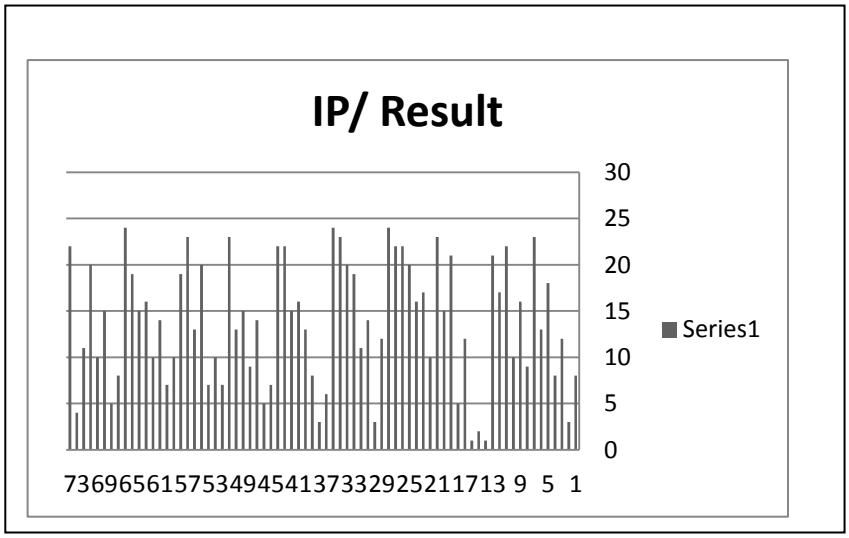


Figure 3: Carve From table 3 Result

Table 3 Segment of Result From System

address	Ip with Binary represent	Result
189:108:93:214	10111101011011000101110111010110	19
185:148:230:169	10111001100101001110011010101001	8
182:51:165:56	10110110001100111010010100111000	3
187:68:150:101	10111011010001001001011001100101	12
195:130:156:137	11000011100000101001110010001001	8
192:65:163:63	11000000010000011010001100111111	18
176:88:123:184	10110000010110000111101110111000	13

176:84:142:127	10110000010101001000111001111111	23
178:122:232:111	10110010011110101110100001101111	9
173:130:200:208	10101101100000101100100011010000	16
195:124:131:163	11000011011111001000001110100011	10
183:97:184:203	10110111011000011011100011001011	22
190:60:132:108	10111110001111001000010001101100	17
189:142:60:175	10111101100011100011110010101111	21
172:66:161:218	10101100010000101010000111011010	1
186:45:139:139	10111010001011011000101110001011	2
189:34:184:205	10111101001000101011100011001101	1
193:38:220:96	11000001001001101101110001100000	12
189:44:145:120	10111101001011001001000101111000	5
186:163:67:155	10111010101000110100001110011011	21
185:178:209:128	10111001101100101101000110000000	15
174:105:153:190	10101110011010011001100110111110	23
174:72:90:89	10101110010010000101101001011001	10
192:169:46:168	11000000101010010010111010101000	17
194:59:86:102	11000010001110110101011001100110	16
188:170:191:134	10111100101010101011111110000110	20
176:116:58:80	10110000011101000011101001010000	22
182:42:101:204	10110110001010100110010111001100	22
181:108:185:98	10110101011011001011100101100010	24
179:142:50:155	10110011100011100011001010011011	12
179:59:141:82	10110011001110111000110101010010	3
180:113:166:156	10110100011100011010011010011100	14
175:94:147:158	10101111010111101001001110011110	11
177:51:173:186	10110001001100111010110110111010	19
184:159:35:200	10111000100111110010001111001000	20
180:81:94:118	10110100010100010101111001110110	23
178:88:173:81	10110010010110001010110101010001	24
185:78:107:80	10111001010011100110101101010000	6
183:34:230:165	10110111001000101110011010100101	3
192:124:123:181	11000000011111000111101110110101	8
186:117:99:105	10111010011101010110001101101001	13
172:70:194:74	10101100010001101100001001001010	16
178:119:198:157	10110010011101111100011010011101	15
182:147:177:70	10110110100100111011000101000110	22
173:55:51:101	10101101001101110011001101100101	22
189:42:54:95	10111101001010100011011001011111	7
181:171:81:212	10110101101010110101000111010100	5
181:108:95:222	10110101011011000101111111011110	14
193:152:214:161	11000001100110001101011010100001	9
187:61:177:126	10111011001111011011000101111110	15
193:161:175:76	11000001101000011010111101001100	13

180:36:224:185	10110100001001001110000010111001	23
194:136:227:72	11000010100010001110001101001000	7
193:118:97:207	11000001011101100110000111001111	10
185:149:120:192	10111001100101010111100011000000	7
186:42:203:198	10111010001010101100101111000110	20
172:177:116:205	10101100101100010111010011001101	13
182:82:147:164	10110110010100101001001110100100	23
180:84:141:184	10110100010101001000110110111000	19
176:105:204:87	10110000011010011100110001010111	10
184:76:215:55	10111000010011001101011100110111	7
173:54:207:185	10101101001101101100111110111001	14
183:136:171:238	10110111100010001010101111101110	10
175:175:122:186	10101111101011110111101010111010	16
184:50:68:152	10111000001100100100010010011000	15
177:101:167:53	10110001011001011010011100110101	19
174:154:103:194	10101110100110100110011111000010	24
179:171:88:239	10110011101010110101100011101111	8
186:43:93:75	10111010001010110101110101001011	5
184:168:101:200	10111000101010000110010111001000	15
186:152:60:122	10111010100110000011110001111010	10
187:147:79:64	10111011100100110100111101000000	20
190:84:182:208	10111110010101001011011011010000	11
192:92:150:157	11000000010111001001011010011101	4
189:46:81:113	10111101001011100101000101110001	22

5- Conclusion

1. Results obtained give good indication (test with simulated environment of real world).
2. While traffic increase, attaching attack more easier
3. Any change in fitness gives a new feature to system (the current fitness may be better).
4. improve security with slice time scheduler for process

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