A New Method for Modifying Blowfish Algorithm for IoT

Shally Nagpal, Suneet Kumar, Suresh Chand Gupta

Abstract: Due to rapid development of internet and web applications, the prominence and the importance of the information exchange using the internet is growing. Communication through internet faces data safety as an important issue. Data has to be safe when communicating as slightly loss or danger to transmitted data can be responsible for excessive harm to the society. For network safety encryption plays a vibrant part. Many times it is little bit confusing to choose best encryption, as there are many cryptography methods for securing the data during transmission. For many applications Blowfish is currently assumed to be insecure. So it turns out to be essential to enhance this procedure through addition of different levels of safety so that it can be used in several reliable communication channels. Blowfish algorithm is modified in a way that it is platform independent; however the present encryption schemes are restricted to platform dependent proposal. This proposed modified blowfish algorithm supports text, images and media files.


I. INTRODUCTION
The notation malicious hackers, from time to time called crackers, confer with persons who breakdown into PCs without authorization. Network Security (NS) has gained massive prominence inside the past few ages as it is the key element of net based totally protection mechanism and also with the rise of hand held Wi-Fi information appliances the capacity to perform protection function with confined computing resources has become more and more significant. In particular protection is needed against modern attacks that can be very dangerous [7]. Automation of attacks, privacy worries is some of the important traits of modern attacks.

A. Cryptography
Cryptography is the learning of undercover (crypto) script (graphy). Cryptography is the discipline or talent of covering the ideologies and techniques of reworking an understandable communication into implicit kind or incomprehensible kind and then remodeling the message returned to its authentic type. As the ground of cryptography has bigger past; cryptography these days is t

Figure 1: Conventional Encryption Model

II. RELATED WORK
Afaf M. Ali Al-Neaimi et al. [1] proposes a method which improves the execution of the blowfish set of rules. This is finished with the aid of constructing another structure for the sixteen adjusts within the first calculation by means of supplanting the interest with ever other offered undertaking. This structure affects usage of numerous to discharge keys. The usual of cell automata (CA) is applied to create those special keys in a primary and compelling manner. The projected technique offers tremendous encryption, and the framework is extremely safe to endeavors of violation the cryptography key.

M. Anand Kumar et al. [2] this work chiefly center around two generally utilized symmetric encryption calculations, for example, Blowfish and Rejindael. These calculations are looked at and execution is assessed. Exploratory outcomes are given to show the execution of these calculations.

Sweta K. Parmar et al. [3] Different Cryptography systems can be utilized for protecting the data during communication, so it can make slight bit difficult to choose finest one. From the survey the blowfish calculation is discovered predominant than alternate calculations.

Christina L et al. [4] Different calculations and conventions are utilized to secure the information. The calculation productivity is estimated by completing time and output per unit time. Effectiveness of the calculation depends on key size; bigger key size may influence the effectiveness.
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The program reproduction result gives the better execution and also security.

Manju Suresh et al. [5] starting with the idea of IoT, design and safety matters, this study divides different safety components for IoT and the criticalness of cryptography techniques for IoT. A proficient cryptographic calculation “Blowfish” is chosen in view of a few examinations. An alteration in Blowfish computation is introduced by changing its Function module 'F'. Encryption time and throughput examination of existing and changed blowfish calculation are considered for comparison.

Avinash M Ghorpade et al. [6] Cryptography expect a key part in the field of framework security. At the present time various encryption estimations are available to safe the data however these computations eat up package of figuring resources, for instance, battery and CPU time. This paper for the most part focuses on normally used symmetric encryption count (calculation) which is Blowfish computation (calculation). Test outcomes are given to outline the execution of this figuring.

III. PROPOSED WORK
A new design for boosting the safety of blowfish algorithm is proposed. This approach design will not contradict the safety of the unique algorithm via retaining all the mathematical criteria of blowfish continue to be unchanged. Various Other Issues Have Been Analyzed Such As Scalability I.E. Key Size And Block Size Variation Is Referred As Scalability, Encryption Ratio I.E. Measures Quantity Of Data That Is To Be Encrypted And Key Length Value I.E. It Plays A Dominant Part That Shows How Data Is Encrypted. There Are Various Motives Why One Would Need To Encrypt Facts In Software: To Make Assured That Documents Transferred To Common Storage (Microsd Card And So On.) Are Without Problems And Not Accessible To Others. If A Key Is Stored Along With The Encrypted Facts, Or While A Document Private To The Application, It Is Fairly Smooth To Extract It And Decrypt The Statistics. Customers Are Quite Familiar With Passwords, And Accordingly A Manner To Generate Sturdy Cryptographic Keys Based Totally On Humanly Achievable Passwords Is Wanted.

IV. RESULTS AND DISCUSSION

Evaluation Parameters

(a) Entropy
The entropy of a document is an index of its information content. The entropy is measured in bits per character. From the information theory point of view, the data in the current window can be viewed as a message source. To calculate the information content one examines the probability distribution of this source. It is assumed here that the individual messages (characters in the document / file) are stochastically independent of each other and are transmitted by the source with a uniform probability

(b) Encrypted/Decrypted File Size (KB)
Size of Cipher text generated.

Figure 2: Proposed Encryption Scheme

Figure 3: Sample text files

Figure 4: Modified Blowfish Encryption switches

Table 1: Size and Entropy of Encrypted Files

<table>
<thead>
<tr>
<th>Plain Text Files</th>
<th>Size (KB)</th>
<th>Encrypted Files</th>
<th>Size (KB)</th>
<th>Decrypted Files</th>
<th>Size (KB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TestFile-1</td>
<td>4095</td>
<td>TestFile-1p</td>
<td>4388</td>
<td>TestFile-1n</td>
<td>4095</td>
</tr>
<tr>
<td>TestFile-2</td>
<td>2207</td>
<td>TestFile-2p</td>
<td>2500</td>
<td>TestFile-2n</td>
<td>2207</td>
</tr>
<tr>
<td>TestFile-3</td>
<td>7378</td>
<td>TestFile-3p</td>
<td>7684</td>
<td>TestFile-3n</td>
<td>7378</td>
</tr>
<tr>
<td>TestFile-4</td>
<td>3456</td>
<td>TestFile-4p</td>
<td>3748</td>
<td>TestFile-4n</td>
<td>3456</td>
</tr>
</tbody>
</table>
As shown in table 1 and figure 6 size of plain text files and decrypted files come out to be same.

**Verifying Hardness of Keys (Entropy)**

Table 2: Entropy of Encrypted Files

<table>
<thead>
<tr>
<th>Encrypted Files</th>
<th>Size (KB)</th>
<th>Entropy</th>
</tr>
</thead>
<tbody>
<tr>
<td>TestFile-1p</td>
<td>4388</td>
<td>7.86</td>
</tr>
<tr>
<td>TestFile-2p</td>
<td>2500</td>
<td>7.77</td>
</tr>
<tr>
<td>TestFile-3p</td>
<td>7684</td>
<td>7.93</td>
</tr>
<tr>
<td>TestFile-4p</td>
<td>3748</td>
<td>7.86</td>
</tr>
<tr>
<td>TestFile-5p</td>
<td>1172</td>
<td>7.41</td>
</tr>
</tbody>
</table>

Figure 7: Entropy

As shown in table 2 and figure 7, entropy varies from 7.41 to 7.93.

Figure 8: Entropy of Modified Blowfish

Table III: Entropy of Encryption Algorithms

<table>
<thead>
<tr>
<th>Encryption Algorithm</th>
<th>Entropy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES</td>
<td>7.82</td>
</tr>
<tr>
<td>3-DES</td>
<td>7.81</td>
</tr>
<tr>
<td>AES</td>
<td>6.47</td>
</tr>
<tr>
<td>Modified Blowfish</td>
<td>7.94</td>
</tr>
</tbody>
</table>

Figure 9: Encryption Algorithms

As shown in table 3 and figure 9, modified blowfish has higher entropy value as compared to existing encryption schemes.

V. CONCLUSION

Network safety has become significant issue for personal pc users, agencies, and the army. The net structure itself allowed for plenty security threats to arise. Many corporations use firewalls and encryption mechanisms for security from the net. The corporations build an “intranet” to stay attached to the net however protected from probable dangers. Information integrity is quite an difficulty in protection and to keep that integrity we tends to enhance as to provide the better encryption procedures for safety. Many of the current encryption schemes support only basic text formats. The existing simulation demonstrates the decryption and encryption is completed using modified blowfish procedure. Existing blowfish algorithm is improved to deliver more safety as shown by higher entropy compared to existing encryption algorithms, therefore nobody in between source and destination will hack the records. A comparative study of modified Blowfish and existing encryption Algorithms is achieved to offer a few measurements at the encryption and decryption. The efficiency of the updated blowfish algorithm is measured by hardness of the key. Blowfish is the finest as far as implementation time, memory utilization, control utilization, safety and accordingly appropriate for...
A New Method for Modifying Blowfish Algorithm for IoT

REFERENCES

AUTHORS PROFILE

Shally Nagpal is research scholar in CSE Deptt in MMDU (Ambala). She has completed her M.Tech from BPSMV Khanpur Kalan in year 2017. She has two years of educational expertise. She has completed his B.Tech from Maharishi Markandeswar College Of Engineering MMDU (Ambala) in 2011.She has published three paper one in international journal one in international Conference and one in national conference. Her research area is security in Big Data.She has attended many workshops.
E-Mail id – shally.ngpl@gmail.com

Suneet Kumar obtained his Doctorate degree in computer science and engineering in 2012. He holdsMaster’s degree in computer science and engineering from Bhagwant university, Ajmer, Rajasthan passed in 2006. His total experience is 16 year, presently, working as Associate Professor(CSE) in MMEC, Maharishi Markandeswar Deemed To Be University since Feb-2015.
He has presented 5 papers in international /national conferences and published 17 paper in international journals. He has conducted various international /national conferences, seminars and workshops also.
E-mail: suneetcit81@gmail.com

Suresh Chand Gupta obtained his Doctorate degree in computer science and application. He holds Master’s degree in computer science and engineering from Thapar university, Patiala, Punjab passed in 2002. His total experience is 20 year, presently, working as Chairperson and Professor(CSE) in Panipat Institute Of Engineering And Technology since Nov-2016. He is author of two books. He has presented 17 papers in international /national conferences and published 24 paper in international journals. He is a CSI member and NBA convener. He has conducted various international /national conferences, seminars and workshops also.
E-mail: sureshgupta.cse@piet.co.in