

A Study on Online Transaction System Security

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Abstract— Online Transaction has become very common practice in our life. All of us are using online transaction very frequently today, so to deal with related security issues like Authorization, data protection, confidentiality is very important. Every person who is doing online transaction, every organization and every government must have the ability to control over the operations of online transactions for securing the information. This paper analyses various types of technology used in online transaction system security. This paper is aimed at evaluating the present status of online transaction security. In this paper, a comprehensive survey on all type of security in online transaction is done.

Index Terms: Authentication, Online Transaction, SET, NEFT, UPI.

I. INTRODUCTION

The World Wide Web has permeated almost every aspect of modern life. If one has accessed to a computer with an Internet connection an almost limitless amount of goods services and entertainment choices are at his fingertips [1]. He can do everything online including the banking and financial transactions. In many areas people are using online transaction system for their work because it is very convenient and increase work speed. In online Transaction system Information is a valuable asset and must be kept confidential, have integrity and be available in order to be worth its name and be credible. As the range of electronic commerce transactions has grown, it has become very attractive to criminals and the volume of fraudulent e-commerce transactions is growing rapidly. Therefore, there has been an increase in the amount of attention given to the security of online transactions. Possibly the main current concern of most Internet users relates to the confidentiality of payment related information, since there is a growing realization that this information can be used to make fake transactions. It is clear that if data confidentiality is

not ensured, it would be possible for an adversary to obtain sensitive information such as card details and then use them to make payments at the expense of the legitimate cardholder. However, security requirements for online transactions are not limited to data confidentiality, but also include other security services such as user authentication, non-repudiation and data integrity.

II. ONLINE TRANSACTION SYSTEM

Online transaction is a commanding tool for business group that allows different companies to increase their sale through reaching new market and improve customer service[2]. Here people are not interacting directly but rather then they are interacting through electronically therefore business requires coherent, consistent environment for online transactions.

For the past few years, a number of solutions have been introduced to improve online transaction processing security. Examples include First Virtual, NetCash, and SET (Secure Electronic Transaction) [3]. However, Secure Socket Layer (SSL), and its standardized version Transport Layer Security (TLS), remain by far the most widely used means for providing security services for e-commerce transactions.

III. ONLINE TRANSACTION ACTIVITIES

Below are the steps taken when a consumer purchases a good/service online [4].

Step 1: The consumer chooses products to purchase on the merchant's ecommerce site.

Step 2: In the checkout process, the customer reviews their order to make sure their chosen products are correct. During this step, the customer also chooses the delivery and shipping method. At the end of the checkout process, the customer clicks, "Submit Order".

Step 3: After step 2, the customer is connected to a payment gateway that allows the customer to enter credit card information.

Step 4: Once the information is entered, the gateway encrypts this data and sends it to the acquirer.

Step 5: The transaction is verified through the respective networks such as the Visa Net or the Mastercard System.

Step 6: The bank responses with either the approval or denial of the purchase.

Step 7: If the purchase is approved, the bank replies with an authorization code.

Step 8: Once the gateway receives this approval code, it displays it for the customer and triggers the receipt to process.

Step 9 The product is shipped to the customer.

Step 10: At a set time, the gateway processes the specified batch for the day.

Step 11: Acquirer routes the transaction through the settlement system against the card-issuing bank.

Step 12: Card-issuing bank routes the transaction back through the settlement system with their fee deducted.

Step 13: Acquirer deposits the transaction amount into merchant's bank account.

Step 14: Customer's cardholder bills the customer for the transaction amount who then pays the bill

IV. TYPES OF ONLINE FINANCIAL TRANSACTION

1) National Electronic Fund Transfer (NEFT)

National Electronic Funds Transfer (NEFT) is a payment system which, provide the facility of one-to-one money transfer[5]. In this system, individuals, firms and corporate can electronically transfer money from any bank branch to any individual, firm or corporate having an account with any other bank branch in the country participating in the Scheme. Individuals, firms or corporate maintaining accounts with a bank branch can transfer funds using NEFT. Even such individuals who do not have a bank account (walk-in customers) can also deposit cash at the NEFT-enabled branches with instructions to transfer funds using NEFT.

Steps for NEFT[6]-

I.Go to Fund Transfer tab, and select 'Transfer to other bank' (NEFT)

II. Select the recipient account and enter the relevant details

III. Accept the (Terms and Conditions)

IV. Recheck the details, if all and complete the process

2) Real Time Gross Settlement (RTGS)

RTGS is a the continuous (real-time) settlement of money transfers individually on an order by order basis (without netting)[7]. 'Real Time' means the processing of transaction is done at the time they are received rather than at some later time. 'Gross Settlement' means the settlement of money transfer instructions occurs individually on an instruction by instruction basis[7]. Considering that the funds settlement takes place in the books of the Reserve Bank of India, the payments are final and irrevocable. The RTGS system is primarily intended for large value transactions.

Steps to make RTGS funds transfer [8]:

I. Go to Fund Transfer tab, and select 'Transfer to other bank' (RTGS)

II. Select the recipient account and enter the relevant details

III. Accept the (Terms and Conditions)

IV.Recheck the details, if all are correct, then confirm and complete the process

3) Electronic Clearing System (ECS)

ECS is an alternative method for effecting payment transactions in respect of the utility-bill-payments such as telephone bills, electricity bills, insurance premium, card payments and loan repayments, etc., which would obviate the need for issuing and handling paper instruments and thereby facilitate improved customer service by banks / companies / corporations/government departments, etc., collecting /receiving the payments[9].

4) Immediate Payment Service (IMPS)

IMPS offers an instant, 24X7, interbank electronic fund transfer service through mobile phones. IMPS is an emphatic tool to transfer money instantly within banks across India through mobile, internet and ATM which is not only safe but also economical both in financial and non-financial perspectives.

Steps to make IMPS money transfer:

- I. Using your Customer ID and Password into Net Banking/Mobile Banking
- II. Go to Funds Transfer tab (Other Bank Account)
- III. Select Debit / Credit Account, mode of transfer as IMPS and beneficiary account
- IV. Enter the amount to be transferred and click on Submit
- V. Click on the confirm button
- VI. Recheck all the information and approve the transaction using OTP (one time password) received on your registered mobile number
- VII. And at last, confirm by clicking on the submit button

5) UPI (Unified Payments Interface)

A Unified Payments Interface is a real-time payment system that allows transactions to be done through any smartphone using VPA (Virtual Payment Address). No bank account detail is needed for the money transfer through UPI. Only mobile number or name is sufficient and the transactions can be done 24/7. UPI-enabled apps allow the transfers up to Rs 1 lakh [11].

V. ADVANTAGES OF ONLINE TRANSACTION SYSTEM

Online Transaction Processing (OLTP) has the following advantages:

- It provides faster and more accurate forecast for revenues and expenses.
- It provides a concrete foundation for a stable organization.
- Because of timely modification of all transactions. It makes the transactions much easier on behalf of the customers.

VI DISADVANTAGES OF ONLINE TRANSACTION SYSTEM

As with any information processing system, security and reliability are considerations. Online transaction systems are generally more susceptible to direct attack and abuse than their offline counterparts [12]. When organizations choose to rely on OLTP, operations can be severely impacted if the transaction system or database is unavailable due to data corruption, systems failure, or network availability

issues. Additionally, like many modern online information

technology solutions, some systems require offline maintenance which further affects the cost-benefit analysis. Online Transaction Processing (OLTP) has the following disadvantages: It makes the database much more susceptible to intruders and hackers because it makes the database available worldwide. For B2B (business-to-business) transactions, businesses must go offline to complete certain steps of an individual process, causing buyers and suppliers to miss out on some of the efficiency benefits that the system provides. As simple as OLTP is, the simplest disruption in the system has the potential to cause a great deal of problems, causing a waste of both time and money. It can lead to server failure, which may cause delays or even wipe out large amounts of data from the database.

VI SECURITY TECHNOLOGY IN ONLINE TRANSACTION SYSTEM

1) SECURE ELECTRONIC TRANSACTION PROTOCOL-

SET is a protocol which ensures security and integrity of electronic transactions done using credit cards in a situation. SET is not some system that enables payment but it is a security protocol applied on those payments. It uses some encryption and hashing techniques to secure payments over internet done through credit cards. SET protocol was supported in development by major organizations like Visa, Mastercard, Microsoft which provided its Secure Transaction Technology (STT) and NetScape which provided technology of Secure Socket Layer (SSL). SET protocol restricts revealing of credit card details to merchants thus keeping hackers and thieves at bay. SET protocol includes Certification Authorities for making use of standard Digital Certificates like X.509 Certificate.

SET protocol has some requirements to meet, some of the important requirements are:

- It has to provide mutual authentication i.e., customer (or cardholder) authentication by confirming if the customer is intended user or not and merchant authentication.

- It has to keep the PI (Payment Information) and OI (Order Information) confidential by appropriate encryptions.
- It has to be resistive against message modifications i.e.no changes should be allowed in the content being transmitted.
- SET also needs to provide interoperability and make use of best security mechanisms.

In the general scenario of online transaction, SET participants are:

1. Cardholder – customer
2. Issuer – customer financial institution
3. Merchant
4. Acquirer – Merchant financial
5. Certificate authority – Authority which follows certain standards and issues certificates (like X.509V3) to all other participants.

2) SECURE HTTP (SHTTP)

It's an alternative to HTTPS, it has the same working as HTTPS and is designed to secure web pages and their messages. There are differences between SHTTP and SSL protocol such as SSL is a connection oriented protocol and it works at transport level by providing a secure tunnel for transmission whereas SHTTP works on application level and each message is encrypted separately, but secure tunnel is created. SSL can be used for secure TCP/IP protocols like FTP but SHTTP works only on HTTP. Its use is fairly limited as compared to HTTPS. (zhijraes)

Secure Electronic Transaction (SET) is a specification designed to utilize technology for authenticating the parties involved in payment card purchases on any type of online network, including the Internet. SET was developed by Visa and MasterCard, with participation from leading technology companies, including Microsoft, IBM, RSA, Terisa Systems, and VeriSign. By using sophisticated cryptographic techniques, SET will make cyberspace a safer place for conducting business and is expected to boost consumer confidence in electronic commerce. SET focuses on maintaining confidentiality of information, ensuring message integrity, and authenticating the parties involved in a transaction. The significance of SET, over existing Internet security protocols, is found in the use of digital certificates. Digital certificates will

be used to authenticate all the parties involved in a transaction. SET will provide those in the virtual world with the same level of trust and confidence a consumer has today when making a purchase at any of the 13 million Visa-acceptance locations in the physical world. Payments are the important factor of any transaction and Internet hardware/software vendors have put their efforts in concentrating the factor in a secured way. Confidentiality of information is ensured by the use of message encryption; payment information integrity is ensured by the use of digital signatures; cardholder account authentication is ensured by the use of digital signatures and cardholder credentials, merchant authentication is ensured by the use of digital signatures and merchant credentials; and interoperability is ensured by the use of specific protocols and message formats.

3) Virtual Private Network (VPN)

VPN, is a way to transport traffic on an unsecured network. It uses a combination of encrypting, authentication and tunneling. There are many different types of methods of VPN but of these 5 are easily recognized. The most known and used protocols are as follows:

- Point-to-Point Tunneling Protocol (PPTP)
- Layer 2 Tunneling Protocol (L2TP)
- Internet Protocol Security (IPsec)

VPN allows a user to secure its privacy as it's very hard to correctly detect the location of the user as the network data may be routed through multiple locations spread across the world before finally reaching its destination. It also can be used to bypass firewall and blocks of websites [5].

4) E-Mail Security

As both the sender and receiver of the email one must be concerned about the sensitivity of the information in the mail, it being viewed by unauthorized users, being modified in the middle or in the storage. Email can be easily counterfeited therefore one must always authenticate its source. E-mail can also be used as a delivery mechanism for viruses. Cryptography as in many other fields plays a crucial role in email security. Emails are very insecure. As they pass through many mail servers during transits they can be easily intercepted and modified. While using common Email there is no process to authenticate the sender and many users would not give a thought to

authenticate the email received. There are many standards one can choose in order to secure his emails some of these are: PGP, PEM, Secure multipurpose Internet mail extension (MIME), Message Security Protocol (MSP).

5) INTRUSION DETECTION SYSTEMS

An Intrusion Detection System (IDS) is an additional protection measure that helps ward off computer intrusions. IDS systems can be software and hardware devices used to detect an attack[13]. IDS products are used to monitor connection in determining whether attacks are been launched. Some IDS systems just monitor and alert of an attack, whereas others try to block the attack.

6) Anti Malware Software and Scanners

Viruses, worms and Trojan horses are all examples of malicious software, or Malware for short. Special so called AntiMalware tools are used to detect them and cure an infected system.

Security issues	Security Technologies
Authorization, Access Control	SET, FireWall
Confidentiality	IDS, Firewall, Encryption, SSL
Non-repudiation	SET(Digital signature)
Integrity	IDS,Anti-Malware,Software

Table1 Security Issues

VII. CONCLUSION

Online transaction can be successful if there is coordination among several applications development platforms, database management systems, systems software and network infrastructure, and in each phase security is required. The key dimensions of online transaction security are Access Control, Privacy/Confidentiality, Authentication, Non Repudiation Integrity and Availability. To increase the quality of security it is important to adopt technical solutions that proactively address adversaries and establish real-time monitoring systems to detect protect and prepare from these attacks and educate the user about safer access to the internet.

This paper outlines some technologies for online transaction security like SET ,HTTP, IDS etc which is responsible for enforcement of cyber crimes rules and regulations. It is very important to educate every

person who is doing online transaction and make them aware of cyber crimes and punishments – penalties for safe surfing and browsing, make them aware how to use and handle mobile and online banking, how to secure personal information, how to use various applications, what precautions has to be taken while.

REFERENCE

[1] (2021) Online Banking- Advantages and disadvantages [Online].Available: <https://m.finweb.com/banking-credit/online-banking-advantages-and-disadvantages.html> /.

[2] (2021) E: Commerce: purchasing and selling online website[Online]. <https://dr6j45jk9xcmk.cloudfront.net/documents/435/medi-booklet-e-commerce-accessible-e-final.pdf>

[3] Rachna, Priyanka Singh” Issues and Challenges of Electronic Payment Systems”,/ International Journal for Research in Management and Pharmacy, Vol. 2, Issue 9, December 2013

[4] (2021) Online Transactions and Security of e-Transactions [Online]. Available: <https://www.toppr.com/guides/business-studies/emerging-modes-of-business/online-transactions-and-security-of-e-transactions/>

[5] (2021)National Electronic Fund Transfer [Online]. Available <https://www.federalbank.co.in/neft>.

[6] (2021) How to Transfer Money through NEFT: Steps to Follow [Online]. Available <https://paytm.com/blog/money-transfer/neft/transfer-money-through-neft/>

[7] (2021) Real-Time Gross Settlement [Online]. Available: <https://www.investopedia.com/terms/r/rtgs.asp>

[8] (2021) RTGS - Real Time Gross Settlement [Online]. Available: <https://indialends.com/ifsc/real-time-gross-settlement-rtgs>

[9] (2022)What is Electronic Clearing System [Online]. Available: <https://www.rbi.org.in/commonman/Upload/English/FAQs/PDFs/ECS12112012.pdf>

[10]X. Geng, A.B. Whinston, Defeating Distributed Denial of Service attacks, IEEE IT Professional 2 (4) , 36–42,2000.

[11](2022)Unified Payments Interface [Online]. Available:<https://www.indiatoday.in/information>

/story/different-types-of-money-transfer-neft-
rtgs-imps-and-more-1464289-2019-02-25

- [12] (2022) Advantages and Disadvantages of online transaction [online]. Available: [https:// www.academia.edu/35754303/Advantages_and_Disadvantages_of_Online_Transaction_and_relevant_Laws_Policies_and_Conditions](https://www.academia.edu/35754303/Advantages_and_Disadvantages_of_Online_Transaction_and_relevant_Laws_Policies_and_Conditions).
- [13] Kartikey Agarwal, Dr. Sanjay Kumar Dubey, "Network Security: Attacks and Defence", International Journal of Advance Foundation and Research in Science & Engineering, Vol. 1, Aug. 2014.