

## 1. Commerce

The exchange or buying and selling of commodities on a large-scale involving transportation from place to place.

## 2. Roles in Commerce

### 2.1. Buyers

These are people with money who want to purchase a good or service.

### 2.2. Sellers

These are the people who offer goods and services to buyers. Sellers are generally recognized in two different forms:

- **Retailers** who sell directly to consumers and
- **Wholesalers or Distributors** who sell to retailers and other businesses.

### 2.3. Producers

These are the people who create the products and services that sellers offer to buyers. A producer is always, by necessity, a seller as well. The producer sells the products produced to wholesalers, retailers or directly to the consumer.

## 3. The elements of Commerce

The following list highlights all of the elements of a typical commerce activity. In this case, the activity is the sale of some product by a retailer to a customer:

- If you would like to sell something to a customer you must have a product or service to offer that you may get directly from a producer or you might go through a distributor, or you may produce the products yourself.
- You must also have a place from which to sell your products.
- You need to figure out a way to get people to come to your place. This process is known as marketing. If no one knows that your place exists, you will never sell anything.
- You need a way to accept orders.
- You also need a way to accept money. It may be cash, credit or debit card, purchase orders in case of B2B, or billing method.
- You need a way to deliver the product or service, often known as fulfillment.
- Sometimes customers do not like what they buy, so you need a way to accept returns.
- Sometimes a product breaks, so you need a way to honor warranty claims.
- A way to provide customer service (often through email, on-line forms, on-line knowledge bases and FAQs, et cetera).

## **4. The Lure of E-commerce**

### **4.1. Lower transaction costs**

If an e-commerce site is implemented well, the web can significantly lower both order-taking costs up front and customer service costs after the sale by automating processes.

### **4.2. Larger purchases per transaction**

Amazon offers a feature that no normal store offers. When you read the description of a book, you also can see what other people who ordered this book also purchased. That is, you can see the related books that people are actually buying. Because of features like these it is common for people to buy more books than they might buy at a normal bookstore.

### **4.3. Integration into the business cycle**

A Website that is well-integrated into the business cycle can offer customers more information than previously available. For example, if Dell tracks each computer through the manufacturing and shipping process, customers can see exactly where their order is at any time. This is what FedEx did when they introduced online package tracking - FedEx made far more information available to the customer.

### **4.4. People can shop in different ways.**

Traditional mail order companies introduced the concept of shopping from home in your pajamas, and e-commerce offers this same luxury. New features that websites offer include:

- The ability to build an order over several days
- The ability to configure products and see actual prices
- The ability to easily build complicated custom orders
- The ability to compare prices between multiple vendors easily
- The ability to search large catalogs easily

### **4.5. Larger catalogs**

A company can build a catalog on the web that would never fit in an ordinary mailbox.

### **4.6. Improved customer interactions**

With automated tools it is possible to interact with a customer in richer ways at virtually no cost. For example, the customer might get an email when the order is confirmed, when the order is shipped and after the order arrives. A happy customer is more likely to purchase something else from the company.

E-commerce allows people to create completely new business models. In a mail order company there is a high cost to printing and mailing catalogs that often end up in the trash. There is also a high cost in staffing the order-taking department that answers the phone. In e-commerce both the catalog distribution cost and the order taking cost fall toward zero. That means that it may be possible to offer products at a lower price, or to offer products that could not be offered before because of the change in cost dynamics.

## 5. Easy and Hard Aspects of E-commerce

The things that are hard about e-commerce include:

- Getting traffic to come to your Website
- Getting traffic to return to your Website a second time
- Differentiating yourself from the competition
- Getting people to buy something from your Website. Having people look at your site is one thing. Getting them to actually type in their credit card numbers is another.
- Integrating an e-commerce Website with existing business data (if applicable)

The things that are easy about e-commerce, especially for small businesses and individuals, include:

- Creating the website
- Taking the orders
- Accepting payment

## 6. Building an E-commerce Site

The things you need to keep in mind when thinking about building an e-commerce site include:

### 6.1. Suppliers

This is no different from the concern that any normal store or mail order company has. Without good suppliers, you cannot offer products.

### 6.2. Your price point

A big part of e-commerce is the fact that price comparisons are extremely easy for the consumer. Your price point is important in a transparent market.

### 6.3. Customer relations

E-commerce offers a variety of different ways to relate to your customer. E-mail, FAQs, knowledge bases, forums, chat rooms... Integrating these features into your e-commerce offering helps you differentiate yourself from the competition.

### 6.4. The back end: fulfillment, returns, customer service

These processes make or break any retail establishment. They define, in a big way, your relationship with your customer.

When you think about e-commerce, you may also want to consider these other desirable capabilities:

- Gift-sending
- Affiliate programs
- Special discounts
- Repeat buyer programs
- Seasonal or periodic sales

The reason why you want to keep these things in mind is because they are all difficult unless your Ecommerce software supports them. If the software does support them, they are trivial.

## **7. Advantages of E-commerce**

- Larger Market Space
- Customer insights through tracking and analytics
- Fast response to consumer Trends and Market demands
- Lower Cost
- More opportunities to sell
- Personalized Communication
- Ability to scale up or scale down

## **8. Disadvantages of E-commerce**

- Price and Product comparison
- Need for Internet access
- Credit card fraud
- IT security issues
- Complexity in taxation, regulations, and compliance

## **9. Classification of Digital Businesses**

### **9.1. Business web Agora**

To run a marketplace for goods and values – dynamic pricing through negotiations.

### **9.2. Business web Aggregator**

To run a digital supermarket – Fixed prices.

### **9.3. Business web Integrator**

To establish an optimized value creation chain.

## 10. E-commerce Business Models

E-commerce business can be generally categorized into the following categories:

1. Business to business (B2B)
2. Business to Consumer (B2C)
3. Consumer to Consumer (C2C)
4. Consumer to Business (C2B)
5. Business to Government (B2G)
6. Government to Business (G2B)
7. Government to citizen (G2C)

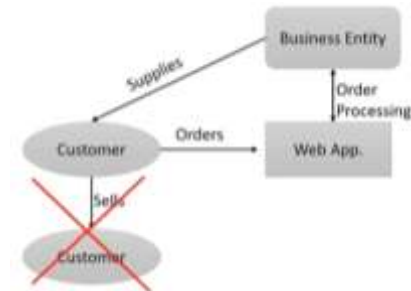
### 10.1. Business to Business (B2B)

A website following the B2B business model sells its products to an intermediate buyer who then sells the product to the final customer. As an example, a wholesaler places an order from a company's website and after receiving the consignment, sells the end product to the final customer who comes to buy the product at one of its retail outlets.



### 10.2. Business to Consumer (B2C)

A website following the B2C business model sells its products directly to a customer. A customer can view the products shown on the website. The customer can choose a product and order the same. The website will then send a notification to the business organization via email and the organization will dispatch the product/goods to the customer.



## 11. DIFFERENCES BETWEEN B2B AND B2C

The primary aspects of B2C business are:

- The fundamental pattern is the one-time cooperation with a focus on the single transaction.
- Each transaction has to be executed as if business partners have never cooperated in the past and will never come together again in the future.
- Both business partners have to find out whether they want to conduct this transaction (negotiation).
- Both business partners have to see that they will benefit from this transaction (win-win situation).
- Prices have to be allocated for each transaction specifically (pricing challenge).
- The appropriate payment method has to be selected (Electronic payment)

The primary aspects of B2B business are:

- The fundamental pattern is the on-going cooperation. Business partners have agreed to cooperate for some time. Business partners have concluded a (written) contract.
- Large data quantities are exchanged along the value creation chain; there is an information process coming along with the business process.
- Different partners with specific objectives have to be coordinated.

- All members work together to reach common objectives.
- Negotiation is in most cases completely done in the initiation phase of the B2B cooperation; there is one decision to cooperate for many transactions or a long period of time.
- Price allocation is in most cases completely done in the initiation phase of the B2B cooperation; it is normally not done in each single transaction.
- Payment is in most cases done beside the B2B cooperation via traditional payment channels; often payments are not done for each single transaction but for a set of transactions, e.g. on a monthly basis.

## **12. The Process Model and its variants**

In the B2C business normally the selling partner is a business organization, but this is not a Must. Normally the buying partner is a single person, but this also is not a Must. So B2C is a synonym for the selling process considered from the point of view of the supplier.

### **12.1. BUYING VIA THE INTERNET**

First, let us naively consider what is going on if we buy something via the Internet. The process starts when the customer generates an order via an online shop. The order is processed in the backend ERP system(s) as a sales order and all ordered products and components are verified. If products are available in the quantity, which the customer has ordered, products can be delivered to the customer's location, and at that point of time, which is convenient for the customer.

Points to consider:

- In house packaging and shipping or third-party courier
- Order changing
- Order tracking
- Order damage
- Exchange and return policy
- Customer behavior
- Customer complaints
- Return shipment in case of unaccepted order

### **12.2. Steps of the Process**

Obviously, the Internet based selling process more complex than it looks like at the first impression. Thus, we will discuss the process steps in more detail.

#### **12.2.1. Information step**

How does the process start? The first variant is, that the customer becomes active. Even here we have to differentiate because the starting point may be different:

- Product/service is clear, the supplier has already been selected
- Product/service is clear; the supplier has not yet been selected
- Product/service has to be determined.

The customer may enter the process via

- Search Engines

- Marketplaces
- Multi shops
- Communities
- Rating Platforms
- Known providers

**Who pays the information provider?** Never the customer, always the business identity.

There may be another variant as well, where the supplier initiates the information step. Here we need to differentiate that

- Whether the customer is already known to the supplier or not
- The customer is unknown, vendor reaches the customer through promotion and marketing

The supplier may take help of

- Communities
- Banners
- Advertisement
- Sponsorships

To reach out the perfect customer, vendors and suppliers may need loads of volumes of customer data so they can track and analyze their needs and recommend products and services according to their preferences.

Approaches to Collect Customer's Data

- Cookies:** Cookies are tokens or short packets of data passed between communicating programs, where the data is typically not meaningful to the recipient program. The contents are opaque and not usually interpreted until the recipient passes the cookie data back to the sender or perhaps another program at a later time. Cookies allow detailed access to statistics.
- Recommendation Engines:** These are software systems, which analyze what the customer has purchased or checked. From this behaviour they make conclusions what the customer could be interested in when he visits the online shop for the next time. Good recommendation engines are learning systems. The longer they monitor the customer the better do they predict the customer's wishes and interests.

### 12.2.2. Initiation Step

When customer and supplier at the end of the information step know that they want to conduct a business transaction together, then they initiate it according to the specific nature of the goods to be sold respectively bought.

### 12.2.3. Contract Conclusion step

In the end, both, the supplier as well as the customer, have to "sign" a contract. Initially, all relevant data have to be put together. The customer has to be identified and his name and contact data have to be documented. The invoicing address, delivery address, and payment data must be selected. If the customer has previously bought from the supplier, then these data may be available in the supplier's customer database or CRM system. However, the customer must be able to change or extend these

data with every order. The specific order data like preferred delivery time and notified method have to be registered. Of course, the shopping cart content is fixed by defining the order.

#### **12.2.4. Delivery / Fulfilment step**

If real goods have been sold, then the contract between supplier and customer is followed by the compilation of the ordered goods. If goods are not in stock of the online shop they have to be ordered at the producer and either they can be taken from the producer's warehouse or they have to be produced. When the ordered goods are available, they must be consigned, packed, and forwarded to transportation. Now the delivery can be made directly to the customer's address or to a station, e.g., an authorized retail shop in the customer's neighborhood or to another home address if we are in an omnibus buying where an 'agent' orders for his friends, colleagues or neighbors.

The process is finished with confirmation and customer satisfaction.

#### **12.2.5. Billing / Invoicing step**

After the confirmation of delivery, the billing and invoicing step can be started. If the customer had to pay before delivery, then it may happen that the invoice has to be corrected and a credit note if the value of the delivered goods was lower than the value of the originally ordered goods) or debit note if the value of the delivered goods was higher than the value of the originally ordered goods) must be created. Customers do not like additional charges. So the customer relationship management has to think of appropriate charging strategies.

#### **12.2.6. Service / Support step**

To be successful in E-Commerce does not only depend on interesting products, low prices and fast delivery. To generate a high customer satisfaction presumes a professional service and support. There must be an effective complaints management. Supplementary and replacement deliveries, including return consignments, must be in place and run smoothly if needed.

#### **12.2.7. Communication / Tracking & Tracing**

step Customer and supplier want to monitor the order processing status. This presumes a seamless and automated data capture during the total workflow, e.g. by scanners or RFID technology (RFID = Radio Frequency identification). RFID is the wireless use of electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information.

### **13. E-PROCUREMENT**

E-Procurement is a synonym for the selling process considered from the point of view of the customer. It is similar to B2C, but now the buying organization is the driver. This organization is the only customer and is looking for many suppliers. Thus, a procurement platform if we talk about IT systems is somehow an inverse of an online shop.

### **14. THE PRICING CHALLENGE**

#### **14.1. PRICING STRATEGIES**

- i. The first pricing strategy (see Chen 2014) is that the supplier sets the prices for his products. The customer makes a "take-it-or-leave-it" decision. In the E-Commerce world this leads to



lower prices and price dispersion. The problem for the supplier is, that it is easy to reduce prices but it is extremely hard to increase prices.

- ii. The second pricing strategy is the auction.
- iii. The third pricing strategy is the individual negotiation between customer and supplier.

## 15. Patent

A patent is an exclusive right granted by law to make, use and sell an invention. In order to be patentable, the invention must be unique, genuine, and useful according to the prevalent technological standards.

## 16. Trade mark and domain name conflicts

A **trademark** is a sign/symbol that associates the manufacturer or service provider with the manufactured goods or services, respectively.

A **trade name** is that name or brand under which a business carries on its business activity to become recognizable. Often, a trade name can be used as a part of the trademark.

A **domain name** is a user-friendly name used to access a website, such as 'vu.edu'. Domain names are unique and global in nature which means that there cannot be two similar domain names. On the other hand, trademarks/trade names can be multiple and localized. Thus, the same trademark/trade name can be used in relation to the same product/service in different countries or geographical areas. Similarly, same trade mark/trade name can be used in relation to different products/services within the same geographical area. Based upon this distinction between trade marks/trade names and the domain names, the experts have identified four areas of conflict as follows:

### 16.1. Cyber squatting

The act of intentionally registering domain names containing trademarks/trade names of prominent companies to later blackmail or demand ransom from those companies is called cyber squatting.

Assume there is a firm 'Glory Enterprise' and it wants to have its website. It also wants to have the word 'glory' as a part of its domain name because for years it has been recognized in the physical world through this word. However, at the time of registration of its domain, name it finds that a person Mr. 'A' who has nothing to do with the business of the firm or the word 'glory' has already registered a domain name containing this word as a part of it. Since there cannot be two similar domain names, the firm is forced to request Mr. 'A' to transfer that domain name to it. In response, if Mr. 'A' blackmails or claims ransom from the said firm, he would be said to have committed cyber squatting.

### 16.2. Concurrent use

This problem arises when two organizations have apparently legitimate claim to use the same domain name but cannot do so due to the uniqueness of domain names.

Suppose, there is a company manufacturing electronic goods and another company selling French fries. Under the traditional trade mark law both these companies can have the same trade mark/trade name such as 'frys'. The problem arises when both apply for the registration of a domain name containing the word 'frys'

### 16.3. Parasites

Parasite domain names are variants on famous domain names, and are confusingly similar to them to gain business advantage. For instance, a software company may intentionally register a domain name as 'macrosoft.com' (a variant of domain name of the famous company 'Microsoft') to take advantage of the

reputation of 'Microsoft'. The idea is that someone intending to reach the website of 'Microsoft' may mistype or misspell and reach the website of 'Macrosoft', instead.

**xyz.com vs. xyz.org** This problem arises due to the fact that second-level domain names can be assigned to multiple top-level domains. For example, 'whitehouse.org' and 'whitehouse.com' are two valid domain names. The former may take you to the website containing information about the residence of the American President, whereas the later may have been deliberately registered with the same second-level domain but a different top-level domain to gain business advantage.

#### **16.4. Online Defamation**

A defamatory statement is a false statement that injures the reputation of another person or company. If a statement injures the reputation of a product or service instead of a person, it is called product disparagement.

Suppose, someone circulates a news item in the media about the reputation of a doctor, alleging him to be professionally incompetent and negligent. This doctor may then file a lawsuit against that person claiming that his reputation has been injured due to such an act. Often, in cases of defamation, the plea taken by the defendant is that his statement is not false. Rather, it is a 'fair comment'.

In case defamation is done using the internet, it is termed online defamation. The person causing defamation can expect to remain anonymous due to the nature of internet technology. It is difficult to draw a clear line between justifiable criticism and defamation. So, commercial websites should avoid making negative or critical statements about other persons or products. Similarly, website designers should avoid any defamation liability when indulged in the alteration or modification of a picture or image of a person. They should not depict such a person in a derogatory or negative sense.

### **17. Online Privacy**

- The issue of online privacy is constantly evolving as internet grows as a tool of communication and commerce.
- Due to the nature of internet technology, it is possible for websites to collect information about page viewing habits of visitors, product selection and demographic information (age, gender etc.) About the customers. This may threaten informational privacy rights of such visitors/customers.
- Cultural difference in different countries is the reason why there are different levels of expectations about privacy in different parts of the world.
- Many countries have, today, privacy laws such as Canada, European Union (EU) etc.
- In the Unites States of America, the government has avoided to introduce any firm privacy regulations. Companies in the U.S.A. are entitled to make policies or devise mechanism to regulate privacy issues themselves. The companies have adopted two different approaches in this regard, that is, the opt-out approach and opt-in approach.

- In more common **opt-out approach**, the company collecting information assumes that the customer does not object to a specific use of information unless the customer specifically denies the permission. Thus, the company may use the collected information for its own purpose, as well as, sell or rent it out to other firms or persons.
- In a less common opt-in approach, the company collecting information assumes that it cannot use the information for any other purpose except the one for which it is collected. Accordingly, it cannot sell, market, or rent out this information to other firms/persons unless the customer specifically chooses to allow such a use.

Experts have highlighted four guiding principles to form the basis of any privacy legislation. These are as follows:

- i. Collected data may be used for improved customer service;
- ii. Sharing of personal data with outside firms/persons should not be allowed unless the customer consents to that;
- iii. Customers should have the right to receive information about what type of data has been collected from them and in what manner has it been used;
- iv. Customers should have the right to ask for the deletion of any of their data collected by the company.

## 18. Cyber Crimes

The use of internet technology has given rise to crimes which could not be conceived of a few years ago. Such crimes more suitably called cyber crimes include

- online fraud
- online hate (spreading hatred against a community through internet)
- cyber-stalking (sending threatening messages using internet)
- online terrorism, using a computer for launching attacks on other computers etc.

Today, many countries of the world are busy in either drafting new laws to deal with the issue of cyber crimes or making suitable amendments in existing criminal code.

Again, the issue of territorial jurisdiction is critical in this behalf. For instance, where a Pakistani resident commits a cyber crime against a Canadian resident, the question arises whether or not the Canadian court can take an action against this Pakistani, particularly, where the act of Pakistani is not considered criminal under the Pakistani law.

## **19. Securing e-Commerce Websites.**

Securing websites, and web servers, in particular, has been the focus of many security articles and conferences over the past few years. Obviously, a website's security level is heavily influenced by the security means, which are used by, and on, the web server.

Building a website is a task that involves more than one OS and more than one kind of software. Therefore, the security of the website is achieved from the synergy of all the factors and not from the web server alone.

### **19.1. Assumptions**

When building a website we must survey the risks facing the website from all different aspects. Not all websites face the same "threats"; Websites conducting business, containing information (considered valuable for a malicious hacker) or holding a political view, are at higher risk than others.

E-commerce websites often hold valuable information (credit card numbers or other private, personal data) and conduct business, and are thus placed at a high-risk position.

Having recognized a website is in the high-risk zone, we must consider the different types of security hazards:

- Denial of Service (including distributed).
- Defacement (the replacement of content on a website, indicating it has been hacked).
- Data Theft.
- Fraud (data manipulation or actual theft).

While many of these attacks might cause revenue loss, the method of defense against each is different. Since there is no global security solution that can provide the full defensive spectrum an e-commerce website requires, it has become extremely difficult to choose the right line of defense.

Security is a product that comes with a price tag. At first, this might be very obvious since products such as firewall and anti-virus have known pricing. However, the costs of on-going security, software-security updates, new web-site technologies etc, cannot be calculated during initial installation planning. Eventually the website owner will have to decide what level of security will be provided, while considering the current risks and costs involved.

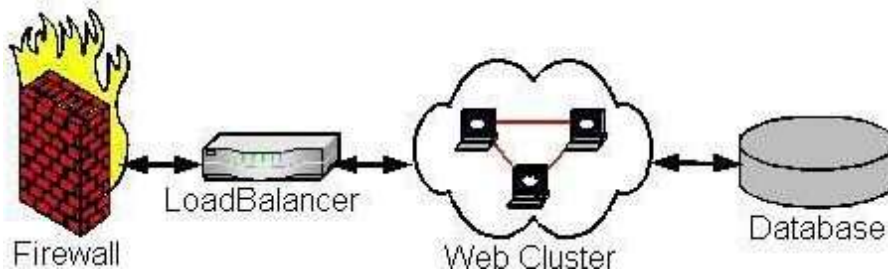
### **19.2. Known Web Configuration**

There is no single way to install a web site that will hold all the security answers. The different ways to install and configure the different web and network components varies greatly as web sites become more complex.

A few known configurations that address the security issues are:

### Configuration 1 – Basic Disjointed

A straightforward configuration, which includes the web server as a multi-homed server with one interface connected to the world and a second interface dedicated for database communications. All communications to and from the web site are maintained by the firewall while internal communications are not monitored or filtered.



#### Pros:

1. Simplicity and streamlining of communications.
2. Easy troubleshooting on all levels.
3. Scalability (when no n-tier architecture is needed).
4. Low cost implementation and minimum hardware.

#### Cons:

1. Management of the DB server requires an out-of-bands communication method or web server routing.
2. Web content is distributed manually or via local scripts and applications.

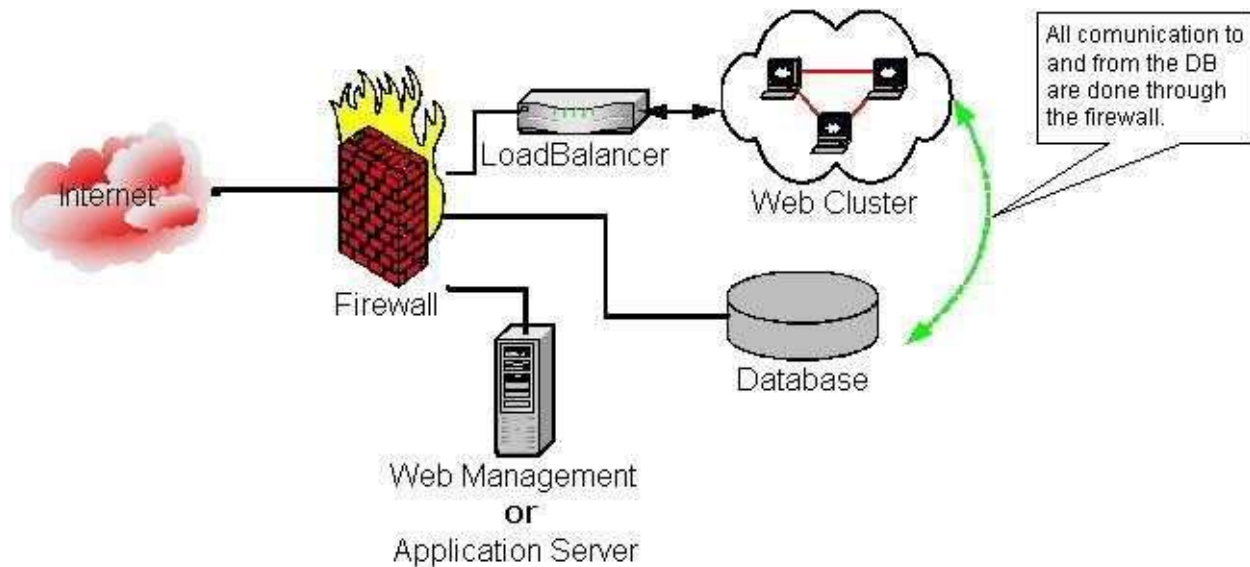
#### Security considerations:

1. This basic configuration provides network level security (via the firewall) and DB protection (via disjointed networks).
2. The load balancer (if external hardware is used) can be used as the second level network-filtering device for extra security.
3. The use of two network cards provides low-level protection against poorly configured firewall devices (for example, fire-walking will not reveal the DB server).

### Configuration 2 – Filtered Disjointed

In this configuration, the addition of the filtering firewall, via the second “DMZ” on the main firewall provides an added level of security. Any hacking on the web servers will provide only minimal access to the database servers. Obviously, the web servers can access the database server with an appropriate ODBC connector or similar means. This configuration could potentially provide a hacker (should he be able to “own” the webserver machine) limited direct data access capabilities.

Application business logic for the web site is based on a separate server to allow for easier scalability. This server may also be used for web management. Software such as MS Site Server or MS Application Server provides the content distribution, web statistics etc.



**Pros:**

1. Relatively easy installation and routing configuration.
2. Easy troubleshooting for connectivity and system level events.
3. Minimal hardware.

**Cons:**

1. The development environment must be similar to the production website, to allow developers to adjust application connectivity with internal servers to the filtering device used.
2. The use of one firewall as a filtering device might show a degradation in the site's performance. Should the use of extra firewalls be applied, cost and ease of installation will no longer be an advantage for this configuration.

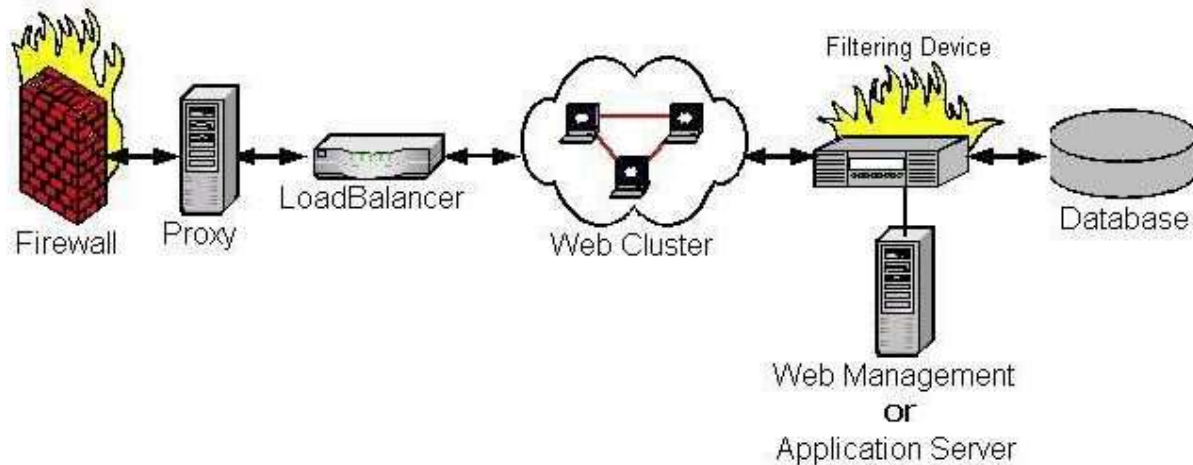
**Security considerations:**

1. This configuration provides network level security (via the firewall) and DB protection (via disjointed networks). It also provides low-level application protection since core data processing is shifted from the front-end web servers to back office application servers that have no direct communications with the site's users.
2. If MS SQL is used, TCP 1433 should be used instead of named pipes. This will provide a higher level of filtering.
3. When implementing the web content distribution mechanism, it is recommended not to use windows shares. FTP or MS Site Server replications are preferred.

### Configuration 3 – Application Protection

In the effort to protect the web site from application-level hacking, we need to use a “higher level” filter. The filter would be used to examine the HTTP protocol, and if possible, the HTTP GET, HEAD, POST, and PUT commands and parameters.

This approach apposes the Microsoft e-commerce strategy shown earlier in configuration 1, and in the e-commerce web site security, that all application-level security should be driven from the DNA design and proper code writing.



#### Pros:

1. High level of assurance that Internet traffic enters the various applications in the correct form and manner.
2. The use of proxy servers could improve performance, if the proxies implement a caching mechanism.

#### Cons:

1. Extremely hard to troubleshoot and configure.
2. High cost of hardware and initial installation.
3. The use of filter devices at the application level could cause functionality issues. This is due to the fact that the connection terminates at the proxy level and connection stickiness, session information and other client information might be misinterpreted before they reach the web servers.
4. It is imperative that the development of the application is done with full awareness to the system configuration. Not all existing web sites can use this configuration with no application adjustments.

#### Security considerations:

1. This configuration provides a high level of security, both network and application level.
2. Application filtering might require the use of out-of-band management tools, since not all proxy servers can act as routers for other non-HTTP protocols.



## 20. Payment Systems

E-Commerce or Electronics Commerce sites use electronic payment where electronic payment refers to paperless monetary transactions. Electronic payment has revolutionized the business processing by reducing paper work, transaction costs, labor cost. Being user friendly and less time consuming than manual processing, helps business organization to expand its market reach / expansion. Some of the modes of electronic payments are following.

- Credit Card
- Debit Card
- Smart Card
- E-Money
- Electronic Fund Transfer EFT

### 20.1. Credit Card

Payment using credit card is one of most common mode of electronic payment. Credit card is small plastic card with a unique number attached with an account. It has also a magnetic strip embedded in it which is used to read credit card via card readers. When a customer purchases a product via credit card, credit card issuer bank pays on behalf of the customer and customer has a certain time period after which he/she can pay the credit card bill. It is usually credit card monthly payment cycle. Following are the actors in the credit card system.

- The card holder - Customer
- The merchant - seller of product who can accept credit card payments.
- The card issuer bank - card holder's bank
- The acquirer bank - the merchant's bank
- The card brand - for example , visa or mastercard.

#### 20.1.1. Credit Card Payment Process

Steps	Description
Step 1	Bank issues and activates a credit card to customer on his/her request.
Step 2	Customer presents credit card information to merchant site or to merchant from whom he/she want to purchase a product/service.
Step 3	Merchant validates customer's identity by asking for approval from card brand company.
Step 4	Card brand company authenticates the credit card and paid the transaction by credit. Merchant keeps the sales slip.
Step 5	Merchant submits the sales slip to acquirer banks and gets the service chargers paid to him/her.
Step 6	Acquirer bank requests the card brand company to clear the credit amount and gets the payment.
Step 7	Now card brand company asks to clear amount from the issuer bank and amount gets transferred to card brand company.

## **20.2. Debit Card**

Debit card, like credit card is a small plastic card with a unique number mapped with the bank account number. It is required to have a bank account before getting a debit card from the bank. The major difference between debit card and credit card is that in case of payment through debit card, amount gets deducted from card's bank account immediately and there should be sufficient balance in bank account for the transaction to get completed. Whereas in case of credit card there is no such compulsion.

Debit cards free customer to carry cash, cheques and even merchants accept debit card more readily. Having restriction on amount being in bank account also helps customer to keep a check on his/her spendings.

## **20.3. Smart Card**

Smart card is again similar to credit card and debit card in appearance but it has a small microprocessor chip embedded in it. It has the capacity to store customer work related/personal information. Smart card is also used to store money which is reduced as per usage.

Smart card can be accessed only using a PIN of customer. Smart cards are secure as they store information in encrypted format and are less expensive/provide faster processing. Mondex and Visa Cash cards are examples of smart cards.

## **20.4. E-Money**

E-Money transactions refer to a situation where payment is done over the network and amount gets transferred from one financial body to another financial body without any involvement of a middleman. E-money transactions are faster, convenient and save a lot of time.

Online payments done via credit card, debit card or smart card are examples of e-money transactions. Another popular example is e-cash. In case of e-cash, both customer and merchant both have to sign up with the bank or company issuing e-cash.

## **20.5. Electronic Fund Transfer**

It is a very popular electronic payment method to transfer money from one bank account to another bank account. Accounts can be in same bank or different bank. Fund transfer can be done using ATM *Automated Teller Machine* or using computer.

Now a day, internet based EFT is getting popularity. In this case, customer uses website provided by the bank. Customer logs in to the bank's website and registers another bank account. He/she then places a request to transfer certain amount to that account. Customer's bank transfers amount to other account if it is in same bank otherwise transfer request is forwarded to ACH *Automated Clearing House* to transfer amount to other account and amount is deducted from customer's account. Once amount is transferred to other account, customer is notified of the fund transfer by the bank.

## **21. Cyber Money**

Cyber money (or digital currency) is a category of money represented in electronic form for the purpose of financial transactions over the Internet. It is a form of currency or medium of exchange that is electronically created and stored (i.e., distinct from physical media, such as banknotes and coins).

The key attribute, which a virtual currency does not have, is the status as a legal tender.

### **21.1. Virtual Money**

#### **21.1.1. Strong Definition**

Virtual money consists of value units, which are stored on electronic media and can be generally used to conduct payments. Neither the supplier nor the customer has to be the issuer of these value units.

#### **21.1.2. Comprehensive definition**

Virtual money are all means of payment and clearing methods which are based on technical innovations and potentially can lead to a substitution of notes and coins and bank reserves as well as to the creation of new types of currencies.

#### **21.1.3. Implementation of virtual money**

If you draw money in a bank you get a mix of notes and coins (the famous household mixture). As an analogy the bank could send you money documents which you could store on your computer or a smartcard. These money documents would be interchangeable like real cash.

#### **21.1.4. Requirements**

The money documents must be authentic (signature). Is there a counter-entry on the banking account? The money documents must be protected against copying or duplicating them.

#### **21.1.5. Handling:**

The money documents can be transmitted via E-Mail (encrypted, electronic envelope). They can be processed at a virtual counter or virtual cash register, where the customer forwards a money document (upload) and gets change money (download).

Protection against theft can be ensured via a virtual safe on the disc (encrypted disc area) or money storage on a separate medium.

Problems are:

- There must a currency unit be defined.
- Who is authorized to print money documents?
- Global currency: Who guarantees for the value (takes over the central bank function)?
- Private currency: Value must be guaranteed by the issuer.
- Private currency: Currency exchange rate with public money has to be fixed.
- No Web transaction is really anonymous.

Examples are: debit cards, stored-value cards, E-Cash, and electronic checks.

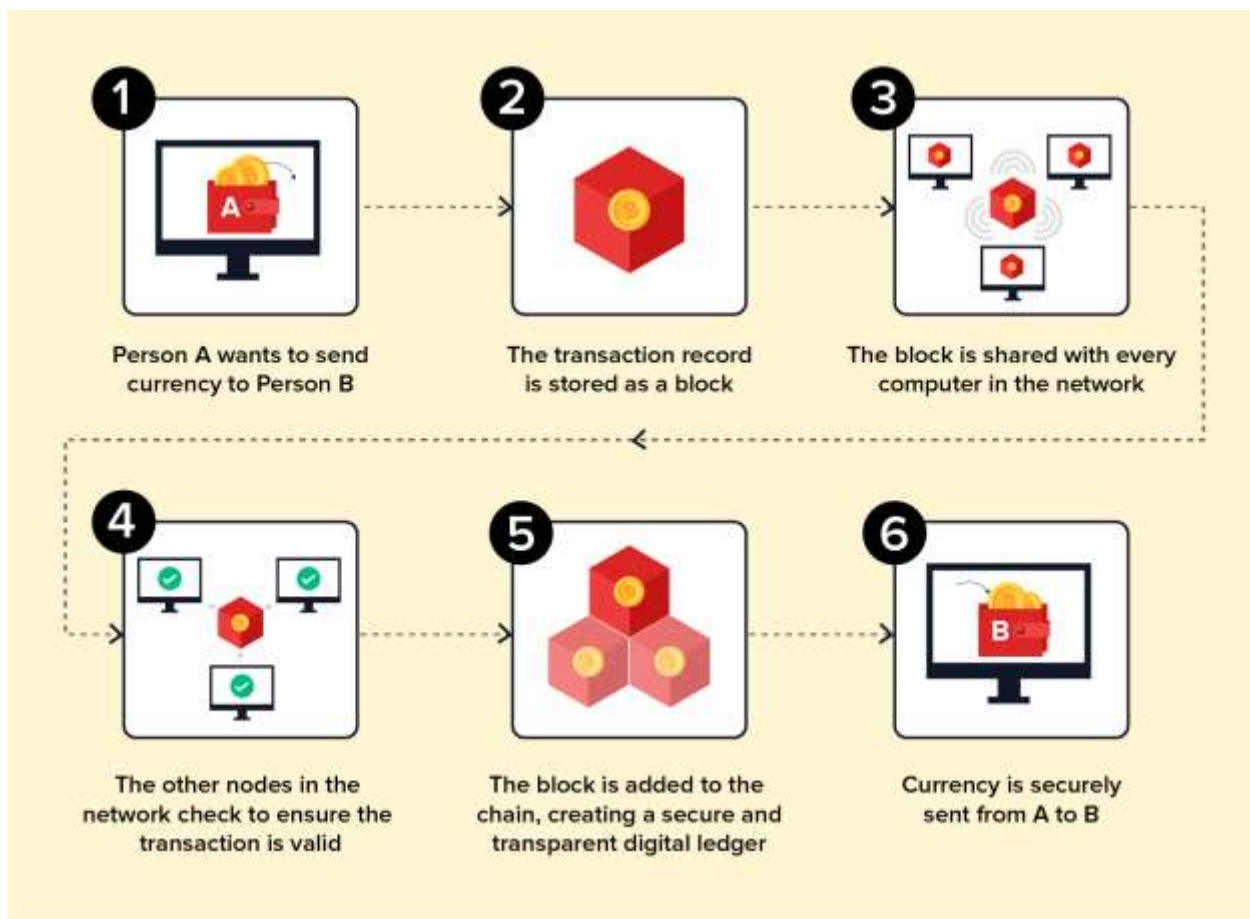
## 22. Blockchain

A blockchain is a chain of blocks that contains information. Each block consists of a number of transactions, and each transaction is recorded in the form of a Hash. Hash is a unique address assigned to each block during its creation and any further modification in the block will lead to a change in its hash.

### 22.1. How do blockchain works?

The name “blockchain” comes from the structure of this digital ledger: individual records, called blocks, are linked together in a list, called a chain.

This chain of blocks becomes a database that is shared across a network of computers, also referred to as nodes, miners, or peers. These nodes maintain their blockchain by validating and transmitting data about digital transactions, like the movement of cryptocurrency from one network user to another.



Here’s an example: say you buy a pizza from your friend George and you pay him in Bitcoin. When you send George a Bitcoin, you create and publish an entry in the Bitcoin blockchain. The other computers in the network will check to make sure you haven’t already sent the data representing that bitcoin to another user (preventing you from spending digital currency you’ve already spent). Every computer in the Bitcoin network keeps a record of all the transactions made within the network, and tracks the balance of every account.

Because this ledger isn't controlled by just one computer and doesn't have a single point of failure, all entries can be viewed by the entire network. This means data that's entered in a blockchain can't be deleted, altered, or corrupted.

## **22.2. Key Features of Blockchain**

### **22.2.1. Immutable**

Immutability means that the blockchain is a permanent and unalterable network. Blockchain technology functions through a collection of nodes.

- Every node in the network has a copy of the digital ledger. To add a transaction every node checks the validity of the transaction and if the majority of the nodes think that it is a valid transaction then it is added to the network. This means that without the approval of a majority of nodes no one can add any transaction blocks to the ledger.
- Any validated records are irreversible and cannot be changed. This means that any user on the network won't be able to edit, change or delete it.

### **22.2.2. Distributed**

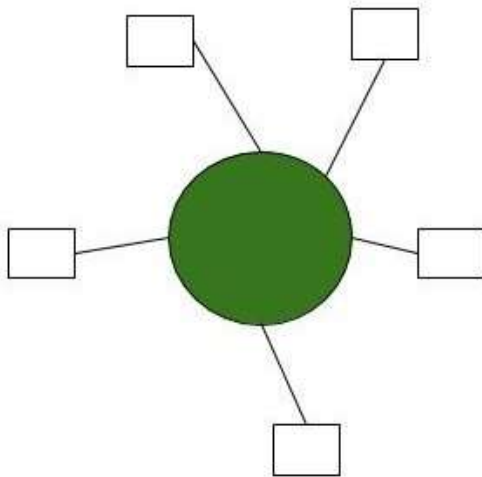
All network participants have a copy of the ledger for complete transparency. A public ledger will provide complete information about all the participants on the network and transactions. The distributed computational power across the computers ensures a better outcome. Distributed ledger is one of the important features of blockchains due to many reasons like:

- In distributed ledger tracking what's happening in the ledger is easy as changes propagate really fast in a distributed ledger.
- Every node on the blockchain network must maintain the ledger and participate in the validation.
- Any change in the ledger will be updated in seconds or minutes and due to no involvement of intermediaries in the blockchain, the validation for the change will be done quickly.
- If a user wants to add a new block then other participating nodes have to verify the transaction. For a new block to be added to the blockchain network it must be approved by a majority of the nodes on the network.
- In a blockchain network, no node will get any sort of special treatment or favors from the network. Everyone will have to follow the standard procedure to add a new block to the network.

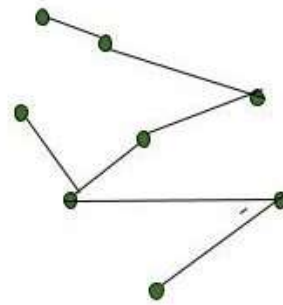
### 22.2.3. Decentralized

The blockchain network is decentralized which means that there is no central governing authority that will responsible for all the decisions. Rather a group of nodes makes and maintain the network. Each and every node in the blockchain network has the same copy of the ledger. Decentralization property offers many advantages in the blockchain network:

- As a blockchain network does not depend on human calculations it is fully organized and fault-tolerant.
- The blockchain network is less prone to failure due to the decentralized nature of the network. Attacking the system is more expensive for the hackers hence it is less likely to fail.
- There is no third-party involved hence no added risk in the system.
- The decentralized nature of blockchain facilitates creating a transparent profile for every participant on the network. Thus, every change is traceable, and more concrete.
- Users now have control over their properties and they don't have to rely on third-party to maintain and manage their assets.



Centralised Network



Decentralised network

### 22.2.4. Secure

All the records in the blockchain are individually encrypted. Using encryption adds another layer of security to the entire process on the blockchain network. Since there is no central authority, it does not mean that one can simply add, update or delete data on the network.

Every information on the blockchain is hashed cryptographically which means that every piece of data has a unique identity on the network. All the blocks contain a unique hash of their own and the hash of the previous block. Due to this property, the blocks are cryptographically linked with each other. Any attempt to modify the data means to change all the hash IDs which is quite impossible.

#### **22.2.5. Consensus**

Every blockchain has a consensus to help the network to make quick and unbiased decisions. Consensus is a decision-making algorithm for the group of nodes active on the network to reach an agreement quickly and faster and for the smooth functioning of the system. Nodes might not trust each other but they can trust the algorithm that runs at the core of the network to make decisions. There are many consensus algorithms available each with its pros and cons. Every blockchain must have a consensus algorithm otherwise it will lose its value.

#### **22.2.6. Unanimous**

All the network participants agree to the validity of the records before they can be added to the network. When a node wants to add a block to the network then it must get majority voting otherwise the block cannot be added to the network. A node cannot simply add, update, or delete information from the network. Every record is updated simultaneously and the updations propagate quickly in the network. So it is not possible to make any change without consent from the majority of nodes in the network.

#### **22.2.7. Faster Settlement**

Traditional banking systems are prone to many reasons for fallout like taking days to process a transaction after finalizing all settlements, which can be corrupted easily. On the other hand, blockchain offers a faster settlement compared to traditional banking systems. This blockchain feature helps make life easier.

Blockchain technology is increasing and improving day by day and has a really bright future in the upcoming years. The transparency, trust, and temper proof characteristics have led to many applications of it like bitcoin, Ethereum, etc. It is a pillar in making the business and governmental procedures more secure, efficient, and effective.

### **22.3. Cryptocurrency**

A cryptocurrency is a type of digital token that relies on cryptography for chaining together digital signatures of token transfers, peer-to-peer networking and decentralization. In some cases a proof-of-work scheme is used to create and manage the currency.

Bitcoin is the most widely used and well-known cryptocurrency. Many of the current cryptocurrencies are based on Bitcoin. Bitcoin is the first decentralized peer-to-peer payment network that is powered by its users with no central authority or middlemen. It was the first practical implementation and is currently the most prominent triple entry bookkeeping system in existence.

### **22.4. Benefits of Blockchain/Cryptocurrency based Ecommerce**

Because blockchain makes transactions safer and faster, the potential impact on ecommerce is tremendous.

The most common blockchain technologies used in ecommerce are Ethereum, which provides a platform for ecommerce brands that want to manage their own blockchains; and Bitcoin, the cryptocurrency that led to the development of blockchain technology and allows customers to make purchases in sites and apps that accept Bitcoin as payment.

Because it makes online financial transactions more secure, blockchain is a win-win for both brands and buyers. But it also provides a lot of other benefits, including cutting costs, improving business processes, making transactions faster, and improving the overall customer experience.

### **22.4.1. Enhanced security**

Data breaches and fraudulent transactions are major concerns for eCommerce retailers. Blockchain technology allows for trusted identities verified by multiple trusted parties, and offers the highest level of security for customer databases and CRM systems.

### **22.4.2. Cost savings**

One big advantage of blockchain technology is that it allows retailers to combine services like payment processing, inventory management, product descriptions, etc. so that they spend less on buying and maintaining separate systems.

And because cryptocurrencies like Bitcoin can be sent instantly peer-to-peer, there's no need to go through banking systems. This cuts down on fees charged by banks for issuing or acquiring funds, or fees charged by credit card companies to process payments.

### **22.4.3. Easier, faster transactions.**

Because blockchain transactions are basically instantaneous and do not go through traditional banks, there are no delays for payment processing or pending transactions. Purchases can be made instantly, which means faster order fulfillment for customers.

### **22.4.4. Improved business processes**

Blockchains can store more than just transactional data. They can store smart contracts (also known as smart properties and chaincode), which can automate tasks based on preset rules and if-then statements, like automatic payments or inventory management.

For example, you buy a Rolex online and pay a deposit via a blockchain-based cryptocurrency. You get a receipt held in a virtual contract. The retailer sends you the watch by a specified delivery date, and if it doesn't arrive on time, the blockchain releases a refund of your deposit. If you do receive the watch, the blockchain releases your full payment to the retailer.

Blockchain can also store digital records like customer receipts and warranty information, making it easier to validate ownership and warranty validation, not to mention cut down on paper records.

### **22.4.5. Reducing cost and complexity of supply chain management.**

Blockchain in ecommerce supply chain means brands can cut the paper and manual work associated with shipping. Bills of lading for cargo can be placed on the blockchain at each stage of the supply chain, cutting down on administrative time/costs and making it easier to track shipments or verify product information and pallet weight.



And for products with expiration dates or certificates of authenticity, blockchain can ensure the validity and quality of inventory and reassure customers they're getting what they paid for.

#### **22.4.6. Greater access for global consumers**

For customers living in developing countries, access to a reliable banking system is not a given. Blockchain and cryptocurrencies allow them to bypass the banking middle man, giving them access to a wider variety of ecommerce retailers. And it allows forward-thinking brands to tap into new and emerging markets.

#### **22.4.7. More convenient rewards and referrals programs.**

Blockchain allows brands to easily issue rewards points that are redeemable across a variety of sites and partner brands. Companies can even pay content creators or influencers in digital tokens, which can then be converted into their preferred currency.