

# BSc CsIt SEM - VI

## E-Commerce

### Unit 4: Building E-commerce System (5 Hrs.)

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#### Syllabus:

#### Unit 4: Building E-commerce System (5 Hrs.)

E-commerce Website/Software, Building Catalogs: Static, Dynamic, Building Shopping Cart, Transaction Processing, Development of E-commerce Website/Software: Databases, Application Programs, Integration with ERP Systems, Integration with Payment Gateways, Using Open Source CMS for Development of E-commerce Applications

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### E-commerce Website/Software

#### E-commerce Website

An e-commerce website is a website that allows you to buy and sell tangible goods, digital products or services online i.e. Any site where you can obtain items for sale over the internet is considered be an ecommerce website. Ecommerce websites are built to connect shoppers to products or services for trading online.

Many luxury clothing and jewellery items are sold online today. Some are sold directly through the manufacturers' **Web sites**, but most are sold through well-known retail merchandisers that have online stores. Of course, high-fashion brand goods sell for luxury prices in most cases. Shoppers who would like to buy these items, but cannot always afford them, might look for bargains at outlet stores.

There are a lot of ecommerce websites selling a variety of items now. From clothing pieces to food items to gardening materials. Even social media accounts are becoming ecommerce platforms and are developed to be ecommerce websites nowadays. The only difference is that on an e-commerce website, you don't have to deal with a human to be able to buy and get your items delivered to your doorstep. An ecommerce website must be as functional as it is with or without the owners or managers monitoring the site and dealing with their customers every second of the day.

One of the obvious differences between an ecommerce website and an ordinary business or company website is in the features that it supports. A company website may just house information on the brand's product and services so users will need to contact the company directly if they want to do business with them. Meanwhile, an ecommerce website works pretty much like how a physical store works. Users can purchase items, arrange for delivery and payments on the same site without the need to call a human person to help them with their order.

**Gilt Groupe ( Gilt is an online shopping and lifestyle website based in the United States, launched in 2007)** offers an interesting angle on the outlet store idea. At noon, its Web site lists a selection of designer clothes and other luxury brand items for sale at deep discounts. The store, which acquires the items through its network of high-end suppliers, sells only the listed items and only for 36 hours (or until an item sells out, which happens frequently). By midnight the next day, the sale is over and a new selection is listed the following noon.

# **BSc CsIt SEM - VI**

## **E-Commerce**

### **Example: Online Shopping Sites in Nepal**

- daraz.com.np
- thulo.com
- sastodeal.com
- meroshopping.com
- smartdoko.com

### **How do eCommerce websites work?**

#### **eCommerce websites typically work like this:**

- A potential customer navigates to an eCommerce website, whether via search engines, paid advertisements, referral traffic, etc.
- The eCommerce website connects to its database, which contains tons of data about the website's categories, products, product dimensions and weight, articles and content, images, etc. The website requests this data to dynamically render any requested web pages.
- After browsing the eCommerce website, a potential customer adds a product or service to their virtual shopping cart and decides to check out.
- The shopper completes the checkout process and finalizes the transaction.
- The shopper's credit card information is encrypted and sent to a Payment Gateway (PayPal, for example) to handle the credit card processing securely and remotely.
- Once the order is complete, and the payment has gone through, the website typically provides an estimated shipping time, a unique transaction number, postal tracking number, etc. Most of these processes are automated and part of a good eCommerce website's core functionality.
- As transactions take place, orders are stored in the website admin and sent to an order fulfillment team. Order fulfillment can be done in-house or by a third-party company/drop shipper.

#### **Pros of eCommerce Websites:**

- Increased market reach (global customer base).
- Reduced costs for goods, services, shipping, etc.
- Secure & encrypted transactions.
- Shortened distribution chain.
- Faster order fulfilment.
- Better, more precise data for future sales forecasting.
- Targeted markets can be razor-focused, based on age, demographics, interests, etc.
- The potential for anonymity.

#### **Cons of eCommerce Websites:**

- Customers can't always see and touch the product in real life before purchasing.
- Potential customers must be somewhat tech-savvy, potentially limiting market reach.
- Less 'personal' shopping experiences.
- Potential for fraud, data privacy issues, etc.

# BSc CsIt SEM - VI

## E-Commerce

### E-commerce Software

Ecommerce software is the software under which you can run your e-commerce website. This is what you will use to manage your inventory, and remove products from the store, and so on.

Ecommerce software is the engine behind the scenes of an online store, making it possible to easily manage inventory, add or remove products, calculate taxes, and everything else required to manage a website and fulfil orders. It offers all the things needed to run a retail site, effectively simplifying online store management.

NodeJS is the best ecommerce framework/software which has in-built Node Clusters that does a very good job in load distribution. Cluster lets you set up a master process that can handle load to worker processes. NodeJS uses the round-robin algorithm to distribute the load between workers in a better way. So, NodeJS eCommerce frameworks can do best for portals that has to sustain large number of visitors and unlimited product uploads.

The best widely used node.js framework is MEAN Stack. And the best node.js e-commerce platforms using MEAN Stack is **Spurt Commerce** (Spurt Commerce is the Node JS and Angular based eCommerce Solution for quickly and easily developing an eCommerce website).

This is newly developed open-source e-commerce solution which uses node.js in back end on Loop Back framework, thus offering an easy-to-use admin panel through which, the site manager can add unlimited pages, product categories and products with images and manage site content.

For front end, Spurt Commerce uses Angular.js . Angular.js can give the front a beautiful look, feel and appearance. The technology makes it easy for your customers to search products and easily navigate to them with easy-to-use filter options.

This solution also supports integration of PayPal payment gateway. The solution is highly suitable for both single vendor as well as multi-vendor eCommerce platforms. The solution comes with complete source code and it can be easily customized.

# **BSc CsIt SEM - VI**

## **E-Commerce**

### **Feature of E-commerce software**

Every website is unique in its own special way. An online website or shop has a lot of complex parts and functionalities. Ecommerce software reduces this to the point where even non-technical employees may operate it without difficulty. The ecommerce platform also makes things easier by integrating with a variety of tools, such as CRM, ERP, CMS, Payment Gateways, and so on. The e-commerce programs will assist you in maintaining your website, lowering operating costs, and attracting new clients. There are a few aspects to keep in mind while starting an online business and acquiring an e-commerce store or website.

#### **1. High-quality site search functionality**

The most important function is a high-quality site search. If you want to improve your conversion rates, then a high-quality site search function is imperative. Whether you are selling black patent leather or a retro pattern scarf, how your site search processes keywords and applies filters can have a huge effect on your sales.

#### **2. Product management**

Effective merchandising is a powerful driver of increased revenue. From product and catalogue management to images, recently viewed products and tracking capabilities, effective product management will keep your customers coming back for more.

#### **3. Content management system (CMS)**

Your site may look the best in the world, but if you cannot easily update its then your ability to react to customer data as it presents itself will be severely limited. Speed is key to efficiency, that's why retailers chose CMS are important.

#### **4. Multi-channel functionality**

In today's retail environment it is highly likely that your sales are spread out over many on and off-line sales channels. Hence the high importance is attributed to managing products, listings, and orders in a multi-channel environment.

#### **5. Order management system (OMS)**

The primary reason to use an OMS system is to reduce your order processing time. OMS can also be effectively integrated with your online store to impact some important eCommerce metrics, like order accuracy, on-time delivery, and inventory visibility.

#### **6. Mobile supported eCommerce**

Despite the fact that customers are still more likely to browse on mobile than buy, powerful mobile support for an eCommerce platform is still a critical factor for many major retailers.

#### **7. In-built SEO capabilities**

SEO eCommerce solutions can be tricky, SEO is a fast-moving area, sensitive to changes in search engine algorithms, and difficult to define objectively. It's important to check 'under the bonnet' to see if the solution is as 'SEO friendly' as it claims.

## **BSc CsIt SEM - VI**

### **E-Commerce**

#### **8. Business Intelligence (BI)**

As the old adage goes, 'if you can't measure it, you can't manage it', but getting accurate business intelligence data from a wide variety of systems sources can be a real challenge. Effective BI allows you to analyse the transaction in-depth, and take advantage of opportunities as they arise.

#### **9. Third-party systems and plug-ins**

The ability to use third party plugins means adaptability, customization, and innovation. These features can be particularly useful for specific features which may not be part of the standard package.

### **Building Catalogues: Static, Dynamic**

An ecommerce catalogue is commonly defined as any online catalogue that showcases the products or services of a company that operates primarily online. An online catalogue is an electronic catalogue on a website that showcases all the products you sell and allows buyers to shop and purchase. A decade ago, bringing a catalogue online might have meant posting chapters of the print catalogue as PDFs. Today, B2B sellers can cater to customers with fully searchable databases of their items and new tools that dramatically improve their shopping experience.

In ecommerce, cataloguing means showcasing products or services and setting them up for online consumption using technology. One of the common ways businesses do this is to use an online shopping cart or ecommerce platform to enable full-featured online shopping. Shoppers can see and select products and compare prices like a paper catalogue and also order all online.

The modern consumer has an increasing desire to browse and shop for products online. Featuring e-commerce or a catalogue on your company's website not only allows customers to get a sense of what you have to offer, it also opens up your business to a broader geographic region of customers. Allowing customers to remotely view and even purchase your products means your customers can be anywhere on the globe.

There are a number of key considerations to take into account when developing an online shop or catalogue. You want the products featured in your online shop or catalogue to look appealing to the customer. You also want the customer to be able to browse your products effortlessly. Finally, if you are going to feature e-commerce on your website, you want to offer a simple and secure payment and shipping method.

A catalogue organizes the goods and services being sold. To further organize its offerings, a retailer may break them down into departments. As in a physical store, merchandise in an online store can be grouped within logical departments to make locating an item, such as a camping stove, simpler. In most physical stores, each product is kept in only one place. A Web store has the advantage of being able to include a single product in multiple categories. For example, running shoes can be listed as both footwear and athletic gear.

# **BSc CsIt SEM - VI**

## **E-Commerce**

### **Static catalogue**

A small commerce site can have a very simple static catalogue. A catalogue is a listing of goods and services. A static catalogue is a simple list written in HTML that appears on a Web page or a series of Web pages. To add an item, delete an item, or change an item's listing, the company must edit the HTML of one or more pages.

### **Dynamic catalogue**

Larger e-commerce sites are more likely to use a dynamic catalogue. A dynamic catalogue stores the information about items in a database, usually on a separate computer that is accessible to the server that is running the Web site itself. A dynamic catalogue can feature multiple photos of each item, detailed descriptions, and a search tool that allows customers to search for an item and determine its availability. The software that implements a dynamic catalogue is often included in larger electronic commerce software packages; however, some companies write their own software to link their existing databases of product information to their Web sites. Both types of catalogues (static and dynamic) are located in the third tier of the Web site architecture.

Small online stores that sell fewer than 100 items usually need only a simple list of products or categories. Organization of the items is not particularly important. Companies that offer only a small number of items can provide a photo of each item on the Web page that is a link to more information about the product. A static catalogue is sufficient for their needs. Larger electronic commerce sites require the more sophisticated navigation aids and better product organization tools that are a part of dynamic catalogues.

### **Building Shopping Cart**

In the early days of electronic commerce, shoppers selected items they wanted to purchase by filling out online forms. Using text box and list box form controls to indicate their choices, users entered the quantity of an item in the quantity text box, the SKU (stock keeping unit) or product number in another text box, and the unit price in yet another text box. This system was awkward for ordering more than one or two items at a time.

One problem with forms-based shopping was that shoppers had to write down product codes, unit prices, and other information about the product before going to the order form, which was inevitably on another page. Another problem was that customers sometimes forgot whether they had clicked the submit button to send in their orders. As a result, they either sent the same order twice (pressing the submit button when they had already done so) or thought they had submitted the order when they really had not (consequently failing to submit the order). The forms-based method of shopping was confusing and error prone.

## BSc CsIt SEM - VI

### E-Commerce

**Gary's Music**

**Gary's Music Store Order Form**

To Order: Please complete order form and click the **Submit Order** button at the bottom of this page.

Purchase Date: 07/26/2010

Item Number	Description	Quantity
429681	Easy Piano Series #5	3
788412	Intermediate Drum Drills	5
691127	Clarinet Reeds #2 Dz Box	2

**Shipping Address:**

Name: James T. Toadvine  
Shipping Address: 9227 Mt. Helix Road  
City: West Lafayette State: IN  
Purchase Order Number (if any): 225685 Zip: 47906  
Phone Number: 574-555-2110  
E-mail Address: toadvine999@yahoo.com

**Billing Address:** ☒ Check if same as shipping address

Name: \_\_\_\_\_  
Mailing Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_  
Phone: \_\_\_\_\_ Zip: \_\_\_\_\_  
E-mail: \_\_\_\_\_

User must enter this data

Figure (a):- Using a form to enter an order

Figure (a) above illustrates the problems that shoppers faced with forms-based ordering systems. First, many customers found it difficult to remember the exact descriptions of the products. Second, customers had to enter the item numbers, which were located on a different Web page, in the text boxes. Thus, the customers needed to either write down or memorize the numbers.

Because forms-based ordering is cumbersome and error-prone, only a few of the smallest online stores still use it. Shopping carts are now the standard method for processing sales on most electronic commerce sites. A shopping cart, also sometimes called a shopping bag or shopping basket, keeps track of the items the customer has selected and allows customers to view the contents of their carts, add new items, or remove items. To order an item, the customer simply clicks that item. All of the details about the item, including its price, product number, and other identifying information, are stored automatically in the cart. If a customer later changes his or her mind about an item, he or she can view the cart's contents and remove the unwanted items. When the customer is ready to conclude the shopping session, the click of a button executes the purchase transaction. Figure(b) below shows a typical shopping cart page at a site that sells computer equipment.

## BSc CsIt SEM - VI

### E-Commerce



Figure(b): Typical shopping cart page

Clicking the Checkout button usually displays a screen that asks for billing and shipping information and that confirms the order. As you can see from the figure, the shopping cart software keeps a running total of each type of item. The shopping cart calculates a total as well as sales tax and shipping costs.

Some shopping cart software allows the customer to fill a shopping cart with purchases, put the cart in virtual storage, and come back days later to confirm and pay for the purchases. A number of companies, including BIZNET Internet Services, SalesCart, and WebGenie Software, sell shopping cart software that sellers can add to their Web sites. These software packages range in price from a few hundred dollars to several thousand dollars, plus an ongoing monthly fee. The shopping cart software sold by SalesCart works with several different Web site design tools, as shown in Figure (c) below.



## BSc CsIt SEM - VI

### E-Commerce



Figure (c): SalesCart shopping cart software page

Because the Web is a stateless system—unable to remember anything from one transmission or session to another—shopping cart information must be stored explicitly for the shopper to retrieve later. Furthermore, it must distinguish one shopper from another so that the purchases are not mixed up. One way to uniquely identify users and store information about their choices is to create and store cookies, which, as you learned in earlier chapters, are bits of information stored on a client computer. When a customer returns to a site that issued a particular cookie, the shopping software reads either the cookie from the customer's computer or the database record from the merchant's server.

If a shopper's browser does not allow storage of cookies, sites can use another way to preserve shopping cart information from one browser session to another. Some shopping cart software packages, such as ShopSite, do this by automatically assigning a shopper a temporary number. The number is added to the end of the URL that appears in the browser's address bar and persists as the shopper navigates from one Web site to another. When the customer returns, the URL still contains shopping cart information that the Web server can interpret. When the shopper closes the browser, the temporary number is discarded and is no longer available, even if the customer later reopens the browser and returns to the same Web site.

## BSc CsIt SEM - VI

### E-Commerce

#### Transaction Processing

Transaction processing occurs when the shopper proceeds to the virtual checkout counter by clicking a checkout button. Then the electronic commerce software performs any necessary calculations, such as volume discounts, sales tax, and shipping costs. At checkout, the customer's Web browser software and the seller's Web server software both switch into a secure state of communication. Figure below shows how the three key functions of a basic electronic commerce Web site (catalogue display, shopping cart, and transaction processing) are combined in the site's architecture.

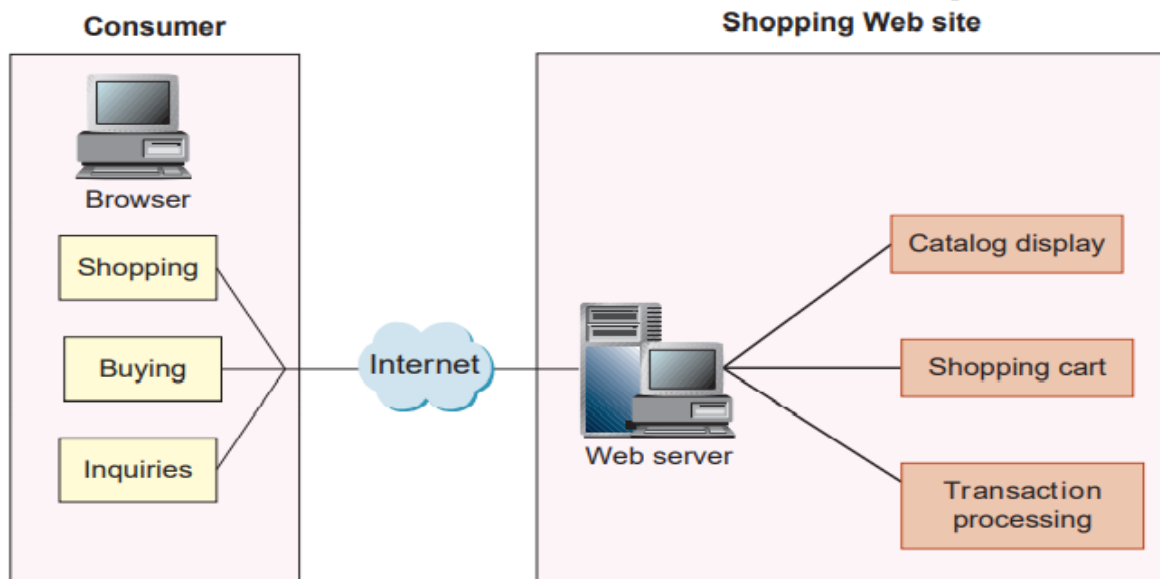


Figure: - Basic electronic commerce Web site architecture

Although a basic online store's electronic commerce software can generate reports that summarize sales and inventory shipped, most midsize and larger companies use an accounting software package to record sales and inventory movements.

To integrate effectively with accounting software, the electronic commerce software must communicate with that accounting software, which typically runs on other computers in the seller's network. When an item is sold online, the electronic commerce software must communicate that fact to both the sales and inventory management modules in the accounting software.

Computing sales taxes and shipping costs are also important parts of online sales. Sales tax rates and shipping rates can change often, so Web site managers must either monitor and update the rates continually or use software that updates the rates automatically.

Shipping companies such as FedEx and UPS offer software to shippers that integrates with electronic commerce software to ensure that the rates, they have are current. Other calculation complications include provisions for coupons, special promotions, and time

## **BSc CsIt SEM - VI**

### **E-Commerce**

sensitive offers; for example, “purchase a round-trip ticket before the end of the month and receive a 50 percent discount.”

#### **Development of E-commerce Website/Software:**

In order to develop E-commerce software, you should learn about the features that larger companies need in their electronic commerce software. Although there are exceptions, such as Amazon.com and Buy.com, most large companies that have electronic commerce operations also have substantial business activity that is not related to electronic commerce. Thus, integrating electronic commerce activities into the company’s other operations is very important. A basic element of any large company’s information system is its collection of databases.

#### **Databases**

A database is a collection of information that is stored on a computer in a highly structured way. The rules a business establishes about its database structure are carefully thought out and take into account how the company does business (its business rules) and how the company can reduce the likelihood that errors and inconsistencies will develop in the database.

A database manager (or database management software) is software that makes it easy for users to enter, edit, update, and retrieve information in the database. One common low-end database manager is Microsoft Access. More complex database managers that can handle larger databases and can perform more functions at higher speeds include IBM DB2, Microsoft SQL Server, and Oracle.

Companies with very large databases that have operations in many locations must make most (or all) of their data available to users in those locations. Large information systems that store the same data in many different physical locations are called distributed information systems, and the databases within those systems are called distributed database systems. The complexity of these systems leads to their high cost.

Most companies that can afford it do use commercial database products; however, an increasing number of companies and other organizations are using MySQL, which was developed and is maintained by a community of programmers on the Web.

Except for small sites offering only a few products, companies should determine the level of database support provided by any electronic commerce software they are considering. Most online stores that sell many products use a database that stores product information, including size, colour, type and price detail.

Usually, the database that serves an online store is the same one that is used by the company’s existing sales operations. It is usually better to have one database serving the two sales functions (online and in-store retail, for example) because it eliminates the errors that can occur when running parallel but distinct databases. If a company has existing inventory and product databases, then it should consider only electronic commerce software that supports these systems.

# **BSc CsIt SEM - VI**

## **E-Commerce**

### **Application Programs**

A program that performs a specific function, such as creating invoices, calculating payroll, or processing payments received from customers, is called an application program, application software or, more simply, an application. An application server is a computer that takes the request messages received by the Web server and runs application programs that perform some kind of action based on the contents of the request messages. The actions that the application server software performs are determined by the rules used in the business. These rules are called business logic. An example of a business rule is: When a customer logs in, check the password entered against the password file in the database.

In many organizations, the business logic is distributed among many different applications that are used in different parts of the organization. In recent years, many IT departments have devoted significant resources to the creation of links among these scattered applications so that the organization's business logic can be interconnected. The creation and management of these links is called application integration or enterprise application integration. The integration is accomplished by programs that transfer information from one application to another.

For example, a program might transfer information from order entry systems in several different divisions to a single accounts receivable and sales system that integrates all enterprise-wide sales activity. In many cases, the data formats in the various programs are different and the transfer programs must edit and reformat the data before transferring it. Increasingly, programmers are using XML data feeds to move data from one application to another in enterprise integration implementations

Application servers are usually grouped into two types:

- page-based
- component-based systems

### **Page-based application**

- Page-based application systems return pages generated by scripts that include the rules for presenting data on the Web page with the business logic.
- Common page-based server systems include Adobe ColdFusion, JavaServer Pages (JSP), Microsoft Active Server Pages (ASP), and Hypertext Preprocessor (PHP). These page-based systems work quite well for small and midsize Web sites. Because they combine the page presentation logic with the business logic, however, they can be difficult to revise and update.

### **Component-based application**

- Larger businesses often prefer to use a component-based application system that separates the presentation logic from the business logic. Each component of logic is created and maintained separately. This makes updating and changing elements of the system much easier; especially on large electronic commerce sites that are built and maintained by teams of programmers.

## **BSc CsIt SEM - VI**

### **E-Commerce**

- The most common component-based systems used on the Web are Enterprise JavaBeans (EJBs), Microsoft Component Object Model (COM), and the Object Management Group Common Object Request Broker Architecture (CORBA).

### **Integration with ERP Systems**

Many B2B Web sites must be able to connect to existing information systems such as enterprise resource planning software. Enterprise resource planning (ERP) software packages are business systems that integrate all facets of a business, including accounting, logistics, manufacturing, marketing, planning, project management, and treasury functions.

### **Enterprise Resource Planning**

- Enterprise resource planning (ERP) refers to a type of software/process that organizations use to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, and supply chain operations.
- A complete ERP suite also includes enterprise performance management, software that helps plan, budget, predict, and report on an organization's financial results.
- ERP systems tie together a multitude of business processes and enable the flow of data between them.
- By collecting an organization's shared transactional data from multiple sources, ERP systems eliminate data duplication and provide data integrity with a single source of truth.
- Today, ERP systems are critical for managing thousands of businesses of all sizes and in all industries.
- To these companies, ERP is as indispensable as the electricity that keeps the lights on

The two major ERP vendors are Oracle and SAP. A typical installation of ERP software costs between \$2 million and \$25 million; thus, companies that are already running these systems have made a significant investment in them and require that their electronic commerce and EDI operations to integrate with them.

Figure below shows a typical architecture for a B2B Web site that connects to several existing information systems, including the ERP system within the company and its trading partners' systems through EDI connections.

## BSc CsIt SEM - VI

### E-Commerce

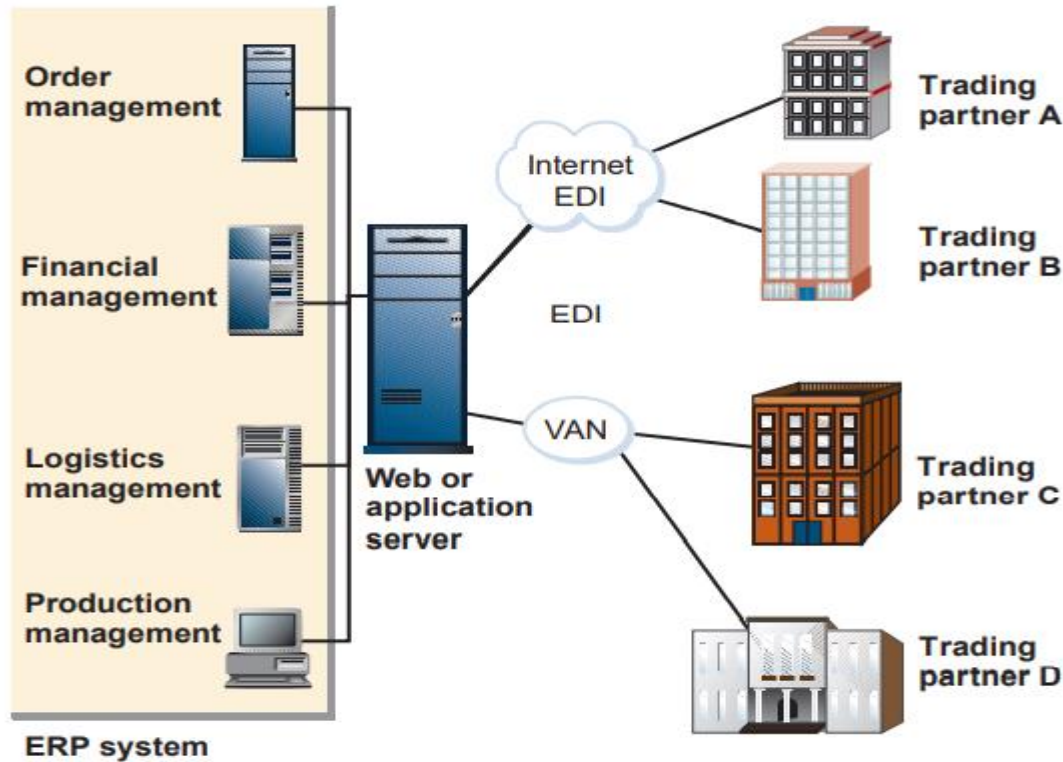


Figure: - ERP system integration with EDI

#### Business Benefits of ERP

- It's impossible to ignore the impact of ERP in today's business world.
- As enterprise data and processes are corralled into ERP systems, businesses can align separate departments and improve workflows, resulting in significant bottom-line savings.
- Examples of specific business benefits include
  - **Improved business insight** from real-time information generated by reports
  - **Lower operational costs** through streamlined business processes and best practices
  - **Enhanced collaboration** from users sharing data in contracts, requisitions, and purchase orders
  - **Improved efficiency** through a common user experience across many business functions and well-defined business processes
  - **Consistent infrastructure** from the back office to the front office, with all business activities having the same look and feel
  - **Higher user-adoption rates** from a common user experience and design
  - **Reduced risk** through improved data integrity and financial controls
  - **Lower management and operational costs** through uniform and integrated systems

## BSc CsIt SEM - VI

### E-Commerce

#### Integration with Payment Gateways

- A payment gateway as a merchant service that processes credit card payments for ecommerce sites and traditional brick and mortar stores.
- Popular payment gateways include PayPal/Braintree, Stripe, Square, Esewa etc
- Most payment gateways accomplish that in a few seconds with these steps
  - **Encryption** : Between the user's browser and the server of the retailer, a payment gateway will encrypt (encode for private use) data for exclusive use between seller and buyer
  - **Request** : The authorization request occurs when a payment processor gets approval from a credit card company or financial institution to proceed with the transaction
  - **Fulfilment** : When the payment gateway has the authorization, it allows the website and interface to proceed to the next action

#### Using Open-source CMS for Development of E-commerce Applications

- Large companies are finding new ways to use the Web to share information among their employees, customers, suppliers, and partners. Content management software helps companies control the large amounts of text, graphics, and media files that have become crucial to doing business. Increased use of smart phones, netbook computers, and pad computing devices has made content management even more important.
- Most electronic commerce software comes with wizards and other automated helpers that create template-driven pages, such as home pages, about pages, and contact pages. But most businesses want to customize Web pages with company and product pictures and text.
- Open-source CMSs are built collaboratively by a community of users, using a code that is available online for anyone to use, modify and distribute. These platforms are typically free of charge, as no one technically owns them.
- An open-source CMS also has features exactly as the name implies: a source code open to the public eye and free to use by anyone with restrictions depending on the license type, with the most common being GPL(General Public License ) and Apache.
- Developers who create an open-source CMS publish the code and allow others to use and modify it. This might spawn a developer community, where programmers come together to develop the software and provide support to users.
- Some characteristics of open-source CMSs include:
  - A code source and platform that can be shared by all users.
  - One party manages it, but anyone can access it.
  - They are typically free and open to anyone



## BSc CsIt SEM - VI

### E-Commerce

#### **Example:**

- **WordPress** is by far the most popular open-source CMS. It has 65% CMS market share, powers 43% of the entire internet, and is used by websites including The New York Times, The Walt Disney Company, and Sony.
- **Joomla**, the second most popular open-source CMS, is known for its combination of power, flexibility, and ease of use, and is especially well-suited for ecommerce sites and social networking. Sites that use Joomla include IKEA, Harvard University, and the Guggenheim Museum.
- **Drupal** is a more complex and powerful option that offers almost unlimited customization, but requires more advanced technical knowledge to build and maintain. Organizations that use Drupal for their websites include Tesla, the NCAA, and NASA.

===== End of Unit-4 =====

#### **Unit 4: Building E-commerce System (5 Hrs.)**

E-commerce Website/Software, Building Catalogs: Static, Dynamic, Building Shopping Cart, Transaction Processing, Development of E-commerce Website/Software: Databases, Application Programs, Integration with ERP Systems, Integration with Payment Gateways, Using Open Source CMS for Development of E-commerce Applications

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