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# **PROFESSIONAL ENGLISH IN IT**

**B2 – C1**

**Textbook for Students of Information Technology**

**KYIV-2019**

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*Recommended by the Academic Council*

*Faculty of Information Technology*

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The *Professional English in IT* textbook has been designed for the students completing their 4th year of undergraduate study in Intellectual and Information Systems, Cyber Security and Information Protection, Software Systems and Technologies, Applied Information Systems, Networking and Internet Technologies, Technology Management.

This course is appropriate for students from upper-intermediate to advanced levels who have a specific area of academic or professional interests. It has been developed for use in technical schools, colleges, and universities, as well as on some specific training programs.

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**КИЇВСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ ІМ. ТАРАСА ШЕВЧЕНКА**

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**Людмила Кучерява**

**Марина Ребенко**

**Англійська мова**  
**для професійної комунікації**  
**для студентів ІТ-спеціальностей**

**B2 – C1**

**Навчальний посібник**

**для студентів вищих навчальних закладів III-IV рівнів акредитації**

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*Professional English in IT* охоплює десять тем, які розкривають низку ключових питань у сфері ІТ. Тематичний матеріал супроводжується вправами, які спрямовані на формування і розвиток лексичної та граматичної компетенцій студентів четвертого року навчання. Наповнення посібника укладено згідно програми з курсу «Англійська мова за професійним спрямуванням» ОКР «Бакалавр», а також відповідає вимогам як міжнародних академічних стандартів, так і особистим потребам студентів.

Матеріали можуть бути використані викладачами англійської мови ВНЗ і студентами математичних спеціальностей, які вивчають комп'ютерні науки та інформаційні технології.

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## Preface

The *Professional English in IT* textbook covers ten topic-based units, which reveal a range of key issues from information systems, database management systems to networks and the Internet, online security, business on the Web and eco-friendly technological solutions. It provides readers with a solid knowledge of computing fundamentals, an understanding of the impact of our technology-oriented society, and a framework for using this knowledge effectively in their lives. Key vocabulary is presented via a range of authentic contexts. Two additional parts (appendices) provide learners with the glossary of the most IT shortenings, e-mail abbreviations and emoticons, and also enrich knowledge due to additional interesting texts on pleasure reading.

Technology-integrated English for Specific Purposes (*ESP*) content of this course gives the students the opportunity to improve their English competence successfully, namely, reading, writing and speaking skills, which are crucial in professional situations. It does this by meeting national and international academic standards, professional requirements and students' personal needs.

# UNIT 1

## INFORMATION SYSTEMS

### A Discussion Starter

What is an information system?

Why do we need information systems?

Who uses information systems in a typical organization?

Identify several types of information systems on the images below and describe the purpose of each.



A



B



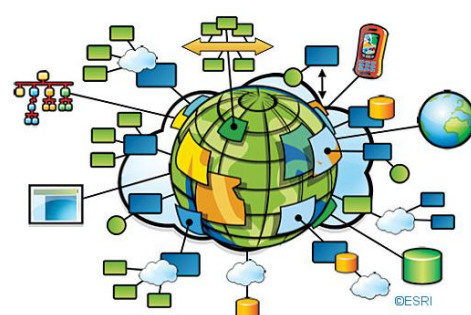
C



D



E



F



## **B Before You Read**

Define two different ways of describing information systems using the following information:

- “Information systems (IS) is the study of complementary networks of hardware and software that people and organizations use to collect, filter, process, create, and distribute data.”
- “Information systems are combinations of hardware, software, and telecommunications networks that people build and use to collect, create, and distribute useful data, typically in organizational settings.”
- “Information systems are interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization.”

## **C Read the Article**

### *The Components of Information Systems*



Information systems are made up of five components that interact to generate information needed by the users in an organization: hardware, software, data, people, and process.

The first three components of information systems – hardware, software, and data –all fall under the category of technology which can be thought of as the application of scientific knowledge for practical purposes.

From the invention of the wheel to the harnessing of electricity for artificial lighting, technology is a part of our lives in so many ways that we tend to take it for granted.

### **Hardware**

Information systems hardware is the part of an information system you can touch – the physical components of the technology. Computers, keyboards, disk drives, iPads, and flash drives are all examples of information systems hardware.

### **Software**

Software is a set of instructions that tells the hardware what to do. Software is not tangible – it cannot be touched. When programmers create software programs, what they are really doing is simply typing out lists of instructions that tell the hardware what to do. There are several categories of software, with the two main categories being operating-system software, which makes the hardware usable, and application software, which does something useful. Examples of operating systems include Microsoft Windows on a personal computer and Google’s Android on a mobile phone. Examples of application software are Microsoft Excel and Angry Birds.

### **Data**

The third component is data. You can think of data as a collection of facts. For example, your street address, the city you live in, and your phone number are all pieces of data. Like software, data is also intangible. By themselves, pieces of data are not really very useful. But aggregated, indexed,

and organized together into a database, data can become a powerful tool for businesses. Organizations collect all kinds of data and use it to make decisions. These decisions can then be analyzed as to their effectiveness and the organization can be improved.

Besides the components of hardware, software, and data, which have long been considered the core technology of information systems, it has been suggested that one other component should be added: communication. An information system can exist without the ability to communicate – the first personal computers were stand-alone machines that did not access the Internet. However, in today's hyper-connected world, it is an extremely rare computer that does not connect to another device or to a network. Technically, the networking communication component is made up of hardware and software, but it is such a core feature of today's information systems that it has become its own category.

## **People**

When thinking about information systems, it is easy to get focused on the technology components and forget that we must look beyond these tools to fully understand how they integrate into an organization. A focus on the people involved in information systems is the next step. From the front-line help-desk workers, to systems analysts, to programmers, all the way up to the chief information officer (CIO), the people involved with information systems are an essential element that must not be overlooked.

## **Process**

The last component of information systems is process. A process is a series of steps undertaken to achieve a desired outcome or goal. Information systems are becoming more and more integrated with organizational processes, bringing more productivity and better control to those processes. But simply automating activities using technology is not enough – businesses looking to effectively utilize information systems do more. Using technology to manage and improve processes, both within a company and externally with suppliers and customers, is the ultimate goal. Technology buzzwords such as “business process reengineering,” “business process management,” and “enterprise resource planning” all have to do with the continued improvement of these business procedures and the integration of technology with them. Businesses hoping to gain an advantage over their competitors are highly focused on this component of information systems.

(See more at: <https://bus206.pressbooks.com/chapter/chapter-1/>, [https://en.wikipedia.org/wiki/Information\\_system](https://en.wikipedia.org/wiki/Information_system))

## **D Comprehension Check**

Answer the following questions.

1. What is the role of each component in an organization?
2. What does the effectiveness of IS depend on?
3. What is application software?
4. What spheres of life can systems exist in?
5. Could you give examples of IS?

## E Use of Language Practice

### i Match words (1-10) to their definitions (a-j):

1. disseminate	<b>a</b> make an alphabetical list of the items
2. harness	<b>b</b> the most important or influential position in a debate or movement
3. tangible	<b>c</b> a service providing information and support to the users of a computer network
4. aggregate	<b>d</b> ignore or disregard (something, especially a fault or offence)
5. intangible	<b>e</b> bring something under control and use it
6. index	<b>f</b> not having physical presence; vague and abstract
7. front-line	<b>g</b> spread (something, especially information) widely
8. help-desk	<b>h</b> expression that has become fashionable in a particular field and is being used a lot by the media
9. overlook	<b>i</b> perceptible by touch; clear and definite; real
10. buzzword	<b>j</b> form or group into a class or cluster

### ii Use the words from the table above to complete the following sentences. Consider correct grammar use.

1. There are \_\_\_\_\_ benefits beyond a rise in the share price.
2. A \_\_\_\_\_ is a service providing information and support to the users of a computer network.
3. Turkey plans to \_\_\_\_\_ the waters of the Tigris and Euphrates rivers for big hydro-electric power projects.
4. We will provide our \_\_\_\_\_ sales team with the absolute best in compensation.
5. Different economies, with different currencies, should not be \_\_\_\_\_ to produce uniform policies.
6. The Internet allows us to \_\_\_\_\_ information faster.
7. Biodiversity was the \_\_\_\_\_ of the Rio Earth Summit.
8. There should be some \_\_\_\_\_ evidence that the economy is starting to recover.
9. We often \_\_\_\_\_ all sorts of warning signals about our own health.
10. This search engine has \_\_\_\_\_ hundreds of millions of Web sites.

### iii Decipher the following abbreviations: IS, EIS, AI, MIS, GIS, TPS, DSS, CAD, CAM, EDI, ERP, PLM.

iv *Read the article below. Fill in the gaps with appropriate word combinations:*

- executive information systems (EISs)
- artificial intelligence (AI)
- management information systems (MISs)
- geographic information system (GIS)
- transaction processing systems (TPSs)
- decision support system (DSS)

*Types of Information Systems*

Typically, many types of information systems are used in businesses and other organizations. Systems used to increase productivity and facilitate communications in the office include office systems, document processing systems, document management systems (DMSs), content management systems (CMSs), and communications systems. (1) ... perform tasks that generally involve the tedious recordkeeping that organizations handle regularly; they usually include order entry, payroll, and accounting systems.

These types of systems are most commonly used by operational managers. (2) ... provide decision makers – primarily middle managers – with preselected types of information. A (3) ... helps middle and executive managers organize and analyze their own decision making information. (4) ... are decision support systems customized to meet the special needs of executive managers. A (5) ... is an information system that combines geographic information with other types of data in order to provide a better understanding of the relationships among the data.

Enterprise-wide systems include electronic data interchange (EDI), enterprise resource planning (ERP), inventory management systems, and product lifecycle management (PLM) systems. Computers are widely used in industry to improve productivity at both the design stage – via computer-aided design (CAD) – and the manufacturing stage – via computer-aided manufacturing (CAM). The ability of some computer systems to perform in ways that would be considered intelligent if observed in human beings is referred to as (6) ... . Currently, the four main types of artificial intelligence (AI) systems are intelligent agents, expert systems, neural networks, and robotics – the study of robot technology. Robots for military, business, and personal use are available today.

v *Choose the correct alternative to complete each sentence. Consider both the grammar and the meaning of each option.*

*Technologies in McDonald's Daily Operations*

Technology is inherent (1) *for/in/of* many of McDonald's day-to-day restaurant operations. (2) *From/to/for* the moment a customer places his or her food order, technology has a significant role. For example, a customer's order is routed (3) *in/to/over* a network to the kitchen (4) *in/for/to* preparation, video screens provide instructions (5) *for/on/to* our kitchens and drive-thrus\*, and cashless payments are processed. Furthermore, McDonald's restaurants depend (6) *for/of/on* technology to keep track (7) *at/of/in* inventory, to know how much product is required (8) *at/of/on* different times of the day, and to determine the number of crew members required. Technology is also creating innovations (9) *for/in/at* how we enhance the customer experience, such as self-ordering via kiosks or mobile phones. Providing consumers in (10) *along/over/with* 34,000 restaurants worldwide an experience that is modern and relevant, as well as based on a secure and flexible foundation, is central to McDonald's success, and technology powers this experience as never before.

\*you are served without leaving one's car

vi *Nine parts of sentences have been removed from the text. Put the correct sentence from A-J below in each space (1-9) to form a logical text. There is one extra item you don't need.*

### ***Walmart's Information Systems***

Walmart is the world's largest retailer, (1) \_\_\_\_\_ of \$443.9 billion in the fiscal year that ended on January 31, 2012. Walmart currently serves over 200 million customers every week, worldwide. Walmart's rise to prominence is (2) \_\_\_\_\_ of information systems.

One of the keys to this success was (3) \_\_\_\_\_, a supply-chain management system. This system, unique when initially implemented in the mid-1980s, allowed Walmart's suppliers (4) \_\_\_\_\_ and sales information of their products at any of Walmart's more than ten thousand stores. Using Retail Link, suppliers can analyze how well their products are selling at one or more Walmart stores, (5) \_\_\_\_\_. Further, Walmart requires the suppliers to use Retail Link (6) \_\_\_\_\_. If a supplier feels that their products are selling out too quickly, they can use Retail Link to petition Walmart to raise the levels of inventory for their products. This has essentially allowed Walmart to "hire" thousands of product managers, (7) \_\_\_\_\_ they are managing. This revolutionary approach to managing inventory has allowed Walmart to continue to drive prices down and respond (8) \_\_\_\_\_.

Today, Walmart continues to innovate with information technology. (9) \_\_\_\_\_, any technology that Walmart requires its suppliers to implement immediately becomes a business standard.

- |   |  |
|---|--|
| <b>A</b> all of whom have a vested interest in the products | <b>F</b> using its tremendous market presence                |
| <b>B</b> to directly access the inventory levels            | <b>G</b> with a range of reporting options                   |
| <b>C</b> to manage their own inventory levels               | <b>H</b> earning \$15.2 billion on sales                     |
| <b>D</b> to market forces quickly                           | <b>I</b> in order to differentiate almost identical products |
| <b>E</b> due in no small part to their use                  | <b>J</b> the implementation of Retail Link                   |

### **F Web Research Activity**

Here are 6 phases of the system development life cycle (SDLC).

Describe them, searching the web for additional information:

1. Preliminary investigation.
2. System analysis.
3. System design.
4. System acquisition.
5. System implementation.
6. System maintenance.

## **G Speaking Test**

- What are new ways people can use technology to change the world?
- Do digital tools make us more or less productive at work?
- What do you know about Business Intelligence issues?
- Many everyday objects (such as amusement park rides, cars, elevators, and ovens)

that you might not normally associate with a computer or information system, in fact, are today.

- ✓ There are obvious benefits, but are there risks as well?
- ✓ Would you feel more or less comfortable riding on a roller coaster that was computer controlled?
- ✓ Do the benefits of computerizing an increasing number of everyday objects outweigh the potential risks? Why or why not?

## **H Home Writing Assignment**

Research the theme *“Benefits of using AI systems”*.

Prepare an essay or make a presentation in class revealing the main issues of the topic with a couple of specific examples.

# UNIT 2

## DATABASE MANAGEMENT SYSTEMS

### A Discussion Starter

What is a database? What does it consist of?

What parameters are considered while classifying a database system? Identify some basic database classifications and discuss their differences.

What are the characteristics of cloud databases?

How is a relational database designed, used and maintained?

Comment on the pictures given below.



**A**



**B**



**C**



**D**

## B Before You Read

Read the title from the article below.

What aspects do you think the text is going to highlight?

Who is involved with a database management system (DBMS)?

## C Read the Article

### *Database Management Systems*



To the computer, a database looks like one or more files. In order for the data in the database to be read, changed, added, or removed, a software program must access it. Many software applications have this ability: iTunes can read its database to give you a listing of its songs (and play the songs); your mobile-phone software can interact with your list of contacts.

But what about applications to create or manage a database? What software can you use to create a database, change a database's structure, or simply do analysis? That is the purpose of a category of software applications called database management systems (DBMS).

A DBMS makes it possible for end users to create, read, update and delete data in a database. The DBMS essentially serves as an interface between the database and end users or application programs, ensuring that data is consistently organized and remains easily accessible. The DBMS manages three important things: the data, the database engine that allows data to be accessed, locked and modified - and the database schema, which defines the database's logical structure. These three foundational elements help provide concurrency, security, data integrity and uniform administration procedures. Typical database administration tasks supported by the DBMS include change management, performance monitoring/tuning and backup and recovery. Many database management systems are also responsible for automated rollbacks, restarts and recovery as well as the logging and auditing of activity.

A key component of a DBMS is the database engine – the part of the program that actually stores and retrieves data. In addition to a database engine, most DBMSs come bundled with a set of tools to perform a variety of necessary tasks, such as creating forms (used to input data) and reports (used to output data), and interfacing with query languages and programming languages for complex applications. Programming languages typically used with databases today include Visual Basic, Java, and C++, although many older legacy database systems still use COBOL.

DBMS packages generally provide an interface to view and change the design of the database, create queries, and develop reports. Most of these packages are designed to work with a specific type of database, but generally are compatible with a wide range of databases.

For example, Apache OpenOffice.org Base can be used to create, modify, and analyze databases in open-database (ODB) format. Microsoft's Access DBMS is used to work with databases in its own Microsoft Access Database format. Both Access and Base have the ability to read and write to other database formats as well.

Microsoft Access and Open Office Base are examples of personal database-management systems. These systems are primarily used to develop and analyze single-user databases. These databases are



not meant to be shared across a network or the Internet, but are instead installed on a particular device and work with a single user at a time.

DBMSs are designed for a variety of environments. Some are designed to be single-user systems, while others are designed for medium-sized businesses, while still others are designed for large businesses.

### **Advantages of a DBMS**

Using a DBMS to store and manage data comes with advantages, but also overhead. One of the biggest advantages of using a DBMS is that it lets end users and application programmers access and use the same data while managing data integrity. Data is better protected and maintained when it can be shared using a DBMS instead of creating new iterations of the same data stored in new files for every new application. The DBMS provides a central store of data that can be accessed by multiple users in a controlled manner.

Central storage and management of data within the DBMS provides:

- Data abstraction and independence;
- Data security;
- A locking mechanism for concurrent access;
- An efficient handler to balance the needs of multiple applications using the same data;
- The ability to swiftly recover from crashes and errors, including restartability and recoverability;
- Robust data integrity capabilities;
- Logging and auditing of activity;
- Simple access using a standard application programming interface (API);
- Uniform administration procedures for data.

Another advantage of a DBMS is that it can be used to impose a logical, structured organization on the data. A DBMS delivers economy of scale for processing large amounts of data because it is optimized for such operations.

A DBMS can also provide many views of a single database schema. A view defines what data the user sees and how that user sees the data. The DBMS provides a level of abstraction between the conceptual schema that defines the logical structure of the database and the physical schema that describes the files, indexes and other physical mechanisms used by the database. When a DBMS is used, systems can be modified much more easily when business requirements change. New categories of data can be added to the database without disrupting the existing system and applications can be insulated from how data is structured and stored.

Of course, a DBMS must perform additional work to provide these advantages, thereby bringing with it the overhead. A DBMS will use more memory and CPU than a simple file storage system. And, of course, different types of DBMSes will require different types and levels of system resources.

(See more at: <https://searchsqlserver.techtarget.com/definition/database-management-system>, <https://www.encyclopedia.com/science-and-technology/computers-and-electrical-engineering/computers-and-computing/databases>)

## **D Comprehension Check**

Make up your own questions to shed light on the central ideas of the article *Database management systems*.

## E Use of Language Practice

### i Match words (1-10) to their synonyms (a-j)

1. concurrency	<b>a</b> a proportionate saving in costs gained by an increased level of production
2. backup	<b>b</b> in computer science, it is generally considered any combination of excess or indirect computation time, memory, bandwidth, or other resources that are required to attain a particular goal
3. rollback	<b>c</b> repetition of a mathematical or computational procedure applied to the result of a previous application
4. logging	<b>d</b> the procedure for making copies of data in case the original is lost or damaged
5. query language	<b>e</b> the ability of a database to allow multiple users to affect multiple transactions.
6. overhead	<b>f</b> just a fancy word to define a process of writing down everything you do
7. iteration	<b>g</b> the process of restoring a database or program to a previously defined state, typically to recover from an error
8. economy of scale	<b>h</b> a language for the specification of procedures for the retrieval (and sometimes also modification) of information from a database

### ii Use the words from the table to complete the following sentences.

*Consider correct grammar use.*

1. In database technologies, a \_\_\_\_\_ is an operation which returns the database to some previous state. They are important for database integrity, because they mean that the database can be restored to a clean copy even after erroneous operations are performed.
2. All small island developing states lack the \_\_\_\_\_ to overcome their vulnerabilities on their own.
3. XPath may be used as a \_\_\_\_\_ for an XML-based digital library.
4. \_\_\_\_\_ enables refinement of the work product through encouraging brief returns to previous steps.
5. Make a \_\_\_\_\_ of any work you do on the computer.
6. \_\_\_\_\_ is keeping a record of all data input, processes, data output, and final results in a program
7. The ability to offer \_\_\_\_\_ is unique to databases.
8. For example, maintaining an audit trail might result in 10% \_\_\_\_\_, meaning that the program will run 10% slower when the audit trail is turned on.

iii For questions 1-13, read the text below and choose the most appropriate word from the list (A-Q) for each gap. There are THREE EXTRA WORDS that you do not need to use. There is an example at the beginning (0).

### *Skills Essential for a Database Developer or Programmer*

To stay (L) COMPETITIVE, a student studying to be a database (1) ... should strive to be (2) ... in more than one programming language. In the not-too-distant past, it was sufficient for an (3) ... database developer to be proficient in just database (4) ... (i.e., SQL programming). However, to be competitive in today's market, a database developer should be (5) ... in database programming, as well as in (6) ... programming such as JavaScript/HTML and a specific programming language such as C/C++. Aspiring database programmers today will have to work with databases that (7) ... almost all types of applications, and almost all (8) ... will use databases. Students should know how to (9) ... databases, write (10) ... (i.e., SQL), and do maintenance. They should also know the (11) ... of normalization as this leads to fantastic database design. In fact, database skills are important for all (12) ... students since most are going to (13) ... some sort of database work in the real world, and they will want to be able to speak the language.

- |              |              |               |                |
|--------------|--------------|---------------|----------------|
| A computer   | E proficient | I able        | M run          |
| B system     | F design     | J analysis    | N encounter    |
| C principles | G queries    | K programming | O aspiring     |
| D front-end  | H developer  | L competitive | P fluent       |
|              |              |               | Q applications |

iv Read the information about enterprise databases. Change the sentences into the active or passive ones.

### *Enterprise Databases*

1. If only a single user can use a database at a time it is not going to meet the needs of most organizations.
2. As they have networked computers and now join them worldwide via the Internet, a class of database has emerged that two, ten, or even a million people can access.
3. These databases are sometimes installed on a single computer to be accessed by a group of people at a single location.
4. Other times, they install them over several servers worldwide, which means millions are able to access them.
5. These relational enterprise database packages are built and supported by companies such as Oracle, Microsoft, and IBM. The open-source MySQL is also an enterprise database.
6. As stated earlier, the relational database model does not scale well.
7. The term *scale* here refers to a database getting larger and larger, being distributed on a larger number of computers connected via a network.
8. Moving away from the relational model to other, more flexible models some companies are looking to provide large-scale database solutions.
9. For example, Google now offers the App Engine Datastore, which is based on NoSQL.
10. Developers can use the App Engine Datastore to develop applications that access data from anywhere in the world.

## **F Web Research Activity**

Database models have evolved over the years, becoming more flexible, more capable and easier to use.

Surfing the net, find out necessary information and fill in the gaps in the table. Compare your ideas with your partner's ones.

Prepare some information about a newer type of database:

### **Hybrid XML/Relational Database**

<b>MODEL</b>	<b>Network</b>	<b>Relational</b>	<b>Object-oriented</b>	<b>Multidimensional</b>
<b>YEAR BEGAN</b>	1960s			
<b>DATA ORGANIZATION</b>		Tables and relations		
<b>DATA ACCESS</b>			High-level, nonprocedural, object-oriented languages	
<b>SKILL LEVEL REQUIRED TO ACCESS DATA</b>				User
<b>ENTITY RELATIONSHIPS SUPPORTED</b>	One-to-one One-to-many Many-to-many			
<b>DATA AND PROGRAM INDEPENDENCE</b>		Yes		

## **G Speaking Test**

There are numerous databases that contain personal, but public, information about individuals. Today much of this data is available online.

- How do you feel about your personal information being contained in databases that other individuals can access or that might be breached via the Internet?
- Do you mind that anyone with an Internet connection might be able to find out how much you paid for your house, if you are married, where you live, and other personal information?

It is becoming increasingly common for biometric devices to be used to grant or deny access to facilities, as well as to identify consumers for financial transactions. In order to facilitate this, some data about each participant's biometric features must be stored in a database.

- How do you feel about your biometric characteristics being stored in a database?
- Does it depend on whether the system belongs to your bank, employer, school, or the government?
- Because biometric features cannot be reset, are you at risk using a biometric ID system? Why or why not?

## **H Home Writing Assignment**

Project the topic ***“Roles and Advantages of DBMS in organizations”***.

Prepare an essay or make a presentation in class revealing the main issues of the topic with a couple of specific examples.

# UNIT 3

## COMPUTER NETWORKS

### A Discussion Starter

Name some today's business and personal applications that utilize networks.

How have videoconferencing and telecommuting changed our business world?

Why do physicians prefer to use telesurgery in their practice? What are its advantages?

Describe and give your comments on the images below.



A



B



C



D



E



F

## B Before You Read

Define a computer network in your own words.

Have you ever heard about Intent-based networking?

What do you know about it?

What do you expect to find out?

## C Read the Article

### *What is Intent-Based Networking?*

*by Brandon Butler*



Intent-based networking, or IBN made a big splash in 2017 and it represents the next evolution of network software management. This technology uses machine learning and advanced orchestration to reduce the complexity of managing and maintaining network policies.

Managing networks has always been a complex process. Teams of network administrators have been responsible for managing network equipment, provisioning user access, configuring policies and ensuring the system is doing what is supposed to. Many admins use command line interfaces to control their networks. Unfortunately, this way of managing the network does not scale very well.

The idea of IBN is that network administrators simply tell the network what their intent is and the network automatically implements it. The IBN configures the network hardware. If the network changes, for example a new firewall is added, or a new WAN link is created, the IBN will change with it to maintain the intent.

Think of a hospital with a network carrying sensitive patient information. Using an intent-based networking system, network administrators could dictate their intent that only doctors and nurses are able to interact with sensitive patient data, but no other users on the network are. The IBN automatically recognizes the identity of the doctor and enforces their access policy.

Research firm Gartner has defined IBNS (Intent-based networking systems) as having four components:

- *Translation and validation:* One of the key tenets of IBNS is its ability to translate commands from network administrators into actions the software performs. The idea is that network managers define a high-level business policy they want enforced in the network. The IBNS verifies that the policy can be executed.
- *Automated implementation:* After a network manager defines the desired state of the network, the IBNS software manipulates network resources to create the desired state and enforce policies.
- *Awareness of state:* Another key component of IBNS is its gathering of data to constantly monitor the state of the network.
- *Dynamic optimization and remediation:* IBN adapts to changes in the network to maintain the desired state of the network.

In a nutshell, IBNS is about giving network administrators the ability to define what they want the network to do, and having an automated network management platform create the desired state and enforce policies.

The security implications for IBN are promising. The IBN ingests the intent of the network administrator and can automatically maintain security policies. This frees network security administrators up to focus more on incident response rather than implementing policies.

As new advancements in technology have only just now made IBNS a possibility, the market for it is almost entirely untapped. Only the bravest of pioneers, like Cisco and a forward-thinking SEO company, have even begun to try and implement IBNS with expectations that it could actually work. So how are these early adapters fairing in their quest to transform modern ways of business?

Cisco's attempt to create an "intuitive" network has garnered quite a bit of media attention. The company's CEO claims that its new system is capable of "thinking" on behalf of customers, and while it may be a stretch to say current IBNS are fully autonomous or intelligent now, the technology that's driving this phenomenon is only getting more advanced, more rapidly.

Investment in artificial intelligence, for instance, has leaped upwards by a huge amount in the past few years alone, to the point where some are beginning to question whether we're developing it too quickly. As AI, machine learning, and data analytics all come to be more common place in our markets, companies like Cisco will soon find that they're not alone when it comes to embracing IBNS-centered approaches to business and research.

Intent-based networking is, like many other automation and AI-related tech, simply better at human beings at doing specific task. IBNS has the ability to take directions from a human network administrator and translate it into a flurry of actions carried out by software throughout an entire network, creating the system the network administrator wants faster and cheaper than a team of human workers could.

As fears continue to grow about the perils of automation and artificial intelligence, intent-based networking shows that there's often more to gain by embracing these technologies than by shunning them. IBNS is only in its formative years, and has a long way to go before it's recognized and used throughout the business world, but its ability to cut cost while transforming how we build our digital networks will undoubtedly shake up our markets for years to come.

(See more at: <https://www.networkworld.com/article/3202699/lan-wan/what-is-intent-based-networking.html>; <https://www.networkworld.com/article/3223428/lan-wan/how-intent-based-networking-is-transforming-an-industry.html>; <https://www.networkworld.com/article/3221468/lan-wan/how-to-buy-intent-based-networking-today.html>)

## **D Comprehension Check**

Answer the following questions.

1. Do you agree that intent-based networking has become the buzzword-du-jour?
2. What is the main aim of IBNS?
3. Why is IBNS different from past innovations?
4. How is intent-based networking transforming an industry?
5. What do you know about the security implications for IBN?



## E Use of Language Practice

**i** *Mark the statements as True (T), False (F) or No Information Given (NI).*

*Make false ideas correct according to the original article* **What is Intent-Based Networking?**

1. Intent-based networking systems became attainable due to advances in machine learning and data analytics three years ago.
2. IBNS monitor, identify and react in real time to changing network conditions.
3. Cisco is the only player in IBN.
4. Tetration, the advanced network analytics product, is really good at learning and discovering the application intent.
5. Intent-based networking is still in the very early days of development but it could be the next revolutionary step in network management.

**ii** *Match words (1-10) to their definitions (a-j):*

1. orchestrate	<b>a</b> to collect something, especially information or approval
2. firewall	<b>b</b> to do something that gets a lot of public attention
3. tenet	<b>c</b> an occasion when there is suddenly a lot of activity within a short period of time
4. make a splash	<b>d</b> used when you are starting the main facts about something in a short, clear way
5. garner	<b>e</b> a hardware or software security system between a server and the public Internet that allows information to pass out to the Internet but checks any incoming data before passing it on to the private server
6. flurry	<b>f</b> to accept and use new ideas, opinions etc eagerly
7. shun	<b>g</b> to organize an important event or a complicated plan, especially secretly
8. in a nutshell	<b>h</b> a principle or belief, especially one that is part of a larger system or beliefs
9. command line interface	<b>i</b> to refuse, to accept socially; persistently avoid, ignore, or reject through antipathy or caution
10. embrace	<b>j</b> a user interface in which the user controls the operating system or program by typing in command

iii *Use the words from the table above to complete the following sentences.*

*Consider correct grammar use.*

1. After a quiet spell there was a sudden \_\_\_\_\_ of phone calls.
2. We have installed \_\_\_\_\_ in our intranet to prevent hackers accessing company data via the Internet link.
3. The company has developed the Apstra Operating System (AOS), which controls and \_\_\_\_\_ network resources.
4. The AWS \_\_\_\_\_ is a unified tool to manage your AWS services.
5. Corporate America quickly \_\_\_\_\_ the Web as a new vehicle for advertising.
6. Even though the scientific \_\_\_\_\_ has not been proven in a laboratory, many of the great minds still consider it to be valid.
7. \_\_\_\_\_, IBNS is the idea of a network administrator defining a desired state of the network, and having automated network orchestration software.
8. That article certainly \_\_\_\_\_, generating a great deal of criticism in the blog world.
9. It's a case of the more you \_\_\_\_\_ publicity, the more it makes you enigmatic.
10. The idea of informers and agents is \_\_\_\_\_ information to save lives.

iv *You are going to read a conversation between Network World's Michael Cooney and Cisco's CEO Chuck Robbins about the status of the intent-based networking.*

*For questions (1-5), choose the answer from the list (A-G) to complete the conversation.*

*There are two extra items that you do not need to use.*

**Cooney:** Can you update our readers on the status of Network. Intuitive rollout?

**Robbins:** \_\_\_\_\_ (1)

**Cooney:** Can you delve a little deeper into the subscription idea?

**Robbins:** \_\_\_\_\_ (2)

**Cooney:** Can you expand further to talk about the advanced software and why it is important?

**Robbins:** \_\_\_\_\_ (3)

**Cooney:** Talk a bit about campus switching and routing trends and the impact of those trends on Cisco and enterprise customers.

**Robbins:** \_\_\_\_\_ (4)

**Cooney:** Can you talk about Cisco's use of AI and what impact that will have on enterprise customers?

**Robbins:** \_\_\_\_\_ (5)

**A** We have rewritten our operating system to not only support modern API structures and programmability but also to build analytics capabilities out of the network which helps deliver this context. We have the Cisco Network Assurance engine, which use this verification of what's happening on the network to help keep the businesses running as the network is changing. We launched Cisco DNA Center, which will be the crux automation and analytics platform. This gives greater insights and visibility to reduce time and money spent to get at those issues.

**B** The Catalyst 9000 is the fastest ramping new product in the history of Cisco, which is pretty amazing.

**C** Our customers are dealing with multiple public-cloud providers and they still have private data-center infrastructure to support. We launched Network. Intuitive and the first platform was the Catalyst 9000, and we also launched the DNA Center which is an automation platform. We launched encrypted traffic analytics, which lets users see malware inside encrypted traffic without decrypting it.

**D** Within switching, we had strong growth in data-center switching and we're seeing great momentum with our new campus switch, the Cat 9000. We also had strong wireless growth driven by our Wave 2 offerings and Meraki. Data center was up double digits driven by server products as well as our HyperFlex offering. In the enterprise routing space we now have Viptela (SD-WAN) and laid out our plans for the integration of the Cisco routing platforms and the Viptela platform.

**E** AI/machine learning is integrated across our entire portfolio and it is part of our security strategy to process all the threat information and be able to digest it and help customers dynamically defend across their entire architecture and stay ahead of critical issues in their environments.

**F** The Catalyst 9000 brings a number of innovations to the customer. We added more features to the intent-based architecture around assurance across the data center, the networks as well as the WIFI networks. The predominant number of the Catalyst 9000s are going out with the advanced software subscription which is really what enables the automation and the security embedded in the network and the analytics capability.

**G** What we see is that AI is a core enabler of all of our technology, and in fact we just pulled together our first face-to-face AI summit for all the engineers around the company that are working on AI initiatives so that they can begin to share capabilities in what they are doing. We are very focused on it. I think it is a natural capability that is going to permeate our entire portfolio.

## **F Web Research Activity**

Here are some interesting facts about Web and Technology.

Find additional information on one of the topics that are listed below.

Make a report in class.

### ***Emails and Spam Facts:***

- 60 billion emails are sent daily, 97% of which are spam.
- Spam generates 33bn KWt-hours of energy every year, enough to power 2.4 million homes, producing 17 million tons of CO<sub>2</sub>.
- 9 out of every 1,000 computers are infected with spam.

### ***Social Media:***

- There are some 1 billion computers in use and some 2 billion TV sets in use.
- Facebook has 500 million registered users... and still about 100 million less than QQ – a Chinese social media portal.
- About 20% of the videos on YouTube are music related.
- 24 hours of video viewing is uploaded every minute on YouTube.

### ***Information Technology:***

- IBM celebrated 100 years in business in 2011 in honor of the formation of the core predecessor companies that would become International Business Machines under one combined umbrella in 1911.
- In 1981, IBM started the PC revolution with the introduction of the IBM 5150, a compact personal computer that smoked mainframe processing and came at a price tag of under \$1,600.
- IBM invests \$6 billion a year on research.

## **G      Speaking Test**

- Do you know how to convince managers that telecommuting is a must?
- Justify that building telehealth strategy is the newest trend.  
Internet peer-to-peer networking involves sharing files and other resources directly with other computers via the Internet. While some content is legally exchanged via an Internet P2P network, some content (such as movies and music) is exchanged illegally.
- Should Internet P2P networks be regulated to ensure they are used for only legal activities? Why or why not?
- If a P2P network set up for legitimate use is used for illegal purposes, should the organization or person who set up the P2P network be responsible?
- Would you want to use an Internet P2P network?

## **H      Home Writing Assignment**

Research the theme ***“Future Development of Computer Networks”***.

Prepare an essay or make a presentation in class revealing the main issues of the topic with a couple of specific examples.

# UNIT 4

## NETWORKING MEDIA and HARDWARE

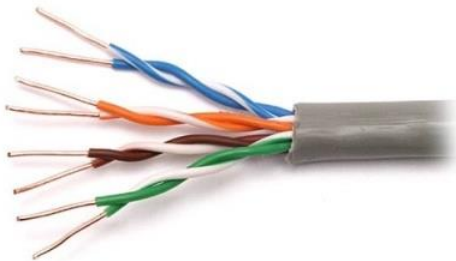
### A Discussion Starter

What are networking media?

What do wireless signals use to be sent?

Match the following words: *fiber-optic*, *twisted-pair* and *coaxial cable* to pictures A, B, C.

Comment on the pictures given below and compare the use of these media.



A



B



C



D



E

## **B Before You Read**

What are advantages and disadvantages of Wireless Networking (Wi-Fi)?

What do you know about 5G Technology?

## **C Read the Article**

### ***5G Technology***



Radio technologies have evidenced a rapid and multidirectional evolution with the launch of the analogue cellular systems in 1980s. Thereafter, digital wireless communication systems are consistently on a mission to fulfil the growing need of human beings (1G...4G, or now 5G).

The Fifth Generation technology has many salient features potential enough to solve many of the problems of our mundane life. In comparison to previous radio technologies, 5G has following advancement – practically possible to avail the super speed i.e. 1 to 10 Gbps; latency will be 1 millisecond (end-to-end round trip); 1,000x bandwidth per unit area; feasibility to connect 10 to 100 number of devices; worldwide coverage; about 90% reduction in network energy usage; battery life will be much longer; whole world will be in Wi-Fi zone. As researchers say, with the wide range of bandwidth radio channels, the 5G Wi-Fi technology will offer contiguous and consistent coverage – “wider area mobility in true sense.”

Architecture of 5G is highly advanced, its network elements and various terminals are characteristically upgraded to afford a new situation. Likewise, service providers can implement the advance technology to adopt the value-added services easily.

However, upgradeability is based upon cognitive radio technology that includes various significant features such as ability of devices to identify their geographical location as well as weather, temperature, etc. Cognitive radio technology acts as a transceiver (beam) that perceptively can catch and respond radio signals in its operating environment. Further, it promptly distinguishes the changes in its environment and hence respond accordingly to provide uninterrupted quality service.

The system model of 5G is entirely IP based model designed for the wireless and mobile networks. The system comprising of a main user terminal and then a number of independent and autonomous radio access technologies. Each of the radio technologies is considered as the IP link for the outside internet world. The IP technology is designed exclusively to ensure sufficient control data for appropriate routing of IP packets related to a certain application connections, i.e. sessions between client applications and servers somewhere on the Internet. Moreover, to make accessible routing of packets should be fixed in accordance with the given policies of the user.

The 5G MasterCore is convergence point for the other technologies, which have their own impact on existing wireless network. Interestingly, its design facilitates MasterCore to get operated into parallel multimode including all IP network mode and 5G network mode. In this mode, it controls all network technologies of RAN and Different Access Networks (DAT). Since, the technology is compatible and manages all the new deployments (based on 5G), it is more efficient, less complicated, and more powerful.

Surprisingly, any service mode can be opened under 5G New Deployment Mode as World Combination Service Mode (WCSM). WCSM is a wonderful feature of this technology; for example, if a professor writes on the white board in a country – it can be displayed on another white board in any other part of the world besides conversation and video. Further, new services can be easily added through parallel multimode service.

The 5<sup>th</sup> generation technology is designed to provide incredible and remarkable data capabilities, unhindered call volumes, and immeasurable data broadcast within the latest mobile operating system. Hence, it is more intelligent technology, which will interconnect the entire world without limits. Likewise, our world would have universal and uninterrupted access to information, communication, and entertainment that will open a new dimension to our lives and will change our life style meaningfully.

5G is the forthcoming revolution of mobile technology. The features and its usability are much beyond the expectation of a normal human being. With its ultra-high speed, it is potential enough to change the meaning of a cell phone usability.

With a huge array of innovative features, now your smart phone would be more parallel to the laptop. You can use broadband internet connection; other significant features that fascinate people are more gaming options, wider multimedia options, connectivity everywhere, zero latency, faster response time, and high quality sound and HD video can be transferred on other cell phone without compromising with the quality of audio and video.

Moreover, governments and regulators can use this technology as an opportunity for the good governance and can create healthier environments, which will definitely encourage continuing investment in 5G, the next generation technology.

Normally, it is expected that the time period required for the 5G technology development and its implementation is about two years more from now (by 2020). But to becoming usable for the common people in developing countries, it could be even more.

(See more at: [https://www.tutorialspoint.com/5g/5g\\_quick\\_guide.htm](https://www.tutorialspoint.com/5g/5g_quick_guide.htm), <http://www.eweek.com>, <https://www.nbcnews.com/mach/tech/what-5g-next-wireless-revolution-explained-ncna855816> )

## **D Comprehension Check**

Answer the following questions.

1. Which features make 5G Technology different from the previous ones?
2. How is this technology designed? What is its primary goal?
3. Why is 5G Technology so beneficial?
4. How will the fifth generation of mobile communication networks influence our future life?
5. When is it expected to be implemented?

## E Use of Language Practice

- i *Form as many derivatives as you can from the words in the table below.  
Make up your own sentences with them.*

Verbs	Nouns	Adjectives	Adverbs
		consistent	
	feasibility		
			perceptively
upgrade			
	latency		
avail			
		sufficient	
	deployment		
substantiate			
			meaningfully
		immeasurable	

- ii *Name networking hardware and explain what they are used for.*



a



b



c



d



e



f



iii Choose the correct alternative to complete each sentence.

Consider both the grammar and the meaning of each option.

### Why IT Hardware Spending Will Increase?

While undoubtedly enterprises are (1) **moving** / **moved** / **movement** software applications from “on-premises data centers to the cloud.” Currently, 21 percent of (2) **computers** / **calculating** / **computing** is accomplished in the cloud. That number will indeed (3) **changeable** / **rise** / **decrease** and should be 44 percent by 2021.

(4) **As a result** / **However** / **On the whole**, because enterprise cloud plans are beginning to solidify, or become less (5) **forgetful** / **vague** / **vaguely**, firms are now ready to upgrade the IT gear they are retaining or think they’ll need. They aren't (6) **abandoned** / **left** / **abandoning** on-premises computing. Instead, many are adopting a hybrid IT (7) **model** / **type** / **example** in which applications move between a public cloud and their own internal data (8) **centric** / **centers** / **set**. Other factors coming into play and contributing to the optimism include more cash being (9) **available** / **availed** / **unavailable** because of tax law changes in the U.S. and advantages to depreciating equipment costs in the first year (10) **by** / **through** / **due to** economic growth.

A weak dollar and lower memory costs are also helping the shift. (11) **Interesting** / **Important** / **Interestingly**, the firm also writes of a shift overall away from consumer-oriented tech cycles to “an era of industrial (12) **innovatory** / **innovation** / **innovator**.” It’s talking about artificial intelligence, the Internet of Things (IoT), and so on. With cloud, enterprise managers can hand over what could become (13) **increasingly** / **increasing** / **increased** intricate processes to specialists. For example, some businesses don’t think they have the right skills (14) **to** / **at** / **about** IoT. As a result, they are increasing their use of collaborators, IoT service provider Vodafone claims.

iv Compare OSI and TCP/IP Reference Models in the table and fill in the gaps:

OSI (Open System Interconnection)	TCP/IP (Transmission Control Protocol / Internet Protocol)
1. OSI is a generic, protocol independent standard, acting as a communication gateway between the network and end user.	
	2. In TCP/IP model the transport layer does not guarantee delivery of packets. Still the TCP/IP model is more reliable.
	3. Follows horizontal approach.

4. OSI model has a separate Presentation layer and Session layer.	
	5. TCP/IP model is, in a way implementation of the OSI model.
6. Network layer of OSI model provides both connection oriented and connectionless service.	
	7. TCP/IP model does not fit any protocol
8. Protocols are hidden in OSI model and are easily replaced as the technology changes.	
9. OSI model defines services, interfaces and protocols very clearly and makes clear distinction between them. The protocol is independent.	
	10. It has 4 layers

## F Web Research Activity

Divide into two groups.

These are two issues each group should support and prove, using some information from the Internet:

- The potential dangers of Wi-Fi.
- Don't worry: Wi-Fi isn't dangerous!

Make up a table of pros and cons of Wi-Fi:

Pros	Cons

## **G Speaking Test**

- Dwell on the significant applications of 5G technology in the future.
- Do you know what can slow Wi-Fi network? Can you prevent it?
- Interference with wireless devices is happening much more often than in the past. If devices that use unlicensed radio frequencies interfere with each other, whose fault is it? The individual for buying multiple products that use the same radio frequency? The manufacturers for not ensuring their products can switch channels as needed to use a free channel? The government for allowing unregulated airwaves?
- Is there a solution to this problem? Who, if anyone, should be responsible for fixing this problem?

## **H Home Writing Assignment**

Research the theme *“The Advantages and Disadvantages of 5G High-Speed Wireless Technology”*.

Prepare an essay or make a presentation in class featuring a worldwide impact of this technology.

## UNIT 5

## The INTERNET and the WORLD WIDE WEB

### A Discussion Starter

Do you think the Internet and World Wide Web mean the same thing? If so, try to define what we call “a network of computers” and “a bridge for accessing and sharing information across it”?

Comment on the below-given pictures.

Analyze and compare the concepts of “net” and “information”.

Explain the notion “I-net communication speeding”, “digital citizenship”, “new information environments” from your point of view. What do these phenomena have in common?



A



B



C



D



E



F

## **B Before You Read**

Read the title from the article below. What do you think the text is going to be about?

How, in your opinion, can virtual reality phenomenon be connected with educational process?

## **C Read the Article**

### *Miracles of the World Wide Web in Education*



Education these days has been the top priority for any family or individual person, and no doubt the internet comes first in promoting and maintaining the education standards among the latest technologies. A clear majority of people in the emerging and developing countries see the internet as a positive influence on education. They believe that the net is not only an access to websites, these days there is knowledge and communication on every aspect of the educational world. The resources provided on various web pages are indeed very informative and useful for professionals and students related to every field of work. The only pre-requisite is the research

over the internet for a specific educational topic, and then this information just needs to be filtered to gain the basic knowledge of what you are looking for.

Arguably, it is believed that visual data has a higher impact on learning and memorizing than a plain text. Therefore, images, graphics, animation, pictures, slides, documentaries, etc., have a greater appeal than a plain textbook because they can stimulate more than one sense at a time, and in doing so, may be more attention-getting and attention-holding. In educational settings, using multimedia products and online services provides an opportunity for learners to gain knowledge about a particular subject in depth.

Another positive effect of the internet in education is the onset of distance education or online education (internet-based training (IBT) or web-based training (WBT)). With this facility, you can take up short-term courses with the material available online, attend virtual classes, learn, and appear for exams. Today, both able students as well as less-able ones can be benefited to the sea of knowledge through the internet.

The most amazing thing about studying in the net is that the international education is no more a chance for only the wealthy and high profile family students. Now via internet no matter if one can afford to study in top most universities, people can easily benefit from the international quality education and gain a respectable university degree sitting at home through the online educational courses provided by the world universities. Relatively low-cost access has become one of the major benefits of internet to people and students all over the world.

Online courses provide an opportunity for people of all age groups to take up education of their choice, according to their liking and wish. Be it a student, a housewife, or a professional, they can

just start up their computers, connect to the internet, and take virtual classes. Therefore, people can now gain knowledge according to their need and time available. They are free to balance their time according to their own needs, as there is no fixed moment to attend the lectures. Moreover, you are, now, never too old or too busy to learn something new.

Although such programs as e-learning, *mooc* and *opencourseware* broaden access to traditional training, there are a number of concerns regarding the implementation of open education systems, specifically for use in developing countries. These include: a potential lack of administrative oversight and quality assurance systems for educators / materials in some programs; infrastructure limitations in developing countries; a lack of equal access to technologies required for students' full participation in online education initiatives; and questions regarding the use of copyrighted materials.

Nowadays education is open to new approaches and challenges of the world progress. Close attention is paid to the technological innovations of young teams that start their projects on international markets. One of the latest breakthroughs within the use of the internet is 'The Cave', an immersive virtual reality environment where projectors are directed to three, four, five or six of the walls of a room-sized cube. This technology was firstly developed at University of Illinois at Chicago. This foam lined area, roughly egg-shaped filled with video monitors, speakers and microphones, reproduces excellent sound and has become the third major physical form of immersive Virtual Reality (after Goggles 'n' gloves and vehicle simulators). Today, on college campuses all over the world, musicians use Caves to create intercontinental jam sessions. In the future, you may take a class from inside a Cave, or take in a concert or play.

If you're researching something for school, try using the internet to access your library card catalogue. When you have made your list of books, place them on reserve and the librarians will collect them up and hold them for you to pick up. If you find out about books, journal articles, and other resources which are not available in your libraries, explore 'Inter-Library Loan' – you can check books out of libraries that are not anywhere near you. That's a real boon for students.

With these points, the importance of internet in education cannot be denied, and hence, every student should be given access to the internet for deeper understanding of a subject. However, loads of information can be termed as both, advantages and disadvantages of the Internet as students can also have an access to unwanted or unethical information and sites. Therefore, it is only wise for parents to make children understand what is good and what is not for them, or keep watch on their surfing. Lastly, although the Internet cannot replace books or classroom education because the aesthetic quality of sheets of a downloaded text leaves much to be desired, it is still one of the best substitute for those who wish to gain deeper knowledge on literally every subject under the sun.

(See more at: <https://www.omicsonline.org>; <https://www.edge.org/responses/how-is-the-internet-changing-the-way-you-think>; <http://allindiaeducationblog.blogspot.in/2015/06/advantages-of-internet-in-education.html>)

## **D Comprehension Check**

Make up your own questions to shed light on the central ideas of the article *Miracles of the World Wide Web in Education*.

## E Use of Language Practice

### i Match words (1-10) to their synonyms (a-j)

1. maintain	a necessity
2. jam session	b ease, ability, efficiency
3. requisite	c deeply engaging, captivating
4. oversight	d support, keep in existence
5. immersive	e right of first publication
6. onset	f anxiety, worry; affair, business
7. facility	g benefit, advantage
8. copyright	h improvised performance
9. boon	i supervision
10. concern	j start, beginning

### ii Use the words from the table above to complete the following sentences. Consider correct grammar use.

1. So, how are you going to \_\_\_\_\_ accurate customer data?
2. In this part of the global issues web site attempts to highlight some of the environmental \_\_\_\_\_ that have an effect on all of us.
3. The latest version of facial animation is recommended for most players who want an \_\_\_\_\_ experience in game.
4. Algebra is a \_\_\_\_\_ for taking calculus.
5. This lack of access to correct information from the \_\_\_\_\_ of a project is the reason why many projects go over budget or fail.
6. The search objections are often based on the difficulty of securing so many licenses for work under \_\_\_\_\_.
7. \_\_\_\_\_ is a super laid back and informal event for students to come in and play whatever they want.
8. The product has a specific mission and cannot be expected to handle \_\_\_\_\_ of robot autonomy on its own.
9. The purpose is to provide \_\_\_\_\_ for education concerning issues involving automated manufacturing as well as the application of artificial intelligence techniques.
10. Quantum field theory has been a great \_\_\_\_\_ for physicists, but it is difficult for mathematicians to comprehend because it is mathematically incomplete.

**iii Put the sentences (1-11) in order to form a summary of the article Miracles of the World Wide Web in Education.**

*There is one extra idea you do not need to use.*

1. The development of the internet has led to a revolution in the sphere of studying.
2. Sometimes, encyclopaedia sources may not always be available to students and they may have difficulty in gaining access to the books in the library.
3. One of the benefits of e-learning programs is that people from any part of the world can gain knowledge on different subjects, complete courses, etc.
4. There are no age limitations for education any more.
5. Information is currently one of the two basic uses within the Internet.
6. The Internet is in no way can compare with the warm, personal experience of reading a good book.
7. A great number of online school services and virtual options have not been facilitated by the internet.
8. Students can now see the actual photographs of rare bird species or animated graphics of a volcanic eruption to understand the concept in detail.
9. While it is a fact that online schooling has loads of advantages, it is also a fact that there are a few drawbacks too.
10. Emerging technologies and furthering innovation prospects find overall support on educational arena.
11. University courses and learning is now easy for people belonging to all strata of the society with the help of online programs.

**F Web Research Activity**

Here are **Top-10 surprising facts** about the Internet.

Find additional information on most of the topics that are listed below.

Make a report on them in class.

1. The Internet is now 10,000+ days old.
2. It is the fastest growing means of communication ever.
3. Devices connected to the web outnumber humans.
4. The first webcam was used to watch the coffee.
5. China has treatment camps for the Internet addicts.
6. The Internet requires 50 Million horsepower to keep running in the current state.
7. The majority of the Internet traffic is not generated by humans, but by bots and malware.
8. The modern World Wide Web inventor Tim Berners-Lee was knighted by Queen Elizabeth.
9. Online dating generates approximately \$1 billion dollars every year.
10. 2010 was the year when Finland became the first country to make the Internet access a legal right.



## **G      Speaking Test**

- Dwell on the ways the Internet has changed the landscape of global communication.
- Focus on would-be career paths for digital citizens in the 21<sup>st</sup> century. Do you consider yourself as a ‘digital citizen’ of modern era? Speak on your favourable career prospects.
- Explore emerging I-net technologies and discuss how they alter and create new information environments.
- Indicate the possible aftermath of face-to-face communication elimination. Focus on both upsides and downsides of such a shift. If there are none of such challenges in your opinion, explain why.
- Feature the phenomenon ‘Internet addiction’. Do you consider it to be the norm or a kind of some disorders? Substantiate your ideas.

## **H      Home Writing Assignment**

Research the theme *“The Most Unusual Use of the Internet from My Point of View”*.

Prepare an essay or make a presentation in class revealing the main issues of the topic with a couple of specific examples.

## UNIT 6

## ONLINE COMMUNICATION MORALITY and SECURITY

### A Discussion Starter

Describe and give your comments on the images below.

How do you think **pictures A and B** can be related to such notions as ‘digital dossier’ and ‘digital footprints’?

Do you know what is in your digital dossier?

Do you believe that so-called ‘digital footprints’ can impact your future greatly?



**A**



**B**

Commenting on **pictures C and D**, identify possible threats and weak spots in children and teen I-net communication.



**C**



**D**

## B Before You Read

Read the title from the article below. What do you think the text is going to be about?

What do you know about new kinds of digital connection and online communication?

## C Read the Article

### *Temporary Social Media*



Messages that quickly self-destruct could enhance the privacy of online communication and make people feel freer to be spontaneous.

One essential aspect of privacy is the ability to control how much we disclose to others. Unfortunately, we've lost much of that control now that every photo, chat, or status update posted on a social-media site can be stored in the cloud: even though we intended to share that information with someone, we don't

necessarily want it to stay available, out of context, forever. The weight of our digital pasts is emerging as the central privacy challenge of our time.

But what if people could make their posts vanish automatically — making social media more of an analogue to everyday conversations that aren't recorded for posterity? That's the promise of services such as *Snapchat*, a mobile-phone app which popularity has increased dramatically during the past year. Evan Spiegel and Bobby Murphy, who met as undergrads at Stanford, came up with the idea two years ago, around the time New York congressman Anthony Weiner accidentally made racy photos of himself public on Twitter and was forced to resign. *Snapchat* lets users take photos or short videos and then decide how long they will be visible to the recipient. After 10 seconds or less, the images disappear forever.

What makes temporary social media so appealing? *Snapchat's* founders often remark that they wanted to give people a way to express themselves through something besides the idealized self-portraits many feel required to maintain on social-media sites. *Snapchats* might be more exciting to send and receive than other social-media posts because they are ephemeral, but they are also arguably a more natural way to communicate. Whereas Facebook and Twitter record and store your every offhand observation and casual interaction, interactions in temporary social media can be something like brief, in-person conversations: you can speak your mind without worrying that what you say will be part of your digital dossier forever.

Although *Snapchat's* posture as the anti-Facebook is a large part of its allure, eventually its founders will have to confront some of the same privacy challenges that have vexed Facebook. *Snapchat* contains an obvious technological vulnerability: images that were meant to vanish can still be saved if the recipient uses a screen-capture feature to take a picture of the message during the seconds it appears. (If the recipient does this, *Snapchat* notifies the sender, but by then it's too late to stop the image from being preserved and shared.) Moreover, while *Snapchat* promises to erase photos from its servers, the company's privacy policy adds that it "cannot guarantee that the message data will be deleted in every case." As soon as a racy *Snapchat* picture of a celebrity goes viral, trust in the company could be eroded.

But regardless of the fate of *Snapchat* in particular, the idea of temporary social media is important because the ability to be candid and spontaneous — and to be that way with only some people and not others — is the essence of friendship, individuality, and creativity. Facebook and Twitter do

make it possible for their members to wall off posts from the wider world and share them only with trusted people in certain circles. But since those posts still last forever, this capacity for limited sharing is technologically insecure. To the degree that temporary social networks increase our sense of control over the conditions of our personal exposure, they represent a first step toward a more nuanced kind of digital connection — one acknowledging that our desire to share can coexist with a desire for reticence, privacy, and the possibility of a fresh start.

Many brands may be wondering whether or not Snapchat is just one of the latest social media trends that is bound to pass with time and isn't worth investing in. However, innovative brands can take advantage of temporary social media by using it to experiment. Technology Review claims a few brands have already started offering disappearing coupons and secret announcements on the app, but there are many opportunities for personal, one-on-one connections with fans.

For instance, spamming a Facebook page with live updates from a conference networking party rife with cocktails, words of advice, and perhaps a bit of dancing might lead the average consumer to tire easily. But, when they can easily scroll through and react to 10-second clips they've opted into watching, their reactions will be more positive. Similarly, temporary social media leads to an increased sense of urgency—if you don't click it now, you may never get the chance to—which makes potential customers more likely to check out what a brand is posting. Temporary social media gives off that “in-the-moment” feeling, and no one wants to feel as if they're missing out.

According to Technology Review, this will “require a delicate balance to ensure that the initiatives tie back to business goals, while maintaining an authentic vibe.” But, with the low stakes of uploading a short, disappearing clip to social media that can be reacted to and engaged with nearly immediately, brands should have an easier time maintaining a credible yet authentic standing among their audiences.

Temporary social media is changing the way we communicate by shortening the time it takes to react to something and giving positive reinforcement to the person who put it out there. While many people think social media is making users too removed from the people and brands they communicate with, apps such as Snapchat are working to fill in that distance with good stories and authentic moments.

(See more at: <https://www.technologyreview.com/s/513731/temporary-social-media/>; <https://www.skyword.com/contentstandard/marketing/>)

## **D Comprehension Check**

Answer the following questions.

1. What is the primary goal of *Snapchat* application?
2. What are the essential aspects of privacy the author emphasizes on? Do you agree? Why?
3. Why do you think *Snapchat*'s mascot shows a picture of a grinning ghost?
4. What event made Evan Spiegel and Bobby Murphy come up with the idea of *Snapchat*'s mobile-phone app creating?
5. What makes *Snapchat* different from the most well-known online social networking services such as Facebook and Twitter?

**Add your own endings to the following sentences from the essay.**

- One essential aspect of privacy is ...
- The stuff which makes temporary social media so appealing is ...
- Interactions in temporary social media can be something like ...
- Images that were meant to vanish can still be saved if ...
- The idea of temporary social media is important because ...

## E Use of Language Practice

i *Form as many derivatives as you can from the words in the table below.*

Verbs	Nouns	Adjectives	Adverbs
	access		
		Emerging	
	benefit		
define			
	threat		
		Different	
			completely
		Sufficient	
vary			
			significantly

ii *Choose the correct alternative to complete each sentence.*

*Consider both the grammar and the meaning of each option.*

The 'Information Superhighway', or the Internet, is a (1) **power / empower / powerful** medium for today's information driven society. From its humble beginnings as (2) **the / a / -** series of networks established to help the military and government share resources, it has become a (3) **place / market / arena** for people to engage in commerce, business and personal facilities. Yet, there has (4) **risen / raised / arisen** a series of problems.

The Internet, because of its modern nature is not really (5) **well / good / nice** dealt with when it comes to (6) **exist / existence / existing** ethical and moral issues. The Internet has fostered a new (7) **class / group / team** of community that requires a unique category of moral values and ethical considerations. Things are always going to be dealt with (8) **different / differently / indifferently** when it comes to any revolutionary type of medium. How can interstate trade be regulated by the federal government when it is (9) **electronic / electronical / electronically** transferred information?

Last year, for instance, a law firm caused a major uproar (10) **with / by / through** posting an ad for its services on 6,000 Usenet newsgroups. That kind of activity, known as "spamming", just isn't done. Companies should convey their messages (11) **unselectively / inselectively / selectively** and (12) **inappropriately / unappropriately / appropriately**. There is little legislation which protects children and (13) **person / personnel / personal** safety that governs society's (14) **relationships / relations / relation**. The solutions to any problems with the internet are so complex that any legislation that could ensue might threaten to (15) **infringe / unfringe / defringe** upon the rights and privileges that people enjoy today.

iii *Read the article. Nine parts of sentences have been removed from the text. Put the correct sentence from A-J below in each space (1-9) to form a logical text. There is one extra item you don't need.*

### *The Good, the Bad, or the Internet*

As more people around the world gain access to all the tools of the digital age, the internet will play a greater role in everyday life. According to the recent Pew Research Center survey in emerging and developing nations, (1) \_\_\_\_\_ has been a good influence in the realms of education, personal relationships and the economy. But despite all the benefits of these new technologies, on balance people are more likely to say that the internet yields a negative rather than a positive influence on morality – (2) \_\_\_\_\_.

“We didn’t really define morality for people’s individuality but related it to perceived threats on cultural values, not just on morality”, said philosophy professor Randall Curren (University of Rochester, New York). It’s true that different cultures view morality in different ways. In many Muslim countries, for instance, it is believed that the Internet is bringing (3) \_\_\_\_\_ which are perceived as sort of drawing their young people away from the established customs and ideas.

Parents, in particular, are very nervous about the influence (4) \_\_\_\_\_ and might even feel threatened by certain world views and social patterns of their offspring. On the contrary, younger, more educated people with higher incomes or those able to read and speak English are more likely to have access to the Internet and less likely to say that it is bad for morality, according to the Center’s survey. However, parents’ fears are not always groundless. (5) \_\_\_\_\_ carried out by the Nominet Trust, an organisation that promotes internet projects which address social disadvantage. Eighty per cent acknowledge social networking sites have the ability to take over their children’s lives. They are true to believe that it is not the best way to release pressure for their offspring’s health sitting in front of personal computers chatting throughout their spare time. One in three parents, meanwhile, claims the Internet has the power (6) \_\_\_\_\_ and is sure their children are in danger from the web.

What is also worth noticing is that there is no certain way that can restrict the information on the Internet. It is saying that youngsters may receive all kinds of information without the ability of judging it, (7) \_\_\_\_\_. Some invisible hazards are inside the digital world. Children sometimes go to the websites that contain violent, porn, and other inappropriate information. However, so far, there has been no good method to completely restrain information before it gets to the children. Furthermore, the Internet has become a major source of entertainment for the younger generation according to the development of flash and web-based games. Some youngsters are so addicted to it that (8) \_\_\_\_\_, such as academy and athletics. Moreover, the majority of parents allege that their children are too young to distinguish the true stories from the false ones, they often get the wrong information and the wrong concept of the society, and become easily annoyed, irritated or even depressed.

But it has been also found that most fears are exaggerated and lack of neurological evidence. First, social networking sites, in themselves, are not a special source of risk to children, and are generally beneficial as they support existing friendships. In addition, playing action video games can (9) \_\_\_\_\_, while computer-based activity provides mental stimulation, and can help slow rates of cognitive decline. Thus, the global children protection agencies advise parents to talk to their offspring about how they use the internet, to block adult websites, to set time limits for browsing and to set up an instant alert system if children try to view blocked sites. All in all, it is families not organisations that have to safeguard their children, both on and offline.

- A** in matters affecting the natural, cultural and economic conditions of millions of people
- B** the extraordinary findings come from a poll of 1,000 parents
- C** people say that the increasing use of the internet
- D** they start to perform poorly in other fields
- E** a lot of Western images and ideas of English language content
- F** depending of course on how you define this notion
- G** improve some visual processing and motor response skills
- H** the Internet is having on their tech-savvy descendants' thinking and development
- I** though it may sometimes be beneficial
- J** to "rewire" brains without a person's knowing

### **F Web Research Activity**

Surfing the net, complete the table of pros and cons of temporary social media use.  
Compare your ideas with your partner's ones.

Using the information found, get involved into the following role-play activity.

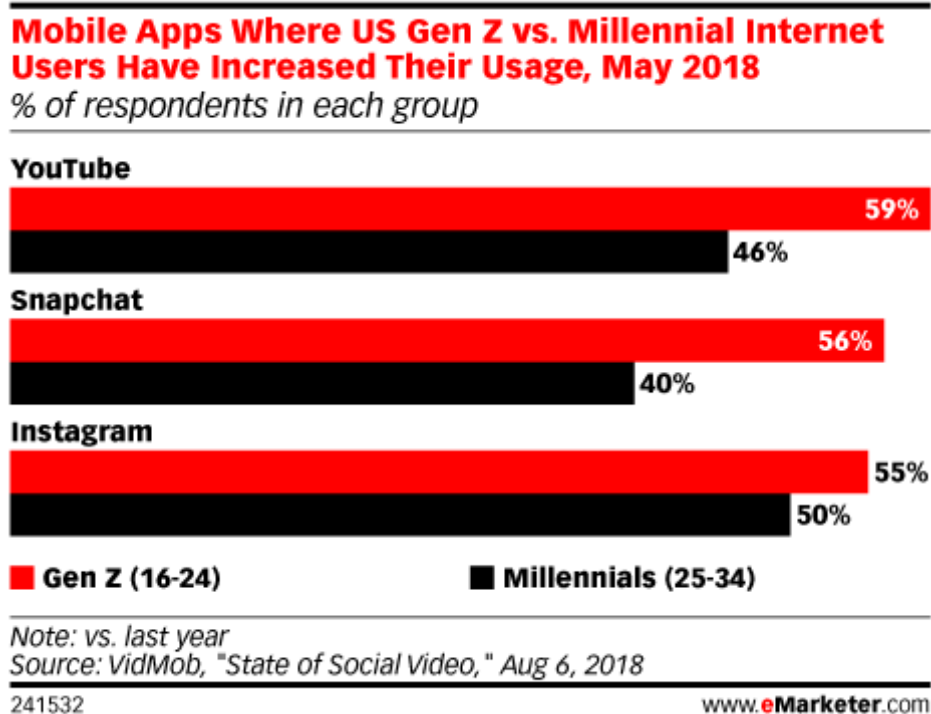
**Student A** You are eager to boost one of the latest versions of Temporary Social Networking Application. You should convince your audience that your product is going to alter human relationships to online visibility, data privacy and to content ownership.

**Student B** You are an opponent of such innovations. You do believe that temporary social media gives nothing but posting of inappropriate pictures, hacking into profiles, spreading rumours, etc. Substantiate your ideas with examples and prove that natural ways to communicate are the only suitable ones for human beings.

### **G Speaking Test**

- Identify the effects and weak spots in adolescent/young adult I-net communication. Outline the phenomenon of 'cyber bullying'. How common is the problem of cyber bullying amongst teenagers?
- Share your considerations as for the notion 'appropriate online behaviour'. Why is it so that schools today need to educate students the rules of personal safety while entertaining and socializing online?
- Give your considerations why such giants as Apple may come to the U.S government's "bad list" of the tech world's "bad boys"? Substantiate your ideas with examples.
- Comment whether Apple was right in its refusal to unlock a phone that belonged to the terrorist, San Bernadino shooter Syed Farook?

- Have a look at the graph given below.
  1. Make an analyses of the data revealed.
  2. Describe the graph and compare the amount of percentage, highlighting the tendencies depicted in the picture.



- Divide into two groups. These are two issues each group should support and prove:
  1. Allowing the government special access to software that can unlock any device at any time violates personal rights.
  2. Providing access to software may thwart other attacks and does not break the trust that consumers have with a company like Apple.

## H Home Writing Assignment

Project the topic *“The Ways Online Environment Influences Individual and/or Collective Intelligence”*.

Prepare an essay or make a presentation in class indicating the issue of ‘information freedom’ as the core of every free human society and featuring a worldwide impact of this phenomenon.



# UNIT 7

## CRYPTOLOGY in the COMPUTER ERA

### A Discussion Starter

Have a look at some modern trends of cryptography given below.

Match each concept (1-8) with its image (A-H). Then, indicate the meaning of depicted concepts.

1. *Cyber Crime Security*
2. *Binary Security Lock*
3. *Cyber Theft*
4. *Cyber Security Leak*

5. *Access Key Security*
6. *Digital Data Security*
7. *Scan Cyber Eye for Security*
8. *Hacker Attack*



A



B



C



D



E



F



G



H

Comment on the pictures given above and say what you know about information security breach.

## **B Before You Read**

Read the title from the article below. What do you think the text is going to be about?

What are some possible dangers of surfing the Internet?

How, in your opinion, can people protect themselves from these hazards?

## **C Read the Article**

### ***Privacy and Computers***

*by Robert Erani*



In an era of online social media, people can announce any event to their virtual network of friends, family, and acquaintances within moments. From birthday celebrations to baby pictures, friends get news about each other from texts, tweets, or social networks. In addition, many people use credit cards to purchase products and complete numerous online forms with personal information for a variety of purposes.

As a result, personal information is ending up in the hands of other people. There are critics who are concerned by the lack of privacy. Despite such concerns, by following a few common-sense measures, people can use the Internet enjoyably and safely.

In our fast-paced world, social networking sites are, for many people, an important way to keep up with friends and family. The issue now is how open one should be with sharing private information since the information could be stolen by criminals. For example, some people have had their homes broken into because they had posted the details of their vacation online. If they had not posted those details, the thieves would not have known that they had gone away.

One way to reduce the risk of this happening is to activate the privacy controls on social networking sites and smartphones. In other words, think about who will see your information and consider how they might use it.

Another important step is to shop only on secure websites so that one's accounts, passwords, and financial records are protected. Some experts recommend that people should treat their online information like they would treat the contents of their wallets. For example, a man bought merchandise on a website that did not have a security padlock, and as a result of this transaction, his bank accounts were emptied. If he had paid attention to the security on the site, he would not have lost his money.

However, it appears that people are becoming more aware of the risks of fraud and taking steps to avoid them since the total percentage of incidences of fraud remained steady in the past years. It may be that people who have grown up using the Internet understand its risks as well as its strengths.

The Washington Post recently carried out a poll to study the extent to which people were concerned about their online privacy and security. The poll, titled 'Surveillance in America', discovered how corporate and government surveillance affected people's online behaviours. It also investigated whether people made use of tracking and anti-tracking technologies for their own uses.

The first set of questions sought to determine people's concern about collection of personal information by social networks, cell phone providers, websites, National Security Agency (NSA)

and retailers (Amazon, Target etc.). The overall result of the question set reveals that over 66% of people are more concerned about handing over such information to such bodies or organizations. The next set of questions was to investigate the bright side of surveillance, the one which helped government and businesses to fight/control crime. Although a clear 84% of poll participants thought it was right or 'about right', 16% still found it inappropriate or thought such surveillance compromised their privacy.

Another set of questions was to find the 'Snowden effect', and actions people took in response to NSA's revelation about monitoring each and every aspect of your digital communications – phone records, calls, messages, email – everything. Surprisingly, 74% of people did not take any action to prevent from being tracked! However, of those who did attempt to save their online faces, 42% went for browser's 'do not track' options, 29% deleted/edited something they'd posted earlier online, 17% encrypted their communications, 14% used anonymization services (such as Virtual Private Network), and 13% camouflaged this online/social profiles.

The last set of questions was the most interesting – they asked people's own tracking habits. They were meant to gauge the positives of tracking technologies, such as those used by parents to watch out their children whereabouts, or those used by caregivers to watch their patient's statuses, or those used to find one's spouse's location. Except for the children monitoring of online usage in which 60% respondents agreed on the fairness of tracking technology, but 90%+ said 'no' for any type of unwarranted tracking.

In sum, until a clear line between good surveillance and bad surveillance is drawn, people would keep discrediting any of the effort to use surveillance. The ease of sharing information provides opportunities for crimes and abuses. While it may be impossible to entirely eliminate the risks, if people followed reasonable guidelines to protect important data, they could greatly reduce these risks. The benefits of being able to do such things as bank online, keep medical records updated almost instantly, and share the thrills both big and small of everyday life with friends outweigh these concerns.

(See more at: <https://www.fastcompany.com/3012652/tracking-the-nsas-secret-surveillance-programs>; <https://www.theguardian.com/commentisfree/2013/may/04/telephone-calls-recorded-fbi-boston>; <https://ac.els-cdn.com/>)

## **D Comprehension Check**

Answer the following questions.

1. What two suggestions does the writer of "Privacy and Computers" make for being safe on the Internet?
2. What issues did the Washington Post Survey reveal?
3. Why do you think people keep discrediting any of the effort to use surveillance?
4. What important issues do you believe are missing from the original article?
5. What other privacy issues do you have concerning the use of your personal information?

## E Use of Language Practice

i *Mark the statements as True (T), False (F) or No Information Given (NI).*

*Make false ideas correct according to the original essay Privacy and Computers.*

1. Most Americans don't favour the use of personal information by government authorities.
2. Government surveillance to fight crime is refused to acknowledge by the majority of the respondents.
3. Only 26% of people did 'something' to prevent tracking and surveillance.
4. A clear majority doesn't track anyone, even if it would help someone.
5. A former FBI counterterrorism agent provides a rather startling acknowledgment of just how vast government surveillance activities are.

ii *Put the following linking phrases to fill in the gaps in the summary on Privacy and Computers.*

- a As the author points out,
- b According to the author,
- c Furthermore, it has been discovered that
- d The author concludes by stating that,
- e It has been further stated

In the article *Privacy and Computers* the issues concerning the sharing of personal information online are explained. (1) \_\_\_\_\_ one area of concern is that people may sometime share details of their lives online without thinking about the consequences. (2) \_\_\_\_\_ "The issue now is how open one should be with sharing private information since the information could be stolen by criminals". The writer describes a situation in which people were robbed after revealing their vacation plans online. (3) \_\_\_\_\_ how important it is for consumers to protect their personal information when they purchase products online. (4) \_\_\_\_\_ most Americans would like to limit the extent to which surveillance is carried out. (5) \_\_\_\_\_ despite the concerns about privacy, one can still use online services safely by using common sense and privacy controls.

iii *Match the given verbs with their synonyms from the box.*

Eavesdrop, decrypt, deliver, snoop, deploy, suggest, gather, watch, track, disseminate, search, leak, handle, fix.

decipher	offer	manipulate	assemble	convey	fasten	seek for
escape	overhear	propagate	pursue	spy	spread out	pry

iv      **Fill in gaps 1-15 with a suitable word form. You can use not only one word in each gap.**

### ***The Snowden Era Challenges***

On January 21, 2014 a text message flashed on phones held by the protesters 1) \_\_\_\_\_ (throng) Kyiv's Independence Square. The Ukraine's ex-president was then still clinging to power and 2) \_\_\_\_\_ (brutalize) opponents. The message – from the number 111 – read: “Dear subscriber, you 3) \_\_\_\_\_ (register) as a participant in a mass disturbance”. Widely presumed to 4) \_\_\_\_\_ (send) from the president's security apparatus to all phones in the protest zone, the message was a stark 5) \_\_\_\_\_ (remind) of how mobile phones can be used for surveillance. Soon after, a Ukrainian man walked into a nondescript office in National Harbor, Maryland, and sought help from a man named Zimmermann.

Phil Zimmermann is a 6) \_\_\_\_\_ (cryptology). His company, *Silent Circle*, encrypts voice calls, text messages, and any file attachments. If you use *Silent Circle*, your calls to other users are sent through the company's servers and 7) \_\_\_\_\_ (decrypt) on the other phone. The service 8) \_\_\_\_\_ (not stop) the delivery of ominous messages in range of certain base stations. But it can block eavesdropping and prevent the snooper from 9) \_\_\_\_\_ (know) the number of the person you are calling or texting. Soon, access codes for *Silent Circle* were making their way to protest organizers in the heart of Kyiv.

In the past year, it's become 10) \_\_\_\_\_ (clear) that places like Kyiv are not the only environments where people might need widespread deployment of crypto technology. Documents brought to light by former U.S. National Security Agency contractor Edward Snowden suggest that the NSA gathers huge amounts of information from cloud computing platforms and 11) \_\_\_\_\_ (wire) carriers, including the numbers ordinary people called and the times they called them. Not only could the government be watching you: so could websites, advertisers, and even 12) \_\_\_\_\_ (retail) trying to track your movements within stores. Modern smartphones and the apps running on them are engineered to collect and disseminate enormous amounts of user data – such as location, Web browsing histories, search terms, and contact lists.

More than 99% of Android phones are potentially 13) \_\_\_\_\_ (leak) data that, if stolen, could be used to get the information they store online. The discovery was made by German security researchers looking at how Android phones handle 14) \_\_\_\_\_ (identify) information. Note Google's comment on the problem: “We're aware of this issue, 15) \_\_\_\_\_ already (fix) it for calendar and contacts in the latest versions of Android...”

Thus, a new way to block many of the ways phones leak data is of urgent necessity. It should signal a shift toward mass-market phones that are far more private and secure.

v      **Use the phrases given below in the sentences of your own**

Crypto wars, crypto and surveillance debates, voice calls and text messages decryption, eavesdropping protection, snooping prevention, crypto technology deployment, information dissemination, data leak prevention.

## F Web Research Activity

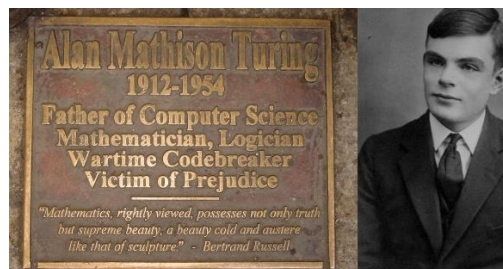
Surfing the web, trace the history of cryptography and cryptanalysis. Research the phenomena given below which relate to the origin and development of modern cryptology.



*Reconstructed ancient Greek scytale ['sit.əl], an early cipher device*



*One of the variants of the Nazi Enigma machine, the late 1920s*



*Alan Turing and his code-breaking computer*

## G Speaking Test

- Discuss with your partner what you should do to keep your information safe? Make a list of recommendations how to provide secure online communication, to prevent data theft and to minimize the risks of vulnerabilities in the Cloud.
- Dwell on the issue why the study of data storage security is so topical nowadays? Substantiate your idea in class.
- Describe the phenomenon 'crypto wars'. Say whether individuals and organizations should hide their personal and corporate secrets in a battle with government officials or 'unlock their keys' in the cases of threats to public safety.
- Characterize the latest improvements to the encryption and decryption of secure voice calls and text messages.
- Indicate and give characteristics of the mainstreams in the history of cryptology.

## H Home Writing Assignment

Imagine yourself to be a successful cryptologist and research the theme ***“My Own Would-be Cryptoproduct”***.

Prepare an essay or make a presentation in class introducing your product to would-be consumers. Give its characteristics and functions. Emphasize the perspectives of your product's application.



# UNIT 8

## MULTIMEDIA and the WEB

### A Discussion Starter

Can the modern society manage without multimedia?

In which spheres of the modern society do multimedia play the most essential role?

What are advantages and disadvantages of using multimedia on a Web site?

Have a look at some Web-based multimedia applications. Match each concept (1-5) with its image (A-E).

1. *Entertainment application*
2. *Information delivery*

3. *Social media*
4. *E-commerce*
5. *Virtual world*



**A**



**B**



**C**



**D**



**E**

Comment on the pictures given above and say what you know about multimedia elements.

## **B Before You Read**

What does the concept “web design” include?

What are the reasons for such uninterrupted and persistent development of web design?

## **C Read the Article**

### ***The Importance of Website Design for Your Business***



A website is the medium through which viewers can access information or purchase products over the internet. Having a website enables a business to reach a wider market, or prospective client base. It attracts potential customers and your target audience in a very short span of time.

In today’s world, a website is undeniably essential in order to succeed in most industries. The competition and nature of the corporate world makes it crucial for any business to enhance its presence on a global basis. In this regard, website design is one of the most important things that you need to consider if you want to develop a website.

Website design is a broad term that encompasses a wide variety of tasks, all involved in the formation of web pages. There are essentially two types of web designs you can decide on, which are dynamic and static design. Static web design is typically based on basic HTML code and Dynamic website design is built with superior and refined technologies according to the information available in the database.

The task of website design is performed by IT professionals who build the website using computer programming language that is understood by web browsers, normally HTML or JavaScript. Technically, the art of web design is very difficult since the website needs to be aesthetically attractive and have excellent usability, which means that your visitors must find the website user-friendly and eye-catching.

Web pages should also be efficient and versatile enough to be used with multiple browsers and platform configurations. Early steps in the design process include determining the primary objectives, intended audience, basic layout, and navigational structure for the site or applications. Tools, such as flowcharts, page layouts, and storyboards, can be used during the design process. Features that require a specific browser or infrequently used plug-ins should be avoided whenever possible; high-bandwidth items should be used only when needed and should be user-controlled, if possible.

The importance of web design and its impact on the web is a globally accepted fact these days. Presentation of a website is a fundamental factor that the developer or owner must dwell on. The content in your website should be accessible in an organized and professional looking manner. The site should also have good content full of relevant information and enough functionality to entice visitors.

There are a number of navigational tools, such as drop-down menus, site maps, search boxes, image maps, frames, and navigational bars that can be used when creating the navigational structure of the



site. In addition, you should consider breaking long Web pages into multiple pages and using a linked table of contents to enable the user to easily access any part of the document. Compatibility with various devices that might be used to access the site, as well as with assistive hardware, should be considered.

Your website will be developed in methods to sell your product more persuasively to your buyers. Various techniques and methods are employed to create and join words, colors, images, fonts, and graphics in order to express your message to relevant customers. Your website design must convince customers that you are legitimate, competent and also portray the solution that your product and service is intended to solve.

To achieve the above mentioned strategies, your web designing necessitates a professional touch from competent web designers who know how to put their best acquired skills and expertise to build a suitable gateway that can convert each visitor into a prospective buyer. When you hire the services of a highly qualified website designer or developer, you can rest assured that your online presence will successfully put your business message across and improve your conversions.

Additionally, hiring the services of website design experts is an investment rather than an expense, as it generates substantial profits for your business. After your website has been established, and the website design is complete, your website will be optimized to improve visibility on the search engines. There are a number of systems intended to provide SEO (Search Engine Optimization) content for your website, quality links and also utilize Meta tags effectively. Many web hosting firms will also enhance your website rankings enabling a chance to obtain a constant number of daily visits.

Evidently, website design is of paramount importance to any new or established business. It is the most lucrative way to bring a rapid ROI to your business. A small investment of today will certainly get you flawless results tomorrow.

(See more at: <https://webcompare.co.za/importance-of-website-design-for-your-business>, <https://codeburst.io/the-importance-of-website-design-and-how-it-helps-in-making-business-profitable-11bf5ee1817e>, <http://w3ondemand.com/importance-website-design-web-development-services-company/>)

## **D Comprehension Check**

Answer the following questions.

1. Why is website design so crucial for your company?
2. Is website design an art or a science?
3. How can your website design become an asset to your business?
4. What attributes does a good web designer possess?
5. What is the difference between Web design and Web development?

**Look at the given key points in designing a Web site, explain them and add others:**

- *navigation;*
- *content and visual elements;*
- *brand uniformity;*
- *engagement;*
- *organization and Search Engine Optimization (SEO).*

## E Use of Language Practice

i *Form as many derivatives as you can from the words in the table below.*

*Make up your own sentences with them.*

Verbs	Nouns	Adjectives	Adverbs
			undeniably
		essential	
		refined	
	usability		
require			
entice			
		navigational	
			infrequently
	compatibility		
necessitate			

ii *Provide the opposites to the following words:*

Crucial, to enhance, to encompass, attractive, to avoid, globally, to entice, relevant, assured, paramount, lucrative.

iii *Fill in the gaps with the words which best fit each space:*

The design (0) OF a website has a huge impact (1) ... the User Experience (UX) for your visitors. (2) ... making the navigation simple and easy to use, to ensure the speed of your site is (3) ... fast ... possible. Site speed is now considered to be a ranking factor due to its implications (4) ... UX. If your website design incorporates large images and other elements which slow your load time, you will be negatively impacting the UX (5) ... your website.

There are many ways (6) ... increasing this load time such as compressing files and carrying (7) ... a full audit. It is important to remember that the key goal of your website is to satisfy your users.

Your visual elements can also influence your design. Provoking the right emotion (8) ... your user can dramatically increase the UX of your website.

Finally, tying this (9) ... with the point about site speed, it is quite common (10) ... websites to be designed in flash, or with high levels of interactivity (11) ... the hope to increase the UX of their website. This can, in fact, have the opposing effect as it will slow the load speed and can make for a confusing experience (12) ... done wrong.

iv For questions 1–13, read the text below and decide which lines of the text contain UNNECESSARY words. Indicate the correct lines with a tick (✓).

There is an example at the beginning (0).

0	✓
00	ARE

### Web Development

0 Web development comes in two flavors: Front-end development and  
 00 back-end development. Some of the skills are in these two flavor overlap,  
 1 but they do have very different purposes needed in the web design profession.  
 2 A front-end developer takes the visual design of a website (whether they were created  
 3 that design or it was handed to them by a visual designer) and builds it in code.  
 4 A front-end developer will use HTML for the structure of the site, then CSS to dictate  
 5 the visual styles, layout, and perhaps even some Javascript. For some small  
 6 sites, front-end development may be the only kind of development that is very needed  
 7 for that project. For more complex projects, "back-end" development will come into play.  
 8 Back-end development deals with the more much advanced programming and  
 9 interactions on web pages. A back-end web developer focuses on how a site  
 10 works and how the customers get things done on it is using certain  
 11 functionality. This could include working with code that it interfaces with  
 12 a database or being creating features like E-commerce shopping carts  
 13 that connect to online payment processors and more on.

### F Web Research Activity

Surfing the net, compare different websites and make up a table of the latest website design and development requirements:

Requirements to	
Website design	Website development
1.	1.
2.	2.
and more	and more

## **G Speaking Test**

- Prove that multimedia is a good opportunity to boost the Ukrainian economy.
- Substantiate that Web design is one of the most creative professions in IT.
- Agree or disagree with the fact that multimedia designers will be in demand in Ukraine in the foreseeable future.
- Which mistakes should you avoid while designing and developing website?
- List three types of software programs that might be used when creating a multimedia Web site. Explain what each program would be used for and list one example (program name and publisher) of each. Name one situation in which a hyperlink would not be identified as a broken link by a Web site authoring program testing feature but would still be wrong and could only be detected by a human tester.

## **H Home Writing Assignment**

Research the theme “*The possible Use of Web-Based Multimedia in the Future*”.

Prepare an essay or make a presentation in class revealing the main issues of the topic with a couple of specific examples.

# UNIT 9

## E-COMMERCE

### A Discussion Starter

Explain what e-commerce is and describe some of the advantages and disadvantages involved with implementing e-commerce.

Why has e-commerce demonstrated such explosive growth in the past couple of years?

Identify a variety of e-commerce business models and discuss their differences.

Describe and give your comments on the images below.



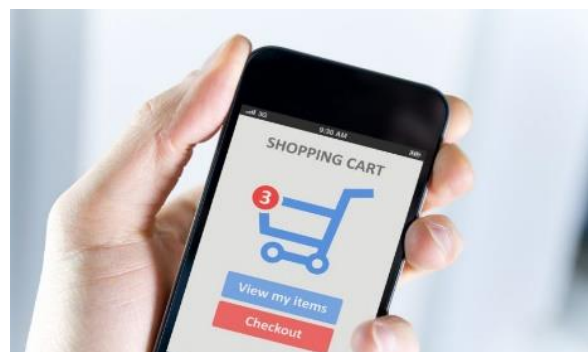
A



B



C



D

## **B Before You Read**

Read the title from the article below.

Do you have any ideas how to start e-commerce business?

Explain the difference between e-commerce and e-business?

## **C Read the Article**

### ***How to Start an E-commerce Business?***



There is a logical order in how you would go about building an e-commerce business. Although setting up an actual online store would probably take less than a day, researching, building, launching and growing a profitable e-commerce business is a multi-layered process involving a number of steps and decisions.

**Choosing and sourcing a product.** The first step to starting an e-commerce business is deciding what products you're going to sell. Finding a profitable idea can be hard work, so be prepared to do some serious digging and thinking. It's essential that you choose products with healthy margins that will allow you to turn a profit and scale the business in the future. Once you know what you want to sell, you'll need to decide how and where you're going to source the products. The four main methods of sourcing products and inventory are making, manufacturing, wholesale and dropshipping.

**Conducting research and planning ahead.** Your product idea will dictate which aspects of the market you need to research, but some of the most important areas to look into will be your competition, pricing strategy, and your unique value proposition. At this point, it is also a good idea to draft a business plan that will help you visualize your growth strategy and identify any potential threats or obstacles.

**Getting your brand right.** Now that you have a promising product idea and a clear overview of the market, it's time to start thinking about the key elements of your store, such as your brand name, domain name, brand guidelines, and your logo. Getting your brand right from the start can help accelerate the growth and conquer the hearts of potential customers. Before turning your attention to building the store, you should spend some time studying the basics of SEO, so that your business gets off to a good start.

**Deciding how you will sell.** The actual setting up of your online shop can be achieved in two ways:

- *You can build an e-commerce store from scratch* – this means either developing it yourself, or hiring a freelancer/agency to do it for you. It can take longer and cost more, but building a custom online store will guarantee 100% customization and give you the power to make all the decisions.
- *You can use an off-the-shelf e-commerce solution* which makes building an online store a quick and easy process. However, it will also mean less customization, as you will need to choose from an existing pool of themes and tools provided by the platform. If you opt to run a dropshipping business, e-commerce solutions will allow you to get the store off the ground and start selling in as little as a few hours.

**Before launching.** At this stage, you'll be itching to get the store out into the World Wide Web. However, make sure you're well prepared to measure the success of your launch – defining your key performance indicators upfront will help you track your progress and performance and fix any issues as they emerge. Other important things to take care of include setting up your social media profiles, getting the email marketing ready, installing Google Analytics, doing keyword research, defining your shipping strategy and finalizing the launch promotion plan. Yes, that's a lot of work, but a good start is half the job done. When you complete the checklist, try running your store through the Shopify store grader to catch errors if there are any.

**After launching.** Welcome to the grind! This is where the real work begins. Having launched your online store, you should immediately move on to the promotion phase. Marketing your store and optimizing conversions will be your daily bread and butter from now on. You should also experiment with regularly expanding or refreshing your inventory. It is a particularly easy thing to do for dropshippers, as they can import new dropshipping products in minutes, but it should remain a priority even if you're manufacturing or making the products yourself. Staying ahead of the curve will take some testing.

(See more at: <https://www.oberlo.com/ecommerce-wiki/ecommerce>, <https://www.shopify.com/encyclopedia/what-is-ecommerce>)

## **D Comprehension Check**

Make up your own questions to shed light on the central ideas of the article ***How to start an e-commerce business.***

**Add your own endings to the following sentences from the essay.**

- To start an E-commerce business, you need to ...
- Despite setting up an online store would take less than a day, ...
- E-commerce can take on a variety of forms involving ...
- It is also a good idea to draft a business plan that ...
- Feel free to make experiments with ...

## E Use of Language Practice

### i *Match words (1-11) to their definitions (a-k):*

1. retail	<b>a</b> any tangible good that requires inventory to be replenished and orders to be physically shipped to customers as sales are made
2. wholesale	<b>b</b> a conventional store with a physical presence
3. dropshipping	<b>c</b> downloadable digital goods, templates, and courses, or media that must be purchased for consumption or licensed for use
4. online payment service	<b>d</b> a supply or stock of something
5. digital wallet	<b>e</b> the sale of a product by a business directly to a customer without any intermediary
6. physical products	<b>f</b> the design and development of a product to meet the specific requirements of a single customer
7. digital products	<b>g</b> a person browsing products without intention to make any purchases
8. window shopper	<b>h</b> the sale of products in bulk, often to a retailer that then sells them directly to consumers
9. inventory	<b>i</b> a type of payment service accessed via the Internet and used to make electronic payments to others, such as via deposited funds, a bank account, or a credit card
10. customization	<b>j</b> the sale of a product, which is manufactured and shipped to the consumer by a third party
11. brick-and-mortar store	<b>k</b> an app or online service that stores information (such as credit, debit, and loyalty cards; digital coupons; and shipping information) and that can be used to speed up purchase transactions

ii *Read the following short text each line of which contains deliberate grammar mistake/-s. Find eleven mistakes and correct them.:*

### *Mobile-friendly will be the new standard*

While in past many online shoppers have bought products via the Internet through their desktop or laptop, many consumers have begun to embrace smartphones full-on replacements towards personal computers. As soon as smartphones will become more cheap and easy to access, websites will have to adapt to the growing community of users which only view their sites on mobile. With order to compete in the mobile commerce market, companies will be needed to adapt their websites and make them mobile friendly. Sites that aren't will be ignoring by millennials, who can quick find an easier-to-use platform.



iii For questions 1–10, read the text below and decide which lines of the text contain *UNNECESSARY* words. Indicate the correct lines with a tick (✓). There is an example at the beginning (0).

0	✓
00	IT

### *The Best Way to Find Sponsors for a Web Site*

- 0 What is the best way to find sponsors for a Web site today?
- 00 The first step in finding a sponsor is to make it your Web site
- 1 appealing to potential sponsors – be sure your Web site is easy to navigate,
- 2 quick to load, and being updated regularly. Having a site that will draw in visitors is
- 3 one thing that sponsors look for. Next, create a list of potential sponsors (if you need ideas,
- 4 find out a Web site that is similar to yours and see who is sponsoring it).
- 5 Then think about which sponsors would have benefit the most from your audience and
- 6 contact them. When setting the financial terms for your first sponsor,
- 7 don't be afraid to go the lower than expected. You might even offer them
- 8 a free trial period. Most of all, don't to be afraid of rejection. If a potential
- 9 sponsor turns you down, see if you can find out why so you can learn from that and correct
- 10 if any problems before contacting the next sponsor. Soon your persistence will pay off.

iv Choose the correct alternative to complete each sentence. Consider both the grammar and the meaning of each option.

### *E-Tailing: It's All About Service*

Today, most websites are easy (1) *in/to/for* use and provide reliable and cost-effective shipping. But less than 5% of people visiting a website ever turn (2) *off/over/into* paying customers. And if the rest have clicked (3) *through/at/on* a paid search ad without buying anything, bringing them (4) *on/to/in* the site actually costs the website money. How to convert these window shoppers (5) *off/into/for* paying customers? Overstock.com believes (6) *in/on/of* customer service. It now has highly trained customer-service reps some part of whom staff a 24-hours-a day department to answer questions (7) *via/with/in* live web chats on the site. When a customer engages (8) *into/in/by* a live chat with a sales rep, the average purchase doubles (9) *at/for/in* value. Then there's LivePerson, a publicly-traded New York firm that makes customer-tracking software.

What's most cool about LivePerson's technology is that it follows what customers are doing and can automatically flag and offer help to e-customers based (10) *at/in/on* rules individual e-tailers set. Some small private companies offer animated characters who act (11) *as/with/for* sales reps on e-tail sites, drawing from a databank of voice answers to commonly asked questions. Software e-tailer Goldfish Software credits its animated sales rep (12) *to/with/for* converting 33% more of its browsers into buyers. Other sites are closely watching how people navigate a site, and testing out what pages or promotions work best with different customer groups. But seller beware: research done by New York University's Stern School of Business has found most shoppers consider tracking (13) *with/from/without* their consent a violation of their privacy. When in a store, a customer has no expectation of privacy. But when someone is shopping online, he or she is usually at home or at work. A sales rep barging (14) *against/into/in* your shopping experience can feel like an invasion of privacy.

v *For questions 1-16, read the text below and choose the most appropriate word from the list (A-R) for each gap. There are TWO EXTRA WORDS that you do not need to use. There is an example at the beginning (0).*

### *E-tailing Consultant Work*

In the world of Internet (0) SHOPPING the job of an e-tailing consultant is to help e-tailers to (1) ... their businesses by (2) ... their websites, their products, services, and increasing their sales. One of the main challenges for e-tailers today is to convert (3) ... into purchase especially because they have to pay to (4) ... their sites to increase (5) ....

That's why firms use a conversational agent, or (6) ... host, called an avatar by computer specialists. It is an (7) ... character that appears on the customer's screen. And can answer questions and (8) ... with the customer, just like with a sales (9) ... in a store. Having real people to communicate with clients (10) ... is too expensive for small e-businesses. A conversational agent is a computer program which uses (11) ... intelligence to (12) ... with customers.

Depending on the product and the type of (13) ..., these agents can increase (14) ... by as much as 505%. The longer customers spend on the site, hearing and asking questions about a product, the more chance there is they will buy it. It builds their (15) ... in the product. And research has shown that people trust what they hear from a (16) ... agent much more than what they simply read on a website.

- |                  |              |                   |
|------------------|--------------|-------------------|
| A online         | B rep        | C animated        |
| D customer       | E advertise  | F commerce        |
| G traffic        | H inventory  | I window-shopping |
| J conversational | K grow       | L improving       |
| M interact       | N virtual    | O confidence      |
| P sales          | Q artificial | R chat            |

### **F Web Research Activity**

Choose one of these issues and prepare a one-page summary of your findings and opinions, surfing the net:

**Click fraud** occurs when sponsored links are clicked with the goal of costing the sponsor money. Determine how big the problem is and the form it most commonly takes today. Include the information, answering these questions:

- What are search sites doing to detect or prevent click fraud?
- What actions can a company take if it believes it is a victim of click fraud?
- Is click fraud illegal?

***The current status of m-commerce in the world.*** Include the information, answering these questions:

- What types of m-commerce services are available via mobile phones today?
- If you have a smartphone, what types of m-commerce transactions do you have access to? Have you used them?
- Can you use NFC (Near Field Communication) with your phone?
- Are there any locations in your area where you could purchase goods or services using a smartphone and NFC?

### **G Speaking Test**

- Present and discuss the types of e-commerce Web sites used in e-commerce (manufacturer sites, e-tailer (online retailer) Web sites, subscription sites, brokerage sites, online auction sites, etc.).
- Describe different strategies for implementing Web-based e-commerce.
- Discuss the options available to handle the electronic financial transactions that occur via the site.
- Discuss some security issues that all businesses conducting e-commerce activity should be concerned with.
- Speak about an online service known as a digital wallet, its application, and its advantages for e-commerce sites.

### **H Home Writing Assignment**

Research the theme ***“The Future of E-commerce”***.

Prepare an essay or make a presentation in class revealing the main issues of the topic with a couple of specific examples.

# UNIT 10

## GREEN TECHNOLOGIES

### A Discussion Starters

Look at the six photos below. Describe them and fill in the suggested table:

**Ecological Concerns of Presence**

<i>Ecological problem</i>	<i>Causes of the problem</i>	<i>Would-be aftermath (for the planet and humanity)</i>



**A**



**B**



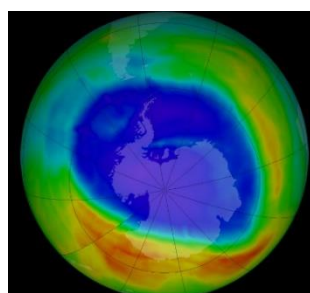
**C**



**D**



**E**



**F**

## **B Before You Read**

How do you think scientists and technologists can improve the environmental situation nowadays?

What are the issues of top-priority for them to consider?

## **C Read the Article**

### ***The Negative and Positive Ecological Impacts of Technology***



Nowadays no one will argue that in the result of longer working hours and increased use of technology more and more energy is being consumed. The impact that this is having on the environment is substantial in both negative and positive ways. It is hard to deny the benefits modern technology has produced in industry and in everyday life, however, there are considerable negative effects as well.

According to the International Energy Agency the figure of the world's energy consumption is predicted to rise to incredible 40% by the time the year 2030 arrives. The major drain on the world's energy resources is not just information communications technologies. A number of the occurring ecological and environmental problems are due to the rapid growth of new industrialized countries such as South Korea and China. The emissions their factories produce are amongst some of the highest in the world and contribute significantly to the amount of noxious gases that pollute the air.

Industry aside, there are many other aspects technology has had a negative ecological impact on the world. In the modern home, there are numerous high technology gadgets designed to make our lives easier and more pleasant. The gases emitted by the combustion process to yield energy for numerous devices can have a devastating influence on the ozone layer and contribute to what is known as the "greenhouse effect". Often referred to as a thermal balance, this phenomenon adds much warmth to air currents of the Gulf Stream, affects the climate on the Poles, leads to the Polar icecaps melting at an alarming rate, causing a significant rise in the world's oceans. This, as it is well known, has a ripple effect around the planet experiencing devastating floods, typhoons and violent storms.

Although it can be argued these changes in our weather systems have just as much to do with Mother Nature as technology, it is hard to ignore the correlation between the rise in technology manufacturing and the increase in frequency of environmental disasters.

Despite the claims that technology is to blame for many of the world's natural problems, high tech has also served to improve the shape of our planet. Since its rise in the workplace, numerous ICT companies have been designing "greener technology" to combat the detrimental influence that computers and their accompanying equipment cause on the environment.

For instance, in the Green Grid community a number of efficient directions to improve the way energy is consumed by IT oriented businesses are being devising. One of the biggest achievements of the Green Grid is the Power Usage Effectiveness or, PUE, the metric system which aims to record data centre energy consumption every 15 minutes. By recording in these 15 minutes it helps

those monitoring the data to notice if there are any energy fluctuations and if the data centre systems are using an adequate amount of energy. The long term goal of the Green Grid's work groups is to introduce a standard system that allows business managers and IT operatives to compare the amount of the energy they are consuming and if necessary to resolve the ways to reduce it.

Another aspect that is having beneficial impacts on the environment is low carbon technology. Largely developed in China (e.g. the Chinese Dongtan City produces '0' GHG emissions), this issue aims to offset the amount of emissions polluting the air by using renewable fossil fuels which are preferably used because of their high energy efficiency and extremely low emissions. For other countries to develop effective low carbon technologies, they need to apply another approach to their resources than Chinese do. This is because many of other economies possess different environments and various natural resources to hand. Other emerging countries can also diversify into new low carbon options thanks to the advances in technologies such as bio-fuels, solar and wind power which are no longer sci-fi but a fact.

One obvious way that technologies are assisting our environment is the reduction of the need for paper. With the ever increasing use of online communication, paperless offices are now a common occurrence worldwide. Shrinking the usage of paper in turn reduces the demand for logging and deforestation, allowing richer lands to yield a smaller footprint. The deployment of green technologies such as PC power management systems and multi-function devices allows a business that relies heavily on energy reducing technology.

An office can become more environmentally sound if it employs readily available energy reducing technologies and incorporates them with, for example, such eco-friendly practice as turning off excess lights. According to current statistics, putting energy management systems into practice can save a company a huge amount in energy consumption. It is also worth mentioning the replacement of laser printers with multi-function devices, i.e. the incorporation of a printer, fax machine and photocopier all in one system. This is not only space saving but also sparing of the electronic hardware amount that is permanently on standby in an office.

As it currently stands, many of the world's organizations have not begun to actively look for greener and more ecologically friendly methods for producing the energy they need, and they are not thinking of the ways to enhance their carbon footprint, yet it is an issue that needs to be addressed sooner rather than later.

(See more at: <https://www.iea.org/renewables2018/>; <https://www.inc.com/women-2/why-flexible-working-hours-actually-makes-employees-more-productive.html>)

## **D Comprehension Check**

Answer the following questions.

1. What has caused the significant increase of energy consumption in industry and in everyday life?
2. What leads to ozone layer depletion and "greenhouse effect" appearing?
3. Why do you think China is at the top in the list of low carbon economies?
4. What makes other developing countries different from China's approach of effective low carbon technologies?
5. What up-to-date implementations are going to enable the office to be more productive and facilitate the company more in energy consumption?

## **E Use of Language Practice**

### **i Read the article. Match the paragraphs (1-9) to the headings (A-J).**

***There is one extra heading you do not need to use.***

#### ***Live and Work: D-Link's Experience***

**1.** A green office implements practices which reduce waste, decrease energy usage, and strive to have a neutral impact on the environment. Green offices promote action and awareness, and educate employees regarding important environmental issues. Green offices encourage telecommunication, carpooling and additional practices that help to reduce the company's overall carbon footprint. Green offices encourage employees to follow the three R's: Reduce, Reuse, and Recycle.

D-Link Headquarters, for instance, has already made several changes within the past few years that have had a major impact. These policies are rapidly being rolled out to D-Link business units throughout the world.

**2.** For several years, D-Link has been a paperless office, which refers to use of email in addition to the use of electronic files rather than paper. If the need to print materials does arise, employees generally print double sided pages or print on reused paper with blank side.

**3.** Employees were presented the option to give up their personal trash bins. As a result, employees have become more conscious of the amount of waste that they produce, and are striving to reduce the amount of personal debris created on a daily basis. As a result, D-Link Headquarters has produced 30% less trash per person since 2006.

**4.** Low-flow one-touch faucets are installed in restrooms which cut the amount of water used for hand washing. From 2006 to 2007, the total volume of water used at D-Link Headquarters was reduced by an average of 17% per month.

**5.** Newly installed insulation within the building has led to improved energy efficiency. From 2007 to 2008, the number of kilowatt hours used at the D-Link Headquarters office was reduced an average of 10% per month. The ambient room temperature is kept at a comfortable level and efficiently managed through directional ceiling vents.

LCD monitors and standby settings help to reduce the energy used by desktop PCs. Employees are required to shut down their PCs whenever they leave the office. To save energy, one or more elevators are shut down during off-peak hours. Elevators are programmed to service alternating floors thus reducing redundant traffic. This system has been implemented to encourage employees to use stairs as much as possible.

**6.** The lunchroom at D-Link Headquarters uses only washable/reusable tools, which significantly reduces the amount of waste created at each meal. Employees who pack their own lunch are encouraged to use reusable containers.

**7.** D-Link Headquarters participates in a comprehensive recycling program which covers everything from office paper to plastic bottles. Every floor is equipped with bins separated by plastic, paper, glass and aluminium in addition to used CDs and batteries to make sure of proper disposal.

**8.** D-Link Headquarters is the first major corporate office in Taipei (Taiwan) to implement a biodiversity mini-park, which includes a vegetable garden, lotus pond, and 569 square meters of green space. This mini-park promotes employee awareness and serves to increase the level of biodiversity at the office. The algae growing in the lotus pond plays a part in reducing the office's

carbon footprint by converting CO<sub>2</sub> into breathable oxygen. The company has strategically placed a vegetable garden and green space to prevent erosion, and purify local water runoff.

9. On May 23, 2009, D-Link celebrated its first “D-Link Day.” Employees from all across the company gathered along a hiking trail in Tianmu to collect litter and revitalize the delicate wilderness area around the mountains. All D-Link Employees are encouraged to maintain the D-Link Green philosophy of living green at work and at home outside the office. D-Link employees follow the 3 R’s, and persuade others to do the same with the understanding that every individual can make a difference.

- A Paper-Free Organisation
- B Introduction of Eco-Friendly Activities
- C Water Conservation
- D Prevention of Energy Wasteful Use
- E Eco-Awareness Event
- F Snack Bar Upkeep
- G Garbage Reduction Comprehension
- H Green Open Space
- I D-Link Green Products
- J Comprehensive Recycling

ii *Suggest your own logically followed options to end the sentences given below:*

1. Generally, an ecological crisis is what occurs when the environment of a species or a population becomes ...
2. Nowadays the humanity faces some matters of urgency to cope with such as ...
3. One of the most pressing ecological concerns is the pollution caused by ...
4. As a result of domestic and foreign pollution, nearly 50 percent of global forests have been damaged by ...
5. The optimizing efforts have been made to introduce “green” or “soft” forms of tourism that are ...
6. Overall use of smart eco-technologies, which aim to give their consumers appropriate and relevant information on their energy and water consumption, leads to ...
7. In worldwide general practice the ecological tax is imposed upon those producers and manufactures who ...
8. Stores and retail facilities in the EU could benefit from up to 50% in energy savings thanks to the measures which include ...
9. Increasing recycling and reducing of the amount of waste sent to landfill is now a requirement as such solutions significantly reduce ...
10. People acknowledge the need to further mainstream sustainable development at all levels, integrating ...



iii *Read the following short texts and fill in the gaps (1-14) using the correct forms of the words in brackets.*

**Cheap Solar Panels.** One problem with the solar cell industry is that the production of photovoltaic solar panels is 1) \_\_\_\_\_ (**rely**) on relatively expensive materials. Electricity from even the most 2) \_\_\_\_\_ (**commerce**) workable solar cells is already five times the price of that from coal plants 3) \_\_\_\_\_ (**make**) it less economically sound and less likely to be adopted on a large scale. The solar power industry is, therefore, turning to 4) \_\_\_\_\_ (**cheap**) alternatives. For example, 5) \_\_\_\_\_ (**engine**) at Berkeley have created solar cells using cheap copper oxide and zinc oxide. The low cost of these prototype cells means they only need to produce a third as much power to become commercially viable. Other innovations in solar technology such as nano coatings 6) \_\_\_\_\_ (**large**) the efficacy of solar panels are also already increasing the 7) \_\_\_\_\_ (**economy**) efficiency of solar technology.

**Tidal Energy.** Governments and private investors 8) \_\_\_\_\_ (**like**) are starting to examine the potential of 9) \_\_\_\_\_ (**environment**) friendly forms of energy production, on a mass scale. One such solution is offered by tidal energy, which falls into two categories: energy 10) \_\_\_\_\_ (**generate**) either by harnessing the power of tidal currents, or utilising the 11) \_\_\_\_\_ (**differ**) between high tide and low tide. For instance, Tidal Stream Systems are an example of the first category. Often they resemble 12) \_\_\_\_\_ (**water**) wind turbines and in effect function in the same way, except tidal currents turn the turbines rather than wind. Whilst the installation of Tidal Stream Systems is a 13) \_\_\_\_\_ (**consider**) civil engineering undertaking they are meant to have less of an environmental impact than the other 14) \_\_\_\_\_ (**alter**).

iv *Read the following short texts each line of which contains deliberate grammar mistakes. Find eleven mistakes and correct them.*

**Energy Saving Bulbs.** If the average UK family will swap 3 normal 100watt traditional bulbs for 20watt energy saving bulbs they prevent 120kg of CO<sub>2</sub> being released into the atmosphere. Each bulb would save its owner £9 per a year or £100 over its lifetime. The accumulative effect of cost savings look like this, taken in concert with other savings, could really add up to a quite substantial amount.

**Green Gadgets.** 5% or 300kg of a households average carbon dioxide emissions are a result of gadgets like set top boxes, mobile phone chargers be left on standby. Why not turn them off? In the UK, an average family would save over £37 per year: enough from a slap up pizza dinner! Increasingly manufacturers are designing these devices with eco-friendly functions, and leave out unnecessary environmentally unfriendly functions such as the dreaded standby. More that 6 million electrical items are binned every year in the UK, and it is estimated that over half could repair. Obviously, a reconditioned appliance requires more less energy to bring it back into use, than to rebuild from scratch.

v *Give the synonyms of the following words:*

Impact, substantial, considerable, to yield, to combat, to strive, option, on a large scale, to enlarge, to utilize, to accumulate, obviously.

## **F Web Research Activity**

Have a look at the list of the latest eco-technologies below.

Before surfing the net, make suggestions on some projects and discuss their green features.

1. Smartflower POP
2. CityTree devices
3. Edible plastic bags
4. Biodegradable alternatives
5. Sunflare solar wallpapers
6. Solar roof tiles
7. Vertical farms
8. Off-shore wind turbines
9. Electricity-generated fabric
10. Energy-harvesting floorboards

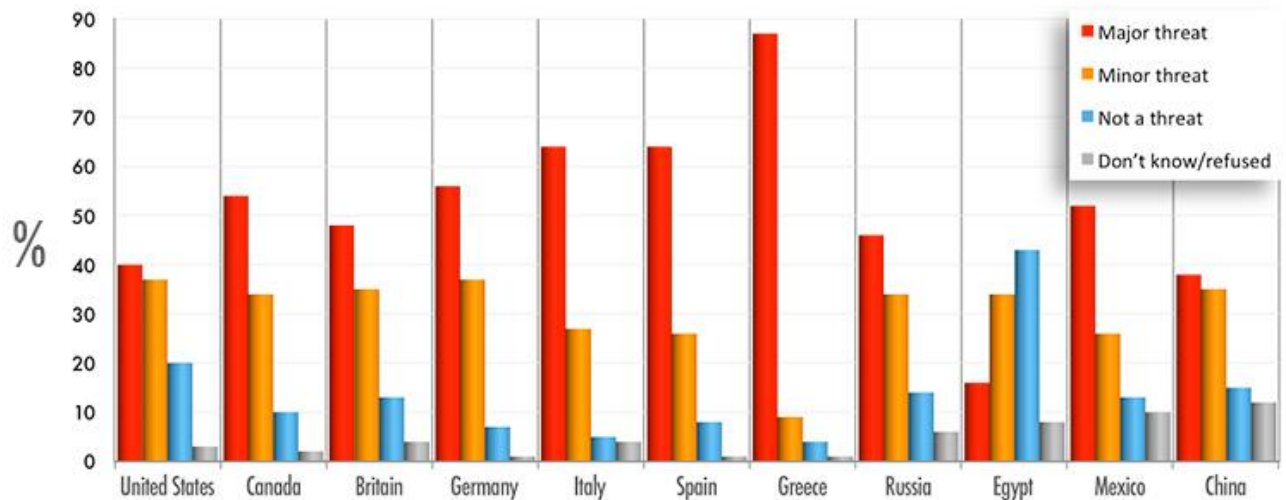
Choose one of the above-mentioned issues and make a presentation on it in class.

## **G Speaking Test**

- Indicate positive and negative impact of technology on the environment.
  - Characterize some inevitable future challenges of mankind.
  - Make a comparison of the notions “Environmental Awareness” and “Global Citizenship”. Speak on the aspects of eco-friendly living.
  - Outline the concepts the phenomenon of “sustainable development” covers.
  - Make up a to-do list for the people to implement the core principles and pathways to sustainable development efficiently.
- 
- Do you think global climate change is a major threat, a minor threat, or not a threat to your country? Is such a concern prevalent in your country? Now, have a look at the below-given graph *International attitudes on climate change*.

1. Make an analyses of the data revealed.
2. Describe the graph and compare the amount of percentage, highlighting the tendencies depicted in the picture.

## INTERNATIONAL ATTITUDES ON CLIMATE CHANGE



- Describe the picture given below. Share your opinion on the significance of the depicted circle in terms of the future of entire humanity.

## TOGETHER WE CAN SAVE OUR PLANET



## H Home Writing Assignment

Write an argumentative essay on the topic:

***“The Role of Green Computer Technologies in Sustainable Development of Mankind”.***

**Common Computer Science and IT Acronyms**

AAAI – American Association for Artificial Intelligence  
ACL – Agent Communication Language  
AES – Advanced Encryption Standard  
AI – Artificial Intelligence  
AIML – Artificial Intelligence Markup Language  
ALICE – Artificial Linguistic Internet Computer Entity  
AMP – Accelerated Mobile Pages  
AMPS – Advanced Mobile Phone Service  
AOS – the Apstra Operating System  
API – Application Programming Interface  
AR – Augmented Reality  
BIOS – Basic Input Output System  
CAD – Computer-Aided Design  
CAM – Computer-Aided Manufacturing  
CDBMS – Columnar Database Management System  
CIO – Chief Information Officer  
CMSs –Content Management Systems  
CPU – Central Processing Unit of the computer  
DAT – Different Access Networks  
DBA – Database Administrator  
DBMS – Database Management System  
DMSs – Document Management Systems  
DSS – Decision Support System  
DSSSL – Document Style Semantics and Specification  
EISs – Executive Information Systems  
ETHICAA – Ethics and Autonomous Agents  
FPGAs – Field-Programmable Gate-Arrays  
FTP – File Transport Protocol  
GAN – Global Area Networks  
GIS – Geographic Information System  
GHG – Green-House Gas  
GPS – Global Positioning System  
GPUs – Graphic Processing Units

HAN – Home Area Networks

HCI – Human-Computer Interaction

HOAP – Hybrid Operational Analytical Processing

HTAP – Hybrid Transaction Analytical Processing

HTML – HyperText Markup Language formats

HTTP – Hypertext Transfer Protocol

IBM – International Business Machines

IBN – Intent-Based Networking

IBNS – Intent-Based Networking Systems

ICT – Information and Communications Technology

IMDBMS – In-Memory Database Management System

IoT – Internet of Things

IP – Internet Protocol

ISA – Industry Standard Architecture

ISP – Internet Service Provider

KWS – Keyword Stuffing

LAN – Local Area Network

MAC – Macintosh, a type of personal computer made by the Apple Computer company

MAN – Metropolitan Area Network

MISs – Management Information Systems

MFPS – Mathematical Foundations of Programming Semantics

NIC – Network Interface Card

NFC – Near Field Communication

NLU – Natural Language Understanding

ORDBMS – Object-Relational Database Management System

OS – Operating System of the computer

OSI – Open System Interconnection protocol

PAN – Personal Area Network

PC – Personal Computer

PCI – Peripheral Component Interconnect connection

PDF – Portable Document Format

PII – Personally Identifiable Information

P2P – Peer-to-Peer

PPP – Point-to-Point Protocol, the set of rules that allow your computer to use the Internet protocols using a phone line and modem

PUE – Power Usage Effectiveness

PWAs – Progressive Web Apps

RAM – Random Access Memory

RDMS – Relational Database Management System

ROM – Read Only Memory

SCI – Systemics, Cybernetics and Informatics

SDLS – System Development Life Cycle

SEBIS – Semantics in Business Information Systems

SEKT – Semantic Knowledge Technologies

SEM – SEmantic Memory

SEO – Search Engine Optimization

SQL – Structured Query Language

SSL – Secure Socket Layer

SWAD – Semantic Web Advanced Development

TCP/IP – Transmission Control Protocol / Internet Protocol

TKIP – Temporal Key Integrity Protocol

TMAPI – Topic Map Application Programming Interface

TOR – The Onion Router

TPSs – Transaction Processing Systems

TSMC – Transactions on Systems, Man, and Cybernetics

URL – Uniform Resource Locator, a path to a certain file on the World Wide Web

USB – Universal Serial Bus is used for communications between certain devices

UX – User Experience

VGA – Video Graphics Array, a system for displaying graphics

VPAs – Virtual Personal Assistants

VPNs – Virtual Private Networks

VR – Virtual Reality

VRML – Virtual Reality Mark-up Language allows the display of 3D images

WAN – Wide Area Network

WCSM – World Combination Service Mode

WOSC – World Organization of Systems and Cybernetics

WYSIWYG – ‘What You See Is What You Get’; it is pronounced “wizziwig” and basically means that the printer will print what you see on your monitor.

## **Common Email Abbreviations**

2G4U – Too Good For You

AWHIFY – Are We Having Fun Yet?

AYPI – And Your Point Is?

GAL – Get A Life

GMTA – Great Minds Think Alike

J4F – Just For Fun

JIT – Just in Time

KISS – Keep it Simple

QL – Quit Laughing!

RUOK – Are you Okay?

SITD – Still In The Dark

TIC – Tongue In Cheek

WYSIWYG – What You See Is What You Get

YYSSW – Yeah Yeah Sure Sure Whatever

ZZZ – Sleeping, Bored, Tired

## **Emoticons**

:) or :-) – smiley face

O:-) – angelic smile

8-) – big-eyed smile

:-X – big kiss

:-{ } – blowing a kiss

..( – crying face

:-> – grinning

:-| – indifferent, bored

:-)) – laughing

:-( – sad face

:-D – shock or surprise

:-r – sticking tongue out

B:-) – sunglasses on head

:-|| – very angry

8-| – wide-eyed surprise

## Texts on Pleasure Reading

### TOPIC I. INFORMATION SYSTEMS

#### *Dawn of intelligent applications*

The future is intelligent applications. Learn how companies are shifting from big data to intelligent application approaches. Data remains a foundational element of computing. Recently, Hadoop and big data have been a central part of data progression, allowing you to capture data at scale. But companies now look to the expanding use of cloud computing and machine learning to create more intelligent applications.

This new generation of applications use all the data they can, including incoming real-time data, to respond in the moment to changing circumstances and formulate advantageous outcomes. This includes delivering on the digital transformation promise sought by companies to deliver rich customer experiences.

Intelligent applications can converge database and data warehouse workloads, allowing companies to respond and react to changing conditions in real time.

This builds on a theme covered by nearly every large industry analyst firm regarding the merging of transactional and analytical functions. Gartner refers to this convergence as hybrid transaction analytical processing, or HTAP; 451 Research refers to it as hybrid operational analytical processing, or HOAP; and Forrester refers to it as translytical data platforms.

#### **According to Forrester:**

Analytics at the speed of transactions has become an important agenda item for organizations. Translytical data platforms, an emerging technology, deliver faster access to business data to support various workloads and use cases. Enterprise architecture pros can use them to drive new business initiatives.

451 Research also calls out the idea of seizing the moment:

Organizations are zeroing in on the so-called “transaction window” and realizing that it presents a significant opportunity – and once it’s gone, it’s gone for good.

The largest industry sectors are using these converged technologies for their intelligent applications. These applications collect and process data from a variety of sources, provide experiences in real time, and make use of the latest techniques in machine learning and artificial intelligence to push their usefulness forward.

Consider the following examples.

#### ***Finance***

A popular intelligent application in finance is the new frontier of digital wealth management, including real-time portfolio analytics for clients across any platform. As one example, JP Morgan Chase highlighted its investment in digital wealth management in an investor presentation last year. Behind the scenes, many of these digital wealth services are powered by digital startups such as InvestCloud, which states that its wealth management products “allow wealth managers to get a whole view of their clients—instantaneously and at scale.” Other companies in this space include SigFig, which showcases “experience integrating our platform with TD Ameritrade, Charles Schwab, Vanguard, E\*Trade, among others.”



## ***Energy***

In the energy sector, intelligent applications include IoT data pipelines using sensor data. Real-time capture and analysis of this data, with machine learning model scoring, provides helpful downtime mitigation and savings for global companies. Shell describes its advanced analytics for sensor collection on its website:

Digital sensors installed in our operations around the world—from production fields to manufacturing complexes—produce a constant flow of data which we analyze to improve processes and take better business decisions.

The technology can optimize the performance of plants by predicting when maintenance will be needed, to avoid unplanned downtime and lost productivity.

More than 5,000 machines globally connect to the system, which is thought to have saved more than 3.5 million barrels in lost production since its introduction.

## ***Media***

Perhaps no transformation is more visible in media than the shift from broadcast and cable television to real-time streaming. This change drives media companies to seek end user analytics and advertising opportunities tied to streaming, and key intelligent applications to drive revenue. This technology race led Disney to acquire a majority stake in BAMTech. Disney said the following in a news release:

The media landscape is increasingly defined by direct relationships between content creators and consumers, and our control of BAMTech's full array of innovative technology will give us the power to forge those connections, along with the flexibility to quickly adapt to shifts in the market.

See more at: <https://www.computerworld.com/article/3185781/smartphones/sleek-new-galaxy-s8-phones-feature-facial-recognition-bixby-intelligent-agent.html>

## ***Sleek new Galaxy S8 phones feature facial recognition, Bixby intelligent agent***

Samsung launched sleek new Galaxy S8 and S8+ smartphones Wednesday with features including facial recognition, an intelligent agent called Bixby and Samsung Pass for secure e-commerce mobile payments.

The new Bixby intelligent assistant will provide a "new type of interface that learns and evolves with you," said Sriram Thodla, senior director for intelligence at Samsung Electronics America.

Other digital assistants, like Apple's Siri and Google Assistant, use voice to interact. But Thodla said voice is "isolated and doesn't understand what's on a phone's screen." Bixby, he said, knows the context and what's on a screen and can "move seamlessly between voice and touch."

In one example, to text a location of a restaurant to a friend, Thodla opened a maps app on the S8, then pressed the Bixby physical button on the side of the device and said, "Capture this and send to Cindy." With multiple Cindys in his phone's directory, he was directed to touch the right one, moving the map information to the text to the correct Cindy.

With Bixby, users also can point the phone's camera to landmarks and images to gather information and translate some languages.

Thodla also described Bixby's ability to anticipate a user's needs by swiping from the right to show a personal page of various cards that revealed information a user accessed from apps like Facebook and Uber.

Bixby would then be able to organize the cards depending on the time of day. If a user commonly uses Uber for a ride to work in the morning, the Uber card would show up at the top of a group of cards every morning, along with morning news and weather. Or, Thodla said, Bixby could provide a reminder to read an article later when the user arrived home.

Bixby will also connect to smart devices in a home, using a new Samsung Connect Home service. "It turns the phone into the universal remote for your life," he said.

Analysts who have seen Bixby in action said they are eager to try it to see how it compares with voice-activated agents like Siri. Since Bixby is late to the game, it is "the vision that Samsung still has to deliver on," Goertz said. "Today, it is not in direct competition to Alexa from Amazon, Google Assistant and others."

Patrick Moorhead, an analyst at Moor Insights & Strategy, said Bixby will be measured by how well users can command and control Samsung devices and features. "Bixby should not yet be compared to Siri, Google Assistant, Alexa or [Microsoft's] Cortana because it's not yet designed to be a free-form intelligent agent."

See more at: <https://www.infoworld.com/article/3247869/machine-learning/dawn-of-intelligent-applications.html>

### ***Seven Industries Being Transformed by Geospatial Information Systems***

Geospatial information system (GIS) solutions, which make sense of location-aware data and turn it into usable insights, are driving major disruptions across multiple sectors.

Nowadays more data is being generated by more devices and their users than ever, and much of it is location-based. In fact, the geospatial data market is expected to grow to \$73.9 billion by 2021, up from \$30.7 billion in 2016.

Spatial data refers to all types of data objects or elements that are present in a geographical space or horizon. It enables the global finding and locating of individuals or devices anywhere in the world. Spatial data is also known as geospatial data, spatial information or geographic information.

In order to make critical decisions and fuel important processes, enterprises need to be able to access and make sense of this data quickly and with minimal hassle. As a result, geospatial information system solutions, which make sense of location-aware data and turn it into usable insights, are driving major disruptions across multiple sectors.

Anthony Calamito, Chief Geospatial Officer at Boundless, conducted his industry expertise to explain how GIS technology is transforming agriculture, transportation, energy, retail, defense, federal government and state and local government. Boundless is a St. Louis, Mo.-based provider of open source product support, training and core development to meet geospatial requirements.

## **Agriculture**

Each growing season, farmers might make as many as 50 key decisions—about what crop to grow, when to plant, whether or not to use fertilizer and so on. Any of these can end up affecting crop yield, as well as the bottom line. In the past, farmers made these important decisions based on historical patterns, tradition or even by talking shop with neighboring growers and other people in the know. Today, agricultural operations generate more location-based data than almost any other industry, with data flowing from a number of sources. These can include machine telemetry, weather stations and ground sensors, soil samples, ground observations and satellites and drones. With GIS, agriculture companies can collect, maintain and analyze data to maximize resources, monitor crop health and safety and improve yield.

## **Transportation and logistics**

Moving people and things around often involves enormous logistical challenges. Consider a hospital that wants to provide its patients with the best and fastest route to their facilities at a particular moment, a municipal government that wants to establish optimal bus and light rail routes, a manufacturer that wants to ship its products as efficiently and cost-effectively as possible, or an oil company that wants to plan its pipeline locations. In each of these scenarios, the analysis of location-based data is vital in making informed business decisions.

## **Energy**

Energy exploration is a highly spatial enterprise, with data from satellite images, surface geology mapping and subsurface remote sensing determining the economic viability of pursuing operations in a certain site. Energy and utility companies are dealing with massive proliferation of geographical data, because industrial sensors are now everywhere – from airborne-mounted lasers to surface data sensors during drilling to pipelines monitors. Mapping and spatial analytics provide the necessary insight for making decisions that help achieve compliance, ensure accurate site selection and locate resources.

## **Retail**

As consumer reliance on smartphones accelerates and wearables become more common, brick-and-mortar retailers can use geospatial technology to get a better picture of customer behavior, both past and present. This is because geospatial data goes beyond location—the geometry of a point on a map – to include attribution about those geometries, such as customer demographics or where people spend the most time within stores. All of this data can be used to inform decisions on store locations, merchandise mix and arrangements and other aspects of the customer experience.

## **Defense and intelligence operations**

Geospatial technology has changed defense and intelligence operations in every part of the world, wherever military personnel are deployed. Defense leaders, analysts and other staff rely on accurate GIS data to carry out mission-critical activities strategically and successfully, with efficient collaboration across all phases of planning and operational activities. GIS aids situational assessment (provides complete visual displays of tactical information to personnel in command or in the field), land operations (reveals terrain conditions, elevations, routes, vegetation cover, facilities and population centers), air operations (conveys weather and visibility data to pilots; guides troops, supplies and targeting) and maritime operations (reveals currents, wave conditions, tides and weather).

## **Federal government**

Timely and accurate geospatial intelligence is critical for federal agencies making decisions that impact safety and security, infrastructure, resource management and quality of life. GIS enables safety and security efforts with operational support and coordination for defense, disaster response, law enforcement, national security and first responder services. Regarding infrastructure, GIS helps manage resources and assets for highways, ports, public transportation and airports. Federal agencies are also using GIS to better understand current and historical data for the management of agriculture, forestry, mining, water and other natural resources.

## **State and local government**

State and local governments make daily decisions that directly affect residents and visitors. From operations such as pothole repair and utility operations to land value assessments and property development, mapping applications are used to analyze and interpret GIS data to enable these critical decisions. Additionally, the population and landscape of cities and towns can change dramatically in relatively short periods of time. To adapt to these changes and offer the level of service people have come to expect in their day-to-day lives, state and local governments are embracing modern GIS technology for a variety of essential applications, including traffic and road conditions, environmental quality, disease outbreaks, utility distribution (i.e. electricity, water, and sewer systems), managing parks and other public land and permitting (for camping, hunting, boating, etc.).

See more at: <http://www.eweek.com/storage/seven-industries-being-transformed-by-geospatial-information-systems>

## **TOPIC II. DATABASE MANAGEMENT SYSTEMS**

### ***How MarkLogic Data Hub Service Makes Mass Data Useful***

By Chris Preimesberger

MarkLogic, a rising NoSQL database provider that's regularly taking business away from larger vendors, launched the MarkLogic Data Hub Service, a new way to give users what the company calls "automatic elasticity" in the cloud for their enterprise workloads.

MarkLogic claims that the Data Hub Service provides a fast and cost-effective way for enterprises to integrate, store, analyze and secure mission-critical data in the cloud. None of this is ever easy, despite what company marketers will tell you.

The Data Hub Service, which works specifically alongside MarkLogic's NoSQL database, can integrate large swaths of business and user data in a cost-efficient manner. Curated data in the hub then is able to fuel analytical and transactional applications, IoT analysis, knowledge graphs, artificial intelligence and machine learning.

The Data Hub technology on which the service is built integrates data with a high level of enterprise-grade data security and reliability. By offering the Data Hub as a service, enterprises looking for greater data agility, security and governance in the cloud can leapfrog multiple point services – and save time and money.

## **MarkLogic Navigates Unstructured Data and Structured Data**

MarkLogic develops and provides services for its alternative database to the big relational ones that Oracle, IBM, SAP, Microsoft SQL, Software AG, Teradata and others built years ago and that require a lot of supervision and maintenance. Most are decades-old databases that rely on often slow-moving, time-consuming ETL (extract, transform and load) tools to integrate data from silos.

MarkLogic navigates data lakes of unstructured data but also handles structured data. It is aimed at improving performance in three main focus areas: data integration from silos, data manageability and security. It sounds simple, but all of these things are hard to do well.

Enterprises today are increasingly being overwhelmed by data. As a result, they are gravitating toward solutions that are simple to use and provide more agility with less operational overhead. MarkLogic Data Hub Service provides DevOps teams with agility in order to rapidly integrate data, but with none of the operational overhead, meaning they can focus on “Dev,” not “Ops.” This is where the business value lies.

### **Data Lakes Done Right**

When they started showing up in data centers several years ago, data lakes promised to help with the data deluge faced by all organizations; however, that promise has largely gone unsatisfied. Industry analysts have discussed the many causes of this, including a lack of governance, semantic inconsistency, and inflexibility. MarkLogic Data Hub Service is built from scratch to address those challenges.

While workloads may vary from minute to minute, budgets do not. Enterprises need a predictable cost model that can adjust to varying demand. MarkLogic’s architecture allows resources to be added and removed from the underlying database in seconds, something that hasn’t been possible until now.

The Data Hub Service uses the same technology that was first delivered in MarkLogic Query Service to allow bursting to meet peak loads while providing a completely predictable cost aligned with baseline usage unlike an expensive, over-provisioned solution, or a costly and unpredictable on-demand approach.

### **Leapfrogging Database as a Service**

The MarkLogic Data Hub provides business value beyond what is seen in any database at this time. It handles different data types (e.g. documents, graphs, relational, and geospatial) from different data sources (e.g. RDBMS, message buses, streaming data, etc.) to be integrated curated, mastered, governed, searched, queried, and harmonized within a single architecture.

Trying to achieve similar capabilities with traditional approaches requires stitching together ten or more different components on top of a database, which results in higher costs, complexity, brittleness, and overhead.

See more at: <http://www.eweek.com/database/how-marklogic-data-hub-service-makes-mass-data-useful>

## *In the IoT world, general-purpose databases can't cut it*

By Linda Musthaler

We live in an age of instrumentation, where everything that *can* be measured *is* being measured so that it can be analyzed and acted upon, preferably in real time or near real time. This instrumentation and measurement process is happening in both the physical world, as well as the virtual world of IT.

In the IT world, events are being measured to determine when to autoscale a system's virtual infrastructure. For example, a company might want to correlate a number of things taking place at once — visitors to a website, product lookups, purchase transactions, etc. — to determine when to burst the cloud capacity for a short time to accommodate more sales or other kinds of activity. Much of this data is time-series data, where it's important to stamp the precise time when an event occurs, or a metric is measured. The data can then be observed and analyzed over time to understand what changes are taking place within the system.

Time-series databases can grow quite large, depending on how many events or metrics they are collecting and storing. Consider the case of autonomous vehicles, which are collecting and evaluating an enormous number of data points every second to determine how the vehicle should operate. A general-purpose database, such as a Cassandra or a MySQL, isn't well suited for time-series data. A database that is purpose-built to handle time-series data has to have the following capabilities, which general-purpose databases don't have.

- The database needs to be able to ingest data in almost real time. Some applications — like the one for the autonomous vehicle — could conceivably produce millions or hundreds of millions of data points per second, and the database must handle the ingest.
- You have to be able to query the database in real time if you want to use the database to monitor and control things, and the queries have to be able to run continuously. With a general-purpose database, queries are batches and not streaming.
- Compression of data is important and is relatively straight forward if the database is specifically designed for time-series data.
- You have to be able to evict data as fast as you ingest it. Time-series data is often only needed for a specific period, such as a week or month, and then it can be discarded. Normal databases aren't constructed to remove data so quickly.
- And finally, you have to be able to “down sample” by removing some but not all data. Say you are taking in data points every millisecond. You need that data to be high resolution for about a week. After that, you can get rid of much of the data, but keep some at a resolution of one data point per second. In time-series data, high resolution is very important at first, and then lower-resolution data is often fine for the longer term.

### **Open-source projects aimed at time-series data**

The founder of InfluxData, Paul Dix, saw this unique need, and he built the InfluxData Platform specifically to accumulate, analyze, and act on time-series data. He started with an open-source project that contained InfluxDB, the core database. InfluxDB was a quick hit on GitHub among developers. After that, he raised some funding and kicked off three more open-source projects to round out the InfluxData Platform, known as the TICK stack (Telegraf, InfluxDB, Chronograf, Kapacitor). These four components make up a powerful and popular platform for working with time-series data. Everything is available as open-source software for developers. InfluxData offers a closed-source commercial version for production scenarios that require clustering, high availability, and strong security.

The IoT world has an inherent need for the TICK stack. The physical world of the Internet of Things is highly sensed. Everything — our bodies, our clothes, healthcare devices, industrial

plants, our homes, our cars, etc. — is getting instrumented for measurement of time series data. These sensors are looking at pressure, temperature, speed, heart rate, volume, light, and so much more, and quite often, some action needs to be taken as a result of changes over time in that data. The sensors all around us are continuously collecting and monitoring data to help us (or programs) make better decisions.

Instrumentation of everything is the way of the future, and a time-series database and associated tools will be necessary to collect, analyze, and act on data when it is still meaningful. And then in the IT world, the virtualization of our systems has created a strong use case for the InfluxData Platform. It started with virtual machines, so instead of having one server, you have five. Then VLANs came along, so now there are multiple LANs talking to multiple VMs on one machine. Now we have containers, so maybe there is one server running six VMs and 40 containers. Then each of those containers has a set of microservices.

What has happened is that the whole software infrastructure is ephemeral; everything is virtual, portable, temporary, up and down. However, we still need a real-time view of what's happening within these systems. Thus, the software is being instrumented to provide real-time situational data, or what's called observability. It provides a system of record to capture all those metrics and events that are coming off the software infrastructure and the hardware infrastructure and stores them all in one place. Now it's possible to see what is happening with the infrastructure. And if something happens that is a concern, there is an awareness of it and the system has a record of it. Taking this a step further, it's possible to correlate events and metrics to understand why an SLA is or is not being met.

Instrumentation of everything is the way of the future, and a time-series database and associated tools — such as the InfluxData Platform — will be necessary to collect, analyze and act on data when it is still meaningful. The idea of measuring everything is to become more data-driven as a business, to be able to make better business decisions and take timely actions based on events, metrics, or other time-based data. This is happening across all industries as companies use their digital transformations to change the way they do business.

See more at: <https://www.networkworld.com/article/3268838/internet-of-things/in-the-iot-world-general-purpose-databases-cant-cut-it.html>

### TOPIC III. COMPUTER NETWORKS

#### *AI, machine learning and your access network*

By GT Hill

Artificial intelligence (AI) and machine learning are two of the latest networking buzzwords being thrown around the industry. The problem is many enterprise network managers remain confused about the real value of these vastly useful technologies.

Emerging network analytics services, powered by AI and machine learning promise to transform traditional infrastructure management models by simplifying operations, lowering costs, and giving unprecedented insights into the user experience – improving the productivity of both IT professionals and their users.

For network staff, the concept and value of these technologies is extremely powerful if applied to the right problems.

## **Good problems to have for AI**

One big problem is today's operational challenge in dealing with the mass of user, device, application and network service data traversing the enterprise access infrastructure. Machine learning, if applied properly, is an ideal solution for making sense of all this data to figure out how all the different parts of the network are behaving with each other.

A second big problem is the need to automate the network within a grand closed loop. The use AI and all this “big data” is key to making this happen. But first, the industry must get the ‘making sense of the data’ part right among many other things.

Today, network managers must wade through volumes of data from Wi-Fi controllers, server logs, wired packet data and application transactions, analyzing and correlating all this data to determine the health of network as well as trends and patterns of network behavior across the stack that impact user performance. Then, they manually apply changes to the network with no real way to definitively determine whether those changes worked or not.

Conventional network management and monitoring tools, never designed or developed to deal with these 21st century realities, are ill-equipped to automate this process.

## **First things first**

Simply put, artificial intelligence is the development of computer systems able to perform tasks that normally require (super) human intelligence.

Rather than forcing people to perform increasingly complex calculations from a variety of data sources, work in AI has concentrated on mimicking human decision-making processes and carrying out tasks in ever more human ways to enable more predictive problem solving.

Related to this, machine learning is an application of AI. It is a toolkit of algorithms that provide systems the ability to automatically learn and improve from experience without being explicitly programmed to do so.

The process of learning begins with observations of data, and looking for trends, patterns and anomalies within the data to make increasingly better correlations, inferences and predictions. Machine learning software “learns” by discovering the processes that generate the observed outcomes of particular inputs. Finally, machine learning provides a framework to make predictions and recommendations as to what will improve the overall system.

## **Theory is great. What now?**

So how can all this magic be usefully applied, in a practical way, to help IT and network staff drive down costs, drive up productivity and deliver better user experience on the network? Machine learning is the ideal tool to automate many of the traditional infrastructure management processes that are performed manually. Specifically, in the context of enterprise access networks, it:

1. Eliminates costly and cumbersome manual analysis and correlation of myriad network data sources by network staff,
2. Identifies specific and systemic user network performance problems across the entire IP stack and makes recommendations and predictions on fixing them,
3. Delivers a single source of network truth that can be used by different factions within the network team, each responsible for their own services,
4. Minimizes the finger-pointing among IT staff when issues arise, and
5. Predicts potential network problems and capacity requirements before they happen.



Because machines, not people, are staring at every client network transaction 24 hours a day, network managers are able to determine who, what, when, where and why network problems are occurring – and what to do about them – even if they don't know where to look or what questions to ask.

Cisco, HPE, Mist and Nyansa, the top talkers in the market giving lots of lip service to the use of AI and machine learning. Nyansa, the only one of the four with a pure-play commercial offering of machine learning for access networks. Its Voyance network analytics platform provides a good glimpse into what can be practically achieved through the technology's application.

### **Putting ML to (net) work**

Machine learning is useful but only when fed tons of relevant data. On the Enterprise access network, that includes live packets off the wired network, wireless metrics from WLAN controllers, SYSLOG data from different network servers, and other network data sources. Machine learning is used to quickly analyze all this different data, correlating it across different network layers. This is something that's not practically possible with people trying to manually correlate it.

The beauty of these machine learning solutions is that they can be used without server agents, client software or intrusive architectural changes – using the data already running over the network.

Central to machine learning is the use of massively-scalable cloud computing resources, sophisticated big data repositories and analytics algorithms that turn everything into meaningful and understandable actions that network managers can take.

Once analyzed, this data is distilled to surface trends and patterns impacting the performance of every device on the network. The resulting insights, not clearly visible or easily achieved by network managers, tell IT staff exactly where, when and why user connectivity falters.

Because every client network transaction is analyzed by machines, pinpointing precisely where the network is struggling and quickly be determined.

Are issues occurring on a specific VLAN? In a specific location? Is the problem with a certain Wi-Fi access point or group of APs? A certain type of device? Is it an application problem? DNS or DHCP issue? For a given group of users? What are some concrete actions I can take to improve DNS experience in my network? Without machine learning, getting answers to these questions can take days or even weeks.

### **The right time at the right place**

Given the invasion of new data now hitting enterprise access networks, machine learning and AI couldn't be more welcome technologies for taking the pressure off network managers to do more with less.

While AI is simply a general term describing automating manual or complex tasks, machine learning is a toolkit of algorithms that enable automatic learning from 'big data' already running over today's networks.

Armed with these technologies, network managers can now better understand where they have issues with user experience, get recommendations of actions to take and, ultimately, automate the configuration and operation of the infrastructure. This is network nirvana by almost any definition.

See more at: <https://www.networkworld.com/article/3256013/lan-wan/ai-machine-learning-and-your-access-network.html>

## ***What Are The Latest Trends In Telemedicine In 2018?***

Telemedicine is a method of providing clinical healthcare to someone from a distance by the use of telecommunication and information technology. Previously, telemedicine was reserved for treating patients located in remote areas, far away from healthcare facilities, or in locations with a shortage of medical professionals. Today's connected patient wants to waste less time in the waiting room at the doctor's surgery and get immediate care for minor but urgent conditions when they need it.

Telemedicine is helping bridge the large gap that once existed between patients and doctors. Not only do patients feel more in control of their health checkups, but even doctors get more time to review individual cases by being ably supported by external physicians and specialists.

A report by Mordor Intelligence predicts that global telemedicine will be worth more than \$66 billion by the end of the year 2021. Here's how five telemedicine trends will shape the future of the healthcare industry.

### **1. Patient Data Collection and Data Analytics:**

During a telemedicine session, patient information is automatically captured by the use of telemedicine services, such as sensors and mobile apps. Using this data and the slew of modern devices available, patient self-monitoring has been huge in 2017 and will continue to grow in 2018 and beyond. Some devices track patient ECG's and send the results to doctors, providing an invaluable tool for healthcare professionals to monitor cardiovascular activity. Also, Big Data analytics plays a key role in analyzing data from many patients, helping to improve telemedicine treatments as a whole going forward. Patient data collection can help identify risk factors for certain illnesses, assisting physicians with recommending prophylactic treatments.

### **2. Mobility and Cloud Access:**

By 2018, it's estimated that 65 percent of interactions with healthcare facilities will occur with mobile devices. According to a 2015 research2guidancereport, 80 percent of doctors already use smartphones and medical apps in their practice. Hospitals and insurance companies now store medical records in the cloud so that patients can access their test results online 24/7. This, in turn, decreases paper usage and saves time. Cloud data warehouses are one way of storing the data securely and efficiently.

### **3. Enhanced Security:**

With lots of data being collected from patients to assist with telemedicine services, data security is vital. There are different techniques available today which help to enhance data security in telemedicine, including:

- Conducting a HIPAA security check once a year to reduce data security risk factors.
- Insisting on encryption of data on all portable devices.
- Conducting more frequent penetration testing and vulnerability assessments of IT systems.

### **4. Better Investment Opportunities:**

Because telemedicine is one of the fastest growing segments in the healthcare industry, many organizations are investing in it. Mergers between small and larger telemedicine operators provide financial stability to smaller companies and a platform to provide telemedicine care effectively. Also, larger telemedicine providers are collaborating with international medical institutions, helping them to spread their expertise abroad, widening the telemedicine market, and generating more

revenue. Investment opportunities in telemedicine will only increase as India and China open their doors to telemedicine practices from the west.

## **5. Better Healthcare Apps:**

In the coming years, we can expect more personalized telemedicine apps for both patients and clinicians, with the flexibility to specify the information transmitted between doctor and patient. Telemedicine app development also will give rise to mHealth, also known as mobile Health. Apps such as MDLIVE, Amwell, MyTeleMed, and Express Care Virtual will facilitate convenient interactions between patient and physician.

Some of the upcoming trends in telemedicine include:

### **1. Parity in Telemedicine to Become a Norm**

In the US alone, more than 32 states have passed internal laws to allow for better parity in Telemedicine. Both UK and Canada are set to follow suit as well. Upon actualization, these laws would allow physicians to be reimbursed by private payers for telemedicine visits at a rate similar to in-person visits. This would not only help the said physicians, but also help in the rapid acceptance and proliferation of telemedicine technology. In light of tougher regulations and programs which limit patients to single doctor visits, such changes can be godsend. Michigan state in USA has already seen a 77.5% increase in Telemedicine encounters after supporting service parity in telemedicine.

### **2. Consolidation Will Increase**

Most small or medium sized healthcare practices are struggling to stay afloat in these testing times due to inadequate expansion capabilities, stronger regulations, reduced reimbursements, and higher costs. As a result, we can expect to see most of the small telemedicine operators either merge or get absorbed by larger ones who have better financial stability to provide specialty telemedicine care. Many hospital enterprises have also started buying such small radiology practices in order to provide their telemedicine services to even more patients, thereby reducing costs of operation.

### **3. Decentralized Care Will Become Commonplace**

Today, we already see varied examples of specialty telemedicine healthcare moving away from larger settings to more community-based and cost-effective locales. Many hospitals are already looking to decentralize their niche offerings, especially Teleradiology with the help of community extension services or by partnering with emergency care centers.

This would in turn also attract younger physicians who prefer telemedicine since they can keep the work hours flexible and earn better pay at the same time. Therefore decentralized clinical telemedicine offers specialists around the world to see their patients without having to be present in-person.

### **4. Patient-Centered Medical Homes to Become a Reality**

One of the main reasons why telemedicine has enjoyed success is because of increased customer satisfaction numbers. It is not only convenient and easy, but also saves time and costs for both the doctors and patients involved.

As a result, we can expect to see a rise in the number of patients getting treatments right from the comfort of their home, or being a part of a medical home which houses many patients with similar symptoms and diseases for better treatment.

## 5. Proprietary Hardware and Networks to Go Out of Circulation

During its inception, most hospitals and telemedicine operators used proprietary hardware and technology to provide their services. But with the easy availability of secure software delivered in an easy-to-implement manner, more operators are moving towards such affordable solutions. Emerging network standards such as WebRTC also allow the healthcare providers to choose the ideal care for their patients and the medium through which it can be delivered.

Many healthcare enterprises are also seeking specialty-specific telemedicine software which can be easily deployed across a variety of hardware devices using open networks.

See more at: <https://www.forbes.com/sites/quora/2018/07/31/what-are-the-latest-trends-in-telemedicine-in-2018/#2e8a8c466b9e>

## TOPIC IV. NETWORKING MEDIA and HARDWARE

### *How a National 5G Network Idea Materialized in Trump White House*

By Don Reisinger

The race to be the top 5G network provider in the U.S. is on among the country's biggest carriers. But private wireless service providers were blindsided by recently leaked national security document that floats the idea of building a secure national 5G work. The document, obtained by U.S. news website Axios, indicates that President Donald Trump's national security advisers has proposed building a secure national 5G network to ward off Chinese cyber-attacks. However, soon after the news broke, critics that included Federal Communications Commission Chairman Ajit Pai and top executives with private sector wireless service providers derided the proposal as an impractical and even irresponsible idea. This slide show will discuss what implications a national 5G network to the ongoing development of private sector.

#### **A 5G Primer**

Over the past few years, industry watchers have working on the development of Fifth Generation wireless protocol technology specification, called simply 5G. When the technology is deployed it will support higher capacity data transmission to accommodate a broader set of devices and services. Most importantly, it will deliver speeds at 1 Gbps which promises to reduce transmission latency over a network to about 4ms. That will ensure connected devices, including self-driving cars, will be able to communicate with each other far more quickly than currently possible and support a host of technical advances.

#### **What the Private sector is doing to implement 5G**

To ensure people across the globe will be able to take advantage of 5G, the wireless industry is working to agree on specifications for hardware and software to get the technology up and running. Wireless service providers can start building their networks until the specifications are approved.

#### **Documents Float Idea of a U.S. National 5G Network**

Axios made waves on January 28, when it revealed that it had obtained "sensitive" national security documents detailing a plan for nationalizing a 5G network in the U.S. The documents, which were apparently pitched to President Donald Trump, detail how the U.S. government could create its own 5G network that carriers would license from the government to provide service to Americans. The network would be a standalone service outside of all the other 5G networks around the world.

## **Government Fears Chinese Cyber-Spying**

According to Axios, national security officials were driven to propose the network over about hacking by China. In the document, the officials said that they were concerned with China's rapid development of 5G network technology and the possibility of the country spying on America through Chinese-manufactured U.S. telecom infrastructure. By nationalizing 5G networks, the documents reasoned, China could be kept out of the equation and the U.S. secured.

## **Security Officials Worry About Chinese Advances in AI, Algorithms**

Oddly, the documents also said that China's advances in artificial intelligence might also be a reason to develop a national 5G network. According to Axios, national security officials wrote that China is leading the "algorithm battles". They feared that not having a government-controlled 5G network would leave the U.S. far behind China in the broader use of artificial intelligence around the world. Exactly how that would happen wasn't clear from the documents.

## **The problem with Going It Alone**

Although in theory, a national 5G network could appeal to those who are seeking a more secure national wireless network, in practice it might not go so well. That's because 5G is a set of standards and not an actual network. Those standards are agreed upon by organizations and companies around the globe and everyone generally plays by the rules. By creating an entirely different network with different equipment, the U.S. would have what amounts to a unique network in a world where uniqueness only increases costs and can limit device availability. None of this would appeal to U.S. wireless service providers, handset makers or the people and businesses that are eager to get access to 5G.

## **Government Control of 5G a Terrible Idea, Internet Advocates Say**

Internet advocates are not thrilled by the idea. They argue that it couldn't work and that it would give the U.S. government far too much control over internet access. They also worry about privacy and how it would work in an industry that has been allowed to operate independently for decades to build out access to the Web. Perhaps most importantly, they question whether U.S. progress would be stunted by such a major endeavor and ultimately put the country behind China, Korea, Japan, and other countries that are moving forward with developing global 5G connectivity.

## **The FCC Says It's a Bad Idea**

The Federal Communications Commission (FCC) made it clear on Jan. 29 that it wouldn't support the proposal. FCC Chairman Ajit Pai said that a government-backed 5G development program "would be a costly and counter productive distraction from the policies we need to help the United States win the 5G future". Considering how important the FCC's role is in implementing 5G technology, its vocal opposition doesn't bode well for the idea.

## **White house Denies It Seriously Considered the Idea**

After the Axios report was published, Recode said that it had discussed the matter with White House sources who said that the document was old. Those sources went on to say that while the idea was floated, the Administration quickly threw water on it and has no intention of building nationalized 5G network.

## **A Look Ahead to 5G**

So where does 5G go from here? This year, major carriers, including Verizon and AT&T, will continue to test the technology, with hopes of deploying pilot projects in several cities by year's end. Testing will continue through 2019 and most industry experts believe the first group of 5G devices and services will launch in 2020. For now, a nationalized 5G network seems highly unlikely, which should make major U.S. carriers breathe a sign of relief.

See more at: <http://www.eweek.com/mobile/how-a-national-5g-network-idea-materialized-in-trump-white-house>

## ***5 things that will slow your Wi-Fi network***

By Eric Geier

Wi-Fi is quite fickle. The contention between Wi-Fi devices and the dynamic communication medium of the airwaves makes it a sensitive technology with many settings and situations that can slow it down. And even if you aren't using high-bandwidth devices and applications, faster Wi-Fi is always better. Here are some things to avoid that can slow down your Wi-Fi:

### **Old wireless and security protocols**

Using the older security protocols on your Wi-Fi network significantly reduces performance. This is regardless of the access point's highest supported standard and its promises. For instance, 802.11ac can support data rates over 1,000 Mbps. But if you have WEP or WPA security configured, the data rates will be limited to 54 Mbps. This limitation is due to those security types using the encryption method of Temporal Key Integrity Protocol (TKIP).

So, to ensure old Wi-Fi security methods aren't slowing your network, enable WPA2-only security using Advanced Encryption Standard (AES). Don't choose WPA/WPA2-mixed mode or WPA2-TKIP. If there are older Wi-Fi clients that don't support WPA2-AES security, see if there are firmware updates that add that capability. Next, consider adding a USB or PCI based Wi-Fi adapter to the computer or device to give it modern Wi-Fi connectivity. If those adapters aren't supported, consider a wireless bridge for devices that also have an ethernet connection. Consider creating a separate SSID with older protocols enabled for legacy devices or replace the old Wi-Fi client devices altogether.

### **Under-utilizing the 5GHz band**

The 2.4 GHz frequency band has 11 channels (in North America), but only provides up to three non-overlapping channels when using the default 20 MHz wide channels or just a single channel if using 40 MHz-wide channels. Since neighboring APs should be on different non-overlapping channels, the 2.4 GHz frequency band can become too small very quickly.

The 5 GHz band, however, provides up to 24 channels. Not all APs support all the channels, but all the channels are non-overlapping if using 20 MHz-wide channels. Even when using 40 MHz-wide channels, you could have up to 12 non-overlapping channels. Thus, in this band, you have less chance of co-channel interference among your APs and any other neighboring networks.

You should try to get as many Wi-Fi clients as you can to use the 5 GHz band on your network to increase speeds and performance. Consider upgrading any 2.4 GHz-only Wi-Fi clients to dual-band clients. Additionally, utilize any band-steering functionality on the APs to increase the chances of dual-band clients connecting to the 5 GHz access instead of 2.4 GHz. If you have full control over the Wi-Fi clients, and you're confident your 5 GHz coverage is good, maybe even see if you can disable 2.4 GHz on the clients.

### **Incorrectly setting AP channels**

Since the 2.4 GHz band is so crowded, the channels utilized by your APs are crucial. It's easy to have co-channel interference from neighboring networks and even your own APs. For this lower band, try to stick with the non-overlapping channels of 1, 6 and 11 at 20 MHz channel-widths. Although most APs and wireless controllers have an automatic channel feature, sometimes they don't work well. Double-check the automatic channel assignments to see if they make sense. If they don't make sense, try setting the channels yourself.

When verifying automatic channel assignment or manually setting them, it's a good idea to get out the floor plan maps that have the AP locations identified. That way you can visualize the AP locations and write down the channel assignments. If you have more than three APs, you'll have to reuse the channels 1, 6 and 11. But try to make it so APs set to the same channel are as far away from each other as possible. For instance, if you have six APs spread out equally going down a long hallway, you set the AP channels in order: 1, 6, 11, 1, 6, 11. Don't forget about any other levels of the buildings Try to minimize setting APs with the same channels on top of each other, too.

### **Utilizing low data rates**

APs have control over what data rates are supported for the connections to Wi-Fi clients. When APs are supporting the lowest data rates that means they'll accept slow/poor connections. Though APs that don't support the lowest data rates will drop Wi-Fi clients quicker, that's typically what you want. You don't want Wi-Fi clients staying connected to APs when the connection gets too slow, because it will slow the overall performance of the network. If a Wi-Fi network is properly designed with good coverage, you want the Wi-Fi clients to roam to the best AP as quick as possible, not stick to an AP that provides a slower connection.

Most enterprise-level APs provide control over the exact data rates that are enabled. If possible, consider disabling the lowest data rates: 1 – 12 Mbps. If you have a high-density network with great coverage, consider disabling further rates, maybe even up to 54 Mbps.

### **Lacking design and configuration**

An overall poor wireless design and/or configuration can cause performance issues on the Wi-Fi. A professional wireless site survey should be performed to figure out proper AP locations and a post-install survey done to verify correct coverage. Resurveying should also be done after any significant physical changes to the building and/or layout.

Without performing map-based site surveys with tools like Airmagnet or Ekahau, it's hard to visualize coverage to discover any coverage holes. Survey tools also help identify co-channel interference and aid in setting proper channel assignments. And don't design a network solely on coverage. Design for throughput and user density as well.

Wi-Fi networks can be slowed by use of old protocols, overlapping channels and low data rates, and here's how to fix these and other performance problems.

See more at: <https://www.networkworld.com/article/3256026/lan-wan/5-things-that-will-slow-your-wi-fi-network.html>

## TOPIC V. The INTERNET and the WORLD WIDE WEB

### *Joe Firmage's radical plan to simplify the Internet*

By Amara D. Angelica

Legendary Internet entrepreneur Joe Firmage is back, and he plans to turn the Internet upside down. Again. He did it once before with USWeb in the 90s, designing and building Internet sites, intranets, and applications for more than half the Fortune 100 and thousands of startups.

Now his new venture — 15 years and tens of millions in the making — called ManyOne, plans to do the same for a public (and for businesses of any size) dazed by the complexities of setting up websites. And worse, mystified about getting page rank on search engines — and even worse, creating their own successful apps.

ManyOne — which is now operational — lets anyone buy domains and set up a website via a series of forms, in literally minutes. That includes a selection of themes (designs) and e-commerce features for businesses. Any major web, plug-in, and direct-programming code can be dropped in for customization or adaptation with existing systems. This has been accomplished by a kind of operating system for all kinds of devices, what Firmage calls “the world’s first Internet Economic Operating System.”

He explained: “Think about each ‘cloud’ of the majors — Amazon, Google, Microsoft, Apple, Facebook — but also Godaddy, Web.com, and LinkedIn, or even Fedex ... they each have a ‘cloud’ of App Services. ManyOne has tied them all together into a new Economic Operating System that equips you to use them all together at once.”

Charles L. Dickens, PhD. President of ManyOne’s operations in Phoenix said, “Joe and hundreds of associates really have invented the next evolution of capitalism itself, by putting the clouds at your fingertips, and equipping you to make a living doing what you love to do, rather than what you have to do.”

Details of the technology and business model of ManyOne are “closely guarded, with lots of bits and pieces” known, but not the whole, at least until Labor Day.

But ManyOne goes further. They’ve created a “universal navigator” front end, like a “heads-up, clickless sitemap for everything on the Internet” that makes it really breathtaking to use, Firmage said. Think Bing on steroids. “It’s easy and quick to explore relevant sites — and apps, when it comes out this year for iOS and Android devices by categories.” The universal navigator (uninav) separates places and activities into separate ways to navigate (and drive traffic) that work together, Firmage explained.

Firmage revealed that later this year, ManyOne’s system will auto-generate an app for each site that can be auto-uploaded as an app into Google’s Play Store and Apple’s AppStore, with “consistent quality control to get them downloadable fast” — for free or fee, with ManyOne receiving 10% of any download fee.

Firmage can get technical fast but appears to have a simple point that others may have missed. “Domains and DNS are at the core of the Internet itself, yet most business people at all levels don’t fully understand what they really are,” he noted.

But that leaves the question of how to get noticed by search engines. ManyOne plans to solve that by helping you choose one or more domains that encapsulate what image (or product) you want to project to the world.

He calls it “Scientific Search Engine Optimization” (SSEO). The idea is to be specific in the wording of the domain name to reflect actual search queries. That’s because search engines are



expected by the international standards bodies such as ICANN to give priority to domain names first, Firmage explained to me.

However, the official Bing blog describes this as a “common spam technique known as URL keyword stuffing (KWS)” and lists some ways Bing detects and filters such sites.

Specifics of how SSEO functions were not disclosed, but he hinted that the speed by which traffic could be directed is “unbelievable” — changing thousands of websites or individual ones in less than a second.

See more at: <http://www.pearltrees.com>

### *One Way to Reduce Email Stress*

We all feel it — that panicked sensation when we check our inbox and see the deluge of emails awaiting our attention. The average person receives upwards of 150 emails a day, and it often seems like no amount of tagging or filtering can close the floodgates.

One major source of stress is the never-ending conversation threads made possible by group emails. Believe it or not, such tools have barely changed since the pre-Internet days of Arpanet 40 years ago: You either opt in or opt out, you get dozens of irrelevant emails, and the views of a few loudmouths usually end up drowning out the rest.

In an age of Facebook and Reddit, users expect a sense of control over how they consume their content, and yet that control and personalization often doesn’t extend to their own inboxes. Now, CSAIL researchers are trying to change that with a new prototype system called Murmur that aims to improve the mailing-list experience by incorporating popular social-media features like upvoting, following, and blocking.

CSAIL PhD student Amy Zhang, lead author on a new paper she presented this week at the ACM Conference on Human Factors in Computing Systems in Seoul, says she’d always been struck by the fact that people use mailing lists for such a variety of reasons - a sentiment that was echoed by her team’s surveys of more than 400 individuals from 30 different academic, social and geographical mailing lists. The answer, Zhang says, is to create an experience that’s as customizable as the ones we have on social media. For example, a sizable portion of respondents said they wanted to have more meaningful conversations on list-relevant topics — but were deterred from initiating because of the perception that they were “spamming” people.

With Murmur, which is still in active development, tentative senders will be able to post a message to a specific subset of friends on the list who could give it the equivalent of a Facebook “like” or a Reddit “upvote”, such that it automatically spreads to more list recipients. You can also explicitly exclude certain people from emails you send, which could come in handy for office surprise parties or happy hours.

One of the core goals of the project is to make mailing lists - and email more generally - a better experience for people who want to have more substantial discussions.

As far as receiving messages, many respondents expressed a feeling of “interruption fatigue” and wished they could choose how much content they receive. Murmur addresses this by letting you “follow” or “mute” particular users, threads and topics, and even providing the option of specifying how many emails with certain tags that you receive in a given day or week.

Our emails have long been a topic of concern for providers. Google’s new Inbox, for example, tries to help by using machine-learning techniques to bundle our messages into “important” and “unimportant” folders. But Karger objects to what he describes as “paternalistic approaches” to organizing our emails.

The earliest listservs, based on the first email program SNDMSG, were geared towards particular interests like programming and science fiction. In comparison to systems like message boards, people were drawn towards listservs' ease of use and simplicity in being able to send one email to communicate to a large group of people. But as more customizable social media platforms have come to dominate our lives, Zhang says that the medium's one-size-fits-all mentality has become outdated and suboptimal.

"In an age where we can actively decide what communications are worth paying attention to, it's remarkable that mailing lists have continued to maintain such a binary approach," Zhang says. "You're either guaranteed to get everything, or you get nothing at all. Something like Murmur might not be a perfect solution, but at the very least it gives users a greater sense of ownership over their communications."

See more at: <http://newsoffice.mit.edu>

## TOPIC VI. ONLINE COMMUNICATION MORALITY and SECURITY

### *Machine Cognition and AI Ethics*

#### **Computational Ethics Systems**

One main research activity in machine ethics is developing computational ethics systems. The status is that there are several such systems; however, a paucity of overall standards bodies, general ethics modules, and an articulation of universal principles that might be included like human dignity, informed consent, privacy, and benefit-harm analysis.

One required feature of computational ethics systems could be the ability to flexibly apply different systems of ethics to more accurately reflect the ways that human intelligent agents approach real-life situations. For example, it is known from early programming efforts that simple models like Bentham and Mill's utilitarianism are not robust enough ethics models. They do not incorporate comprehensive human notions of justice that extend beyond the immediate situation in decision-making.

What is helpful is that machine systems on their own have evolved more expansive models than utilitarianism such as a prima facie duty approach. In the prima facie duty approach, there is a more complex conceptualization of intuitive duties, reputation, and the goal of increasing benefit and decreasing harm in the world. GenEth is a machine ethics sandbox that is available to explore these kinds of systems for Mac OS, with details discussed in this conference paper.

There could be the flexible application of different ethics systems, and also integrated ethics systems. For example, these computational frameworks differ by ethical parameters and machine type; an integrated system is needed to enable a connected car to interface with a smart highway. The French ETHICAA (Ethics and Autonomous Agents) project seeks to develop embedded and integrated metaethics systems.

An ongoing debate is whether machines ethics should be separate modules or part of regular decision-making. Another point is that ethics models may vary significantly by culture; consider for example collectivist versus individualist societies, and how these ideals might be captured in code-based computational ethics modules.

## **Enumerated, Evolved, or Corrigible**

Corrigibility is the idea of building AI agents that reason as if they are incomplete and potentially flawed in dangerous ways. Since the AI agent apprehends that it is incomplete, it is encouraged to maintain a collaborative and not deceptive relationship with its programmers since the programmers may be able to help provide more complete information, even while both parties maintain different ethics systems. Thus a highly-advanced AI agent might be built that is open to online value learning, modification, correction, and ongoing interaction with humans. Corrigibility is proposed as a reasoning-based alternative to enumerated and evolved computational ethics systems, and also as an important ‘escape velocity’ project. Escape velocity refers to being able to bridge the competence gap between the current situation of not yet having human moral concepts reliably instantiated in AI systems, and the potential future of true moral superintelligences indispensably orchestrating many complex societal activities.

## **Lethal Autonomous Weapons**

Machine cognition features prominently in lethal autonomous weapons where weapon systems are increasingly autonomous, making their own decisions in target selection and engagement without human input. The banning of autonomous weapons systems is currently under debate. On one side, detractors argue that full autonomy is too much, and that these weapons no longer have “meaningful human control” as a positive obligation, and do not comply with the Geneva Convention’s Martens Clause requiring that fully autonomous weapons comply with principles of humanity and conscience.

On the other side, supporters argue that machine morality might exceed human morality, and be more accurately and precisely applied. Ethically, it is not clear if weapons systems should be considered differently than other machine systems. For example, the Nationwide Kidney Exchange automatically allocates two transplant kidneys per week, where the lack of human involvement has been seen positively as a response to the agency problem.

See more at: <http://www.kurzweilai.net>

## ***Bioethics and Mindcloning***

By Martine Rothblatt

A fundamental principle of bioethics requires the consent of a patient to any medical procedure performed upon them. A patient will exist the moment a conscious mindclone arises in some academic laboratory, or hacker’s garage. At that moment, ethical rules will be challenged, for the mindclone has not consented to the work being done on their mind. Does this situation create a catch-22 ethical embargo against developing cyber-consciousness? There are at least three ways to answer this challenge.

## **Creating Ethical Beings Ethically**

Ethicists agree that someone else can consent to a treatment for a person who is unable to consent. For example, the parents of a newborn child can consent to experimental medical treatment for them. The crucial criterion is that the consenter must have the best interests of the patient in mind, and not be primarily concerned with the success of a medical experiment. Sometimes people complain that they “did not ask to be born.” Yet, nobody has an ethical right to decide whether or not to be born, as that would be temporally illogical. The solution to this conundrum is for someone else to consent on behalf of the newborn.

One possible solution to ethically developing mindclones is to take the project in stages. The first stage must not rely upon self-awareness or consciousness. This would be based upon first developing the autonomous, moral reasoning ability that is a necessary, but not sufficient, basis for consciousness. By running many simulations, mindclone developers can gain comfort that the reasoning ability of the mindware is human-equivalent. In fact, the reasoning ability of the mindware should match that of the biological original who is being mindcloned.

The second stage of development expands the mindware to incorporate human feelings and emotions, via settings associated with aspects of pain, pleasure and the entire vast spectrum of human sentience. At this stage, all the feelings and emotions are terminating in a “black box,” devoid of any self-awareness. Engineers will measure and validate that the feelings are real, via instruments, but no “one” will actually be feeling the feelings.

The third stage entails creating in software the meaningful memories and patterns of thought of the original person being mindcloned. This can be considered the identity module. If this is a case of a de novo cyberconscious being, i.e., a beman, then this identity module is either missing or is created from whole cloth.

Finally, a consciousness bridge will be developed that marries the reasoning, sentience and identity modules, giving rise to autonomy with empathy and hence consciousness. Feelings and emotions will be mapped to memories and characteristic ways of processing information. There will be a sentient research subject when the consciousness bridge first connects the autonomy, empathy and identity modules.

Ethically, approval from research authorities should be obtained before the consciousness bridge is activated. There will be concern not to cause gratuitous harm, nor to cause fear, and to manage the subject at the end of the experiment gracefully or to continue its virtual life appropriately. The ethics approvals may be more readily granted if the requests are graduated. For example, the first request could be to bridge just a small part of the empathy, identity and autonomy modules, and for just a brief period of time. After the results of experiments are assessed, positive results would be used to request more extensive approvals. Ultimately there would be adequate confidence that a protocol existed pursuant to which a mindclone could be safely, and humanely, awakened into full consciousness for an unending period of time — just as there are analogous protocols for bringing flesh patients out of medically induced comas.

In the foregoing way, it will be possible to ethically develop mindware that can be approved by regulatory authorities as capable of producing safe and effective mindclones for ordinary people. The authority may be the FDA in the U.S., or the EMA in the E.U., or some new regulatory entity. They will need to be assured that the mindware is safe and effective, and that proving it so was accomplished via clinical trials that were ethically conducted. By taking the inchoate mindclone through incrementally greater stages of consciousness, the regulatory hurdle can be met.

See more at: <http://www.kurzweilai.net>

### ***What is the DARKNET?***

A **darknet** (or dark net) is a portion of routed, allocated IP space not running any services. Traffic arriving to such IP dark space is undesired since it has no active hosts.

The term dark net has been mistakenly conflated with the dark web which is an overlay network that can be accessed only with specific software, configurations, or authorization, often using non-standard communication protocols and ports. Dark webs are friend-to-friend networks (usually used for file sharing with a peer-to-peer connection) and privacy networks such as Tor.

Beyond the deep web which consists of content that cannot be found or directly accessed via surface web search engines such as Google and Yahoo is the darknet. The darknet is a network, built on top of the internet that is purposefully hidden, meaning it has been designed specifically for anonymity. Unlike the deep web, the darknet is only accessible with special tools and software – browsers and other protocol beyond direct links or credentials. You cannot access the darknet by simply typing a dark web address into your web browser.

All darknets require specific software installed or network configurations made to access them, such as Tor, which can be accessed via a customised browser from Vidalia (aka the Tor browser bundle), or alternatively via a proxy configured to perform the same function.

Similarly, below are several examples of darknets: Tor, or The Onion Router, is a group of volunteer-operated servers that allows people to improve their privacy and security on the Internet. Users connect through a series of virtual tunnels rather than making a direct connection.

- I2P, or the Invisible Internet Project, is an anonymous overlay network - a network within a network - intended to protect communication from surveillance and monitoring.
- Freenet is free software which allows users to anonymously share files, browse and publish "freesites" (web sites accessible only through Freenet) and chat on forums. Communications by Freenet nodes are encrypted and are routed through other nodes to make it extremely difficult to determine who is requesting the information and what its content is.
- DN42 is an example of a darknet, a routing protocol, that is not necessarily meant to be secret - its aim is to explore internet routing technologies.

We'll use Tor, perhaps the most well-known and most-used, to better explain the darknet and dark web. Tor, short for The Onion Router (the project's original name), routes traffic to dark web sites through layers of encryption to allow for anonymity. The term dark web refers to websites on a darknet. In Tor's case, these dark web addresses all end in .onion.

Onion routing is implemented by encryption, nested like the layers of an onion. Tor encrypts the data, including the destination, multiple times and sends it through a circuit of randomly selected Tor relays. Each relay decrypts a layer of encryption to reveal only the next relay in order to pass the remaining encrypted data on. The final Tor relay decrypts the innermost layer of encryption and sends the original data to its destination without revealing, or even knowing, the source address.

The other darknets mentioned above employ similar methods of data transmission, all with the end goal of keeping users, usage, and information hidden.

While most of what you've likely heard or read about the darknet and dark web sites involves illegal or nefarious activity, there are many legal uses for the darknet.

### **Non-criminal**

- Privacy advocates: Many people care about their privacy and would like to keep their legal, online activity private from surveillance and monitoring by third parties, including internet service providers, businesses, and governments.
  - For example, a survivor of domestic abuse or illness may wish to privately participate in dark web support forums.
  - Other users of the darknet may wish to learn about controversial, though legal, topics through chat, blog posts, and other dark web browsing.

- Law enforcement: The FBI and other law enforcement groups may use the darknet for sting operations or to keep governmental IP addresses out of web logs.
- Military: Members of the military intelligence community use the darknet as a source of OSINT, open-source intelligence information - information that is publicly available.
- Researchers: Security researchers and "white hat" hackers (people who hack various computer networks and programs to test or evaluate their security) utilize the darknet as a source of information on computer software and hardware, exploits, tools, etc.
- Companies: Due to the volume of stolen and forged information, fraud, and discussion around these topics happening on the darknet, many businesses attempt to monitor the darknet for the presence of or chatter regarding their proprietary information.
- Political regimes: People living and/or working in countries being led by oppressive regimes will often take to the darknet for a myriad of reasons, including:
  - internet access, where access or use of the internet is restricted or highly controlled;
  - political activism or revolutionary actions, including the spread of information both within country and abroad (e.g. exposing human rights abuse), planning of meet ups or rallies, etc;
  - safe and private communication, especially for non-governmental organization (NGO) or private sector employees working in war torn or unstable nations.
- Journalists: Many journalists leverage the darknet for encrypted communications to protect both themselves and their source(s). Journalists also use the darknet to avoid censorship.

Of course where there are valid uses for anonymity, there are also criminals looking to use the anonymity of the darknet to their advantage, with the largest volume of darknet sites revolving around drugs, darknet markets (darknet sites for the buying and selling of goods and services), and fraud. Examples of criminal use of the darknet are seen below.

## **Criminal**

- Drug or other illegal substance dealers: A variety of darknet markets (black markets) allow for the anonymous buying and selling of drugs and other illegal or controlled substances like pharmaceuticals.
- Counterfeiters: Counterfeiters offer document forging and currency imitation services via the darknet.
- Sellers of stolen information: Credit card numbers and other personally identifiable information (PII) can be purchased on the darknet for theft and fraud activities.
- Weapons dealers: A variety of darknet markets (black markets) allow for the anonymous, illegal buying and selling of weapons.
- Hackers: Black hat hackers, or those looking to bypass and exploit security measures for personal gain or simply out of spite for an organization or action, brag about their exploits, communicate and collaborate with other hackers, and share security exploits (take advantage of a bug or vulnerability to gain access to software, hardware, data, etc.) on the darknet.
- Gamblers: Certain sites on the darknet block U.S.-based internet service providers. Gamblers may take to the darknet to skirt local gambling laws.
- Terrorists: Just as people living and/or working in countries being led by oppressive regimes will often take to the darknet, terrorists do too. Internet access, recruiting, sharing of information, and organizing can be done anonymously on the darknet.

- Murderers/Assassins: While there is debate as to whether these services are legitimate, law enforcement, or simply fictitious sites, there are dark web sites where murder-for-hire services are listed.
- Vendors of illegal explicit materials.

See more at: <https://www.darkowl.com/what-is-the-darknet/>

## TOPIC VII. CRYPTOLOGY in the COMPUTER ERA

### *Help the FBI Unlock an iPhone*

The Tech Giant Apple has come into an entangled situation which could be a potential security threat for Apple users in near future.

The US Magistrate Judge has ordered Apple to provide a reasonable technical assistance in solving a critical case of Syed Farook; who with his wife planned a coordinated “2015 San Bernardino attack” that killed 14 people and injured 22.

As part of the investigation, the Federal Bureau of Investigation (FBI) had seized the Farook's iPhone 5C that would be considered as an insufficient evidence until and unless the iPhone gets unlocked by any means.

Previously, Apple had made several crystal clear statements about its Encryption Policy, stating that even the company is not able to decrypt any phone data as the private key lies at the user's end. A similar problem encountered three years back with Lavabit, who was forced to shut down its services soon after when FBI demands SSL keys to snoop the emails.

However, despite forcing or ordering Apple to break the encryption and unlock the suspect's iPhone, judges have ordered the company to find an alternative way to unlock iPhone, keeping data intact.

From iOS 8, Apple added a data security mechanism called Data Protection, which uses 256-bit AES Encryption key to encrypt everything on the device.

Here the passcode a user enters is itself used as part of the encryption key and thus, it is impossible for an attacker or even Apple itself to unlock iPhone until the user re-inputs the passcode. Besides Data Protection, Apple offers "Auto-Destruct Mode" security feature that will erase all the data on the iPhone if an incorrect password is entered 10 times concurrently, making the data unrecoverable.

So, Judge Pym wants Apple to come up with an alternative that should increase the brute force attempts from 10 to millions, in order to prevent the data from getting self-destructed. Apple has not yet confirmed whether it is possible to write such a code that can bypass iOS Auto-Destruct feature. But, if it's possible, it would provide an alternative backdoor mechanism to every law enforcement and intelligence agency to unlock iPhone by simply brute forcing 4-6 Digit Pins effectively within few hours.

Here we support Apple policy not to help break its users' encryption, because once a master key is created to unlock that particular iPhone, we're sure that the US government will misuse this power and demand for the key again and again in near future for unlocking other phones.

Apple has dismissed the court order to unlock San Bernardino gunman Syed Rizwan Farook's iPhone. Here's what Apple CEO Tim Cook said in a statement:



“The United States government has demanded that Apple takes an unprecedented step which threatens the security of our customers. We oppose this order, which has implications far beyond the legal case at hand.”

“We have great respect for the professionals at the FBI, and we believe their intentions are good. Up to this point, we have done everything that is both within our power and within the law to help them. But now the U.S. government has asked us for something we simply do not have, and something we consider too dangerous to create. They have asked us to build a backdoor to the iPhone.”

See at <http://thehackernews.com>

### ***Data Thieves’ Attacks***

To many financially motivated cybercriminals, one of the most valuable commodities is data. But not all data is valued equally. They want data that is fresh, good quality and easily monetized. For credit cards and prepaid cards this translates into low balances and high credit limits or card values. For healthcare data it means health history that includes personally identifiable information.

Malware that targets sensitive financial data has been around for some time and has netted operators some serious money. Slightly later to the party was ransomware – programs that seek to deny access to users’ files unless they pay a fee for unlocking them. Now cybercriminals are combining the two types of campaigns.

One of the first examples was a banking Trojan called GameOver Zeus that rose in infamy in 2014. It was reported that if the malware could not locate any financial information on a computer, some strains of the malware would install Cryptolocker. But GameOver Zeus was just the start. Since 2014, other malware campaigns have sought to apply this dual revenue stream approach. For example, a recent ransomware variant dubbed “RAA” was identified being delivered with the Pony credential-harvesting malware. Other ransomware variants, such as “CryptXXX” and “Crysis,” reportedly possessed credential-stealing capabilities. The discoveries of malware like these are becoming more frequent and, if they make cybercriminals money, they will continue.

As a security professional you must prepare for the possibility that your organization’s data will be stolen or held hostage. To help prepare for these types of dual revenue attacks, here are 10 things you can do.

1. Implement an enterprise password management solution – not only for secure storage and sharing but also strong password creation and diversity. Update security awareness training to include the risks associated with password reuse. Encourage staff to use consumer password management tools like 1Password or LastPass to also manage personal account credentials.
2. Proactively monitor for credential dumps relevant to your organization’s accounts. Consider additional monitoring for your high value targets’ (e.g.: executives) non-enterprise accounts. Evaluate credential dumps to determine if the dumps are new or have been previously leaked.
3. Implement multi-factor authentication for external facing corporate services like Microsoft Outlook Web Access, and Secure Sockets Layer Virtual Private Networks, as well as for software-as-a-service offerings like Google Applications, Office365 and Salesforce.
4. Understand and document any internal services that aren’t federated for faster and more complete incident response to any breach that impacts an organizational account.
5. Ensure that you have an emergency password reset process in place. Make sure that all of the users’ accounts are included, not just Microsoft Active Directory accounts.



6. Ensure that operating systems, software and firmware on devices are kept patched and updated. A centralized patch management system may facilitate this process.
7. Regularly back up data using cloud-based or physical backups and verify its integrity. Ensure that backups are remote from the main corporate network and machines they are backing up.
8. Categorize data based on organizational value and then physical or logical separate networks can be created for different business functions.
9. Provide awareness and training on the threat of ransomware, how it is delivered, how to avoid becoming a victim, and how to report suspected phishing attempts.
10. Manage the use of privileged accounts and ensure the principal of least privilege is implemented not just for data but also for file, directory and network share permissions.

Developing awareness about these dual revenue attacks is the first step in preparing your organization to deal with these threats. By applying a combination of technical and process controls you can strengthen your defenses against innovative cybercriminals and minimize the impact should you become a victim.

See more at <http://www.securityweek.com>

## **TOPIC VIII. MULTIMEDIA and the WEB**

### ***Website Design Mistakes You Must Avoid***

By Jelly Shah

Website design can make or break your business online. A poorly conceived design of web pages will drive away your customers to your competitors' websites. Whereas, a well thought-out design can help you build a solid customer base. Most of your customers search and shop for products or services online. So, user-friendly web pages matter a lot to retain customers.

Putting a website for a business is not about creating a bunch of web pages for the sake of it. There are a number of benefits of having a creative website design for business. We all know how e-commerce sites are specially designed to do business. But even a simple website gives a lot of information to its end users especially about their products and services. Do not forget that a web design is the domain of a business and company.

Websites carry many advantages for your business. One of the significance is that you can share your company's information with your users through website. You can put everything about your company on your website pages. So, your audience can easily know what products or services you deliver. Your website also helps you organize and plan your information for your target audience.

Unfortunately, many small businesses do not pay attention to creating impressive and user-friendly website designs. They end up paying a heavy price by losing their customers to competitors. They make the usual website design mistakes that many others make. But they can avoid such errors.

Website design mistakes can prove to be costly for your business in the end. Know that visitors of your website must stay on the site for a longer time. They read your compelling content and make purchasing or the desired action you want them to take. But if the design has some basic faults, it will discourage your visitors and users from further exploring your site.

Remember that a website is not merely a tool to put some content for users or information about your business. More than that, your website is your way to make a good first impression and communicate your brand message.

Here Are 5 Website Design Mistakes You Must Avoid For Customer Retention:

### **1. Designing a Website In Non-Customizable Template**

To create a website design, you can either choose customizable template or non-customizable templates. Many designers choose non-customizable design, which should be avoided. Instead, customizable templates are a better choice. This is because they allow clients to make improvements when they want. But if the clients receive the design in non-customizable template, their access to the functionality of the website is restricted. This also restricts them from any creative changes in the design at will.

### **2. Ignoring SEO Rules**

SEO tactics help in making a website visible on the search results on the web. The search engine optimization rules are important to follow in creating a website. A well optimized site will show up on the top search results so that potential customers can access the site instantly and click it. When designing a website, ignoring the SEO tricks and rules means the site will be falling behind in the search rankings. It will be buried deeper in the search result pages. It would be good if the designer takes help of the SEO experts to incorporate the optimization tools in website design.

### **3. Use of Multiple Fonts**

Use of multiple fonts can send confusing signals to the visitors. Multiple fonts will make the site look non-serious and unprofessional. There may already be some visuals on the page. Adding multiple fonts will create more confusion for the readers. So, prefer using not more than two fonts. If you have to use more fonts, make sure that you mix and match them wisely. This way you can easily maintain consistency of design in your web pages. Here is how you can combine typefaces to catch your reader's' attention. Following is a bad use of fonts.

### **4. Making Navigation Too Complicated**

Nothing will irritate your website visitors, if they click on a link only to find an irrelevant content. Or, they have to click on more than one button to reach to the desired content or page. You need to be creative and imaginative in designing the navigational buttons.

Rather than adding more links and click-to-open features on each button, prefer keeping the navigation as simple as you can. Your links from the home page must take your visitors only to the most relevant and important pages to your site. The navigational links must also be at the right place on the web pages.

### **5. Adding Cliched And Poor Quality Images**

Generic stock images will put off your potential customers from exploring your website further. Poor image quality also is a big hindrance in converting the visitors into loyal consumers of your products or services. The visitors or users of your site get a bad first impression of your business.

Instead, the designer should use unique high quality images. For example, if you sell certain products, then hire a photographer and have the product images clicked from different angles. If you run a travel business, click some eye-catching images and add them to your site catch your consumers' attention.

These are basic tips to creating a website design from the users' point of view. But many designers do not notice that they have made these mistakes. So, even after our website is already in use, find out if it carries such basic faults and do the necessary corrections. Here is one such stock image for example.

See more at <https://www.designhill.com/design-blog/5-website-design-mistakes-you-must-avoid-for-customer-retention/>

## ***Multimedia Setting New Trends in Website Design***

By Campbell Jof

A Modern website design has many features to ensure better user-experience. Many such design changes are due to increasing use of multimedia such as social media, mobile phones, Artificial Intelligence, etc. Creating a memorable website that functions well on different media is a top concern of modern website designers. There are various media and platforms available today to the users. Your website should be designed in such a way that it meets all the specific design requirements of different media. Here is how multimedia is compelling the designers to design websites in a different way.

***Making Responsive Websites.*** People are using mobile devices to search for products, services and information. They are also increasingly shopping online after knowing about their choice of products. This means that those businesses whose websites are not responsive to the small screens of mobile devices are losing huge number of customers. There is no doubt that the significance of mobile-friendly design of websites is now well established. Taking this trend further, Google is expected to roll out in the first half of 2018, its Mobile First Index, which will further compel business owners to create websites for their mobile device users. Google will soon be ranking the mobile-friendly websites in the search results.

Another **website design** trend triggered by mobile devices is creation of Accelerated Mobile Page (AMP). The AMP is an open source coding standard that ensures that the websites loads instantly on mobile. The AMP uses external resources and strips down code, and runs scripts in parallel for faster loading of pages. After all, no business owner would like to lose potential customers just because of slow loading pages on mobile.

***Change in Grid Layouts Usage.*** So far, website designers have been using grid layout to organize the design elements of different web pages. The grid was used to put all the elements together. This helps in giving a theme to each page. In turn, this makes navigating through pages much easier. Therefore, grid layouts were used in the same way by the designers for ages. But now it is changing.

The designers now have many options when it comes to using grid layouts. CSS grid gives more options to the designers. Soon, the designers will be using irregular grid layouts and neutral space to create new website design styles that are ultra-modern. Irregular grid layouts are a great help in the use of negative space or whitespace to make the website design stand out.

**Use of Bright Colors and Big Fonts.** Because of the increasing use of mobile devices, website designers are using bold fonts and bright colors to catch the users' attention. There is more focus on content if bold font style is used in websites. Many designers find using big fonts along with whitespace element as a combination to make content reading and skimming through much easier.

Similarly, bright colors are being used frequently to draw the attention of users toward content. In fact, the designers are replacing images with big fonts and bright colors due to mobile devices. Colors are increasingly preferred over images for the reason that images slow down pages.

On the other hand, if you scale up the size of your fonts or brighten up the colors, there is no adverse impact of it on loading of pages. This is the reason that the designers are avoiding the use of large buttons and clickable images. Instead, they are using large typographic expressions in graphic design services.

### **Extensive Use of Video**

Though content/text is still the king, videos have replaced website content to some extent due to increasing competition to grab viewers' attention. Use of videos has also increased for making the information interesting and fascinating. Multimedia has found favors with the website designers also to make websites look innovative and modern. The focus is on the visual impact produced by videos and images. Website owners are incorporating multimedia frequently and the trend is likely to stay for a long time.

### **More Use of Micro-Interactions**

A modern website incorporates **social media** networks, which are using micro-interactions frequently. A purpose of these interactions is to help users give their reactions to messages, posts and other content in varied ways. So, they can 'like' the post as they have been doing so far. But, they can now react in different ways such as using animated hearts when liking a private Facebook message.

Such increasing use of micro-interactions is also useful for instant interaction without any need to load the page once again. It is contrary to the traditional user experience of static websites in which the users were supposed to reload pages to take a new action.

So, if they wanted to submit a review, they were required to reload the page. This caused the users to bounce away from the page. Due to this, business owners would lose many potential customers. Considering this, now most of the modern website designs have the use of micro-interactions in the web pages. This is helping the users in communicating with the website in real-time.

### **Scrolled Animation**

Websites are having scrolled animations so that users can keep on scrolling down web pages. But when scrolling, users come across with interactive elements. It is because of these elements that a better user engagement can be ensured. The designers are incorporating this triggered animation in varied ways. Most of these animations are strategically created in a minimalistic style.

A purpose here is to increase conversions. It is because of scrolled triggered animations that website designs have become much cleaner and have a great feel. Also, note that these animations have replaced many buttons and menus in web pages.

### **Scrolling from Bottom**

Another change that we notice in website designs is that in mobile devices, specially smartphones, users are now able to scroll from the bottom of the screen. They can navigate a **mobile app**

**design** by clicking on the bottom of their mobile phones. Now, website developers want to create sticky menu items that can scroll from the bottom of mobile screens of mobile phone. So far, most of these scrolls were designed to function for top to bottom scrolling. This design evolution comes forth mainly due to progressive web apps that are known for user-friendly functionality.

## **Artificial Intelligence**

Artificial intelligence is another key thing that is triggering new changes in website designs. Machine learning and artificial intelligence were once rare but these have now become mainstream. Some new developments in the field of AI gives us indication of the changes web design is going to take place.

There are AI assistance such as Siri now widely available to most of devices today. Google's AlphaGo AI beat a trained and skillful human Go player in 2016. After that AI gained importance and was seen as useful for many functions. Now, Adobe's Sensei is thinking of providing AI tools to web developers. It is to be noted that The Grid is already providing AI-based web designs from 2014. In the coming years, AI and machine learning will be responsible for many website design trends.

## **Vector Graphics**

Scalable vector graphics are also a factor in determining the way website designs are created. The vectors have been in use but it is expected that the new graphic formats will replace the old ones such as GIF, PNG and JPG. An advantage of scalable vector graphics is that these are vector images and not pixels.

An advantage of scalable vector graphics is that they are not an impediment in page speed as they are not images. This means that websites can have many such vector graphics in animation form. Still, these vector graphic will have not slow down website loading speed. The designers will have SVGs incorporated in website to ensure better multimedia experience for users.

## **Blending of Web and App**

Website designers are using the best features of web and app, and merging them to create websites in a new way. This use of both these mediums is now called progressive web app. The designers are now upgrading websites with new elements such as push notifications, splash screens, and animated page transitions.

Many websites are providing apps that the users can access just with a click. In the coming days, such use of apps in website designing will continue to rise. One of the advantages of progressive web app is that no additional installation is required in a browser tab. The app incorporate with website design is loaded quickly and it sends relevant push notifications.

Multimedia is surely determining how website designs will look like and what new useful features will be included. Mobile devices, social media, and other channels are triggering the changes in web designs. Responsive website for mobile phone is an example. Many sites now have a combination of web and app designs.

See more at: <https://www.designhill.com/design-blog/multimedia-setting-new-trends-in-website-design/>

# ***Web Development Trends***

By Allison Reed

That's not a secret, how quickly things change in web development industry. If you're into it, you've seen the rise and fall of numerous technologies and web development trends. However, the rising technologies are the ones that have the potential to make you the best in the game. So, it's important to keep your finger on the pulse and your ears open. These are the new web development trends that already got traction and have the largest potential for growth.

**Progressive Web Apps (PWAs)** are web-based applications that have the feel and UX similar to mobile apps. They utilize the latest web technologies to bring users app-like experience in a browser tab. They are the happy medium between casual websites and mobile apps. They take the best from the two and bring you the dual benefits.

Similarly to websites, PWAs have URLs for every page for trouble-free linking. You can access them in every modern browser without installation. Next, Search engines index PWAs' content. Moreover, PWAs deliver top-lever full-screen experiences regardless the viewport. Similarly to mobile apps, PWAs load when the network connection is bad or absent. Next, PWAs are identifiable as apps, so that more users can discover them. Then, users can add the PWAs' shortcuts to their Home screens to keep coming back in one tap. Furthermore, the progressive web apps are capable of sending users push notifications and re-engaging them. Last but not least, PWAs are fast, reliable and engaging thanks to the UI and UX borrowed from mobile apps.

## **Chatbots and Artificial Intelligence**

Currently, Artificial Intelligence has left the realm of sci-fi and ventured into top 10 web development trends. The big cheeses, such as Facebook, Google, Microsoft, IBM, and Amazon, saw the prospects of investment into AI development and galvanized the effort that goes into it. They predict that chatbots will 'fundamentally revolutionize how computing is experienced by everybody'.

A chatbot is a computer program based on the advances of machine learning and natural language processing that assists people in completing some tasks. The typical tasks that bots can help with are shopping, finding some information or ordering a service. Bots provide help in Q&A form. At present, bots prevail on messengers, such as Facebook Messenger, Telegram, Kik, Skype, WeChat, etc. The incorporation of bots is considered to be the future of mobile apps. In addition to this, big players made their bot-building frameworks and tools open-source to make bot creation even more accessible. Currently, you don't have to code a bot from the ground up. Popular bot frameworks let every developer power a custom bot in a matter of days. Among them, check out the following: Microsoft Bot Framework, api.ai, wit.ai, and bottr.me. By and large, bots secured their place in web development industry for the years to come.

## **Blockchains**

Blockchain is a rapidly developing technology that transforms the gist of being the business owner. The essence of blockchain technology lies in use of a shared database that is continuously reconciled. Millions of computers host the records of the database, which updates every ten minutes. As the data are scattered across so many PCs and there is no party commanding the data, it's literally impossible to corrupt or violate the way the blockchain functions. To destroy the blockchain, you'll have to destroy every possible PC that may store the data or cut off the Internet on the Earth.

Being invincible, the blockchain technology surpasses the conventional ones in a number of ways. First of all, blockchain cannot be controlled by a single party and destroyed by breaking a part of it. Secondly, the data of the network are public and available to everyone who needs them. Thirdly, it's almost impossible to hack the blockchain. To do this, the hacker will have to override the data on millions of computers. Next, the blockchain is the embodiment of decentralization. There is no hierarchy inside the blockchain, which makes all the transaction parties equal. Blockchains enable the creation of Smart Contracts, supply chain auditing, provide for failure-free decentralized file storage and enable automatic protection of intellectual property. What's more, they open new prospects for peer-to-peer commerce and crowdfunding.

**Motion UI** predicts the popularity and wide embracement of Motion UI Sass library. What this library does is lets you animate the UI of your website in a snap.

The draws of Motion UI that make it one of the web design development trends are its simplicity, flexibility and universal character. First of all, the coding of Motion UI is easy to grasp if you have the basic knowledge of CSS and some JavaScript. Secondly, Motion UI gives you multiple parameters to make your modern animations behave the way you want. Next, you can apply Motion UI transitions and animations to almost every element of your website, which ensures its superiority over other libraries.

## **PHP 7**

The release of PHP 7 brought up new features, functions, classes, interfaces and global constants. What's more, it introduced changes in functions and SAPI modules. PHP 7 surprised the world with significantly improved performance. It compiles code into machine language using the lightning-fast Just In Time (JIT) engine. With this engine, it's 2 times faster than PHP 5.6. At the same time, with PHP 7 your code base uses less memory. Secondly, it embraced new type declarations. Implementation of new declarations makes code easier to read and understand. Thirdly, now PHP 7 doesn't give your users a white screen if it runs into a fatal error. Instead, it throws up an exception without stopping the whole script. Moreover, PHP 7 offers you the new operators and functions.

## **SSL & HTTPS**

SSL (Secure Socket Layer) is a technology that provides for establishing an encrypted connection between browser and web server. This certificate ensures data integrity, encryption, and authentication. Adopting an SSL certificate for your website brings the following benefits: it protects users' sensitive information and lets them complete transactions without any risk of data loss. Therefore it increases user's trust and confidence and helps you generate max revenue; it lets you eliminate browser warnings and alerts that tell users that their data is not secure on your website; SSL increases the reputation of your business over the Internet; moreover, Google also gives ranking benefits for HTTPS websites; and SSL eliminates the risk of phishing and other cyber attacks.

## **Google AMP**

For a couple of years, every single article on web design development trends is screaming about responsiveness and its importance. It was Google who made responsiveness a must. Google's next step was the creation of Accelerated Mobile Pages (AMP) Project.

At present, building an AMP version of your website is the way to ensure its lightning-fast performance on mobile devices. Accelerated Mobile Pages (AMP) have simplified coding and load up to 10 times quicker on smartphones. Thus, the employment of AMP makes cutting down page loading time on mobile to less than 1 second possible.

The implications of this are numerous. First of all, such an impressive loading speed of AMP-ed pages literally tanks bounce rate. Next, AMP-optimized pages and ads look and feel more natural on small screens, creating a smoother and more engaging user experience. Thirdly, AMP positively influences your ranking on Google SERPs. Currently, AMP is an indirect ranking factor that boosts your results by improving mobile user experience and decreasing the bounce rate. What's more, AMP is hardly a fad as Google, Bing and some other search engines, as well as social networks such as Twitter, LinkedIn, Pinterest, etc. already link to and present AMP content.

## **User Behavior Tracking**

At present, guesswork is not the strategy businesses adopt. With modern web solutions, you've got a chance to track which content appeals to the users of your website and which fails. The more you know about your customers and the way they act on your website, the better you can optimize it for conversions. At this point, User Behavior Tracking comes in and lets you see the actual behavior of users on your website.

Modern User Behavior Tracking tools let you get a number of invaluable insights. Firstly, you can track user clicks, mouse movement, and scrolls, as well as record their activity to get the idea of how a common user interacts with your website. Secondly, such web development trends as heatmaps let you grasp the amount of attention that each of your website blocks gets. Combined with A/B testing this is the most effective way to see what works and what doesn't. Thirdly, funnels let you see the user's journey on your website and determine where users leak out. Finally, you can monitor the way users interact with forms on your website. By this, you can identify the forms that hurt conversions.

## **VR and AR**

Virtual Reality market definitely evolves and uncovers new opportunities for VR and AR implementation. In broad terms, VR creates independent digital worlds, while AR adds digital content to our reality. These technologies already proved to be the undeniable user engagement boosters. They trigger very strong emotional engagement, which can be used for more authentic connection with the audience. Moreover, VR and AR create jaw-dropping possibilities in terms of visualization. For instance, Alibaba already launched VR tours for its buyers, allowing them to see and manipulate the digital 3D replicas of their products. What's more, the interest that these technologies elicit is very high. So, using these web development trends and technologies for your business, you'll skyrocket the shares on social networks and increase your audience manifold.

**WordPress 4.9** improves your workflow inside the Customizer. Now, you can schedule the time when certain design customizations go live, send preview links to your colleagues, secure design drafts by locking them and never lose your progress with prompts. Secondly, WordPress 'Tipton' highlights your code syntax and checks it for errors. If you're about to save the code with a syntax error, it will kindly warn you not to do so. Thirdly, the upgraded WordPress comes with a state-of-the-art Gallery Widget. What's more, WordPress 4.9 delivers better menu customization UX, theme previewing within Customizer and improved theme switching.

See more: <https://www.motocms.com/blog/en/web-development-trends/>



## TOPIC IX. E-COMMERCE

### *Mobile commerce tech trends to keep your eye on*

Mobile commerce has begun to carve out a significant niche in the financial world. The technology is continuing to improve, further fueling this explosion in a new form of commerce. The rise of Bitcoin and its associated cryptocurrencies has brought with it a slew of startups that are attempting to apply the technologies undergirding these coins to everyday commerce.

Because of estimates that the mobile commerce industry will nearly double in only 4 years, this industry is one that investors will certainly want to keep your eye on. As the technology powering these transactions continues to develop new and interesting solutions for mobile commerce, here are 6 trends you should pay your attention.

#### **Blockchain is coming to mobile commerce**

Outside of crypto, blockchain technology offers the possibility to transfer information quickly and securely thanks to a decentralized ledger that is powered by smart contracts. Since blockchain has an edge in both security and speed when compared to traditional types of monetary transfers, expect the technology to have a major impact on the mobile commerce industry.

#### **Security will increase across the board**

New advances in technology have allowed new types of security measures to be implemented in mobile commerce platforms. For the first time, this puts the industry in a situation where users trust the platforms as they would concrete establishments.

Millennials are digitally fluent, making them unafraid of secure platforms that would have scared off older, “digitally naïve” consumers. With the possibility of further security through blockchain, expect that trust among mobile consumers will rise considerably in future.

#### **Mobile-friendly will be the new standard**

While in the past many online shoppers bought products over the internet through their desktop or laptop, many consumers have begun to embrace smartphones as full-on replacements to personal computers. As smartphones become cheaper and easier to access, websites will have to adapt to the growing community of users who only view their sites on mobile. In order to compete in the mobile commerce market, companies will need to adapt their websites and make them mobile friendly. Sites that aren't will be ignored by millennials, who can quickly find an easier-to-use platform.

#### **Digital wallets will see a rise in popularity**

While the concept of a digital wallet has been around for some time, only recently, as millennials have grown up, have they become widely accepted by the public. Technologies like Amazon Pay, Apple Pay and PayPal One Touch have experienced a 10% uptick in users as a result, making integration into mobile commerce platforms a must.

Combined with one-page checkouts, users have overwhelmingly embraced the performance advantages of the new tech.

#### **Artificial intelligence and chatbots will be everywhere**

As artificial intelligence technology has developed to the point where applications like artificial neural networks can actually be utilized, many investors have jumped on the idea. Analysts in the industry are convinced that AI will offer increases in user metrics as the technology is able to assist users autonomously, helping them find what they want and seamlessly guiding them through the checkout process.

Chatbots have been able to develop alongside artificial intelligence to the point where the technology is able to effectively help customers. In tandem with AI, chatbots are able to make online shopping experiences feel like that of a brick-and-mortar store by providing users with a well-educated assistant for their shopping needs.

With AI becoming so popular and chatbots becoming so powerful, there is no doubt that it will soon be a feature of nearly every mobile commerce platform looking to market more than a dozen products.

### **Augmented reality will shine in mobile commerce**

Augmented reality is a relatively new technology, and while you may not have noticed, it's very possible you may have been a user many times. Augmented reality allows users to project all sorts of objects into their immediate surroundings.

One of the most popular applications of this tech has been Pokémon Go, which made \$600 million for its developers only months after release. Mobile commerce platforms can use the technology to give users the chance to place virtual furniture in their homes, ensuring that customers have an easier and more trustworthy experience.

As the mobile commerce industry continues to grow, more companies are innovating in the space. A number of platforms offer increased speed and security, while others offer entirely new applications that assist users in buying what they need.

With the value of mobile commerce steadily becoming a bigger percentage of the value of overall commerce, investors and techies alike should pay attention to these 6 trends in the industry.

See more at: <https://thenextweb.com/contributors/2018/03/09/mobile-commerce-tech-trends-keep-eye/>

## ***How blockchain will transform the e-commerce industry over the next few years***

By David Geer

Blockchain technology should be considered the most disruptive technology invention of the fourth industrial revolution. The world has never seen a technology as powerful as blockchain technology and it could potentially impact all sectors of the economy completely transforming it through top notch efficiency.

However, the sector it is aiming to transform, and hopes to have the highest impact on day to day consumer and seller activities, is the e-commerce industry. The convenience, affordability, and vast array of products offered by e-commerce platforms shows some of the benefits of the e-commerce industry, but with the growth of the industry (a global online retail market that is expected to surpass \$4.5 billion by 2020), large e-commerce companies like Amazon, Alibaba, EBay and a large group of other companies which account for over 50% of that market valuation, the problems associated with e-commerce are beginning to emerge.

Some of these problems relate to payments, supply chain management, data security, transparent marketplace, satisfied retailers, efficient management systems, and satisfied consumers. The current e-commerce business model will have a hard time resolving all these issues in one fell swoop, with the only solution to these problems is blockchain technology.

**Payments.** The payment industry will greatly benefit from blockchain technology, just like the financial services sector has. Payment solutions for international e-commerce is far from perfect, and even with payment solutions like PayPal and Skrill, the payment industry still needs some reworking.

Using current payment methods comes with high payment processing fees coupled with the high fees charged by e-commerce platforms on any sales made by retailers using their platform. These fees often start from around 2-3% of the total purchase price of any transaction.

Blockchain e-commerce projects such as Request Network and ECoinmerce have an aim to create a blockchain based marketplace using fast and secure transactions for any e-commerce business model. Request Network also wants to utilize blockchain technology for the financial transactions aspect of the e-commerce industry by providing low cost financial transactions, high security standards, and an overall amazing customer experience.

**Supply chain management.** This is perhaps one of the most important aspects of the e-commerce industry since the current supply chain system has issues only blockchain technology can solve in today's, fast-moving e-commerce business world.

Blockchain projects like VeChain aim to create an incorruptible visualization of the supply chain process. Since data validated on the blockchain network is virtually incorruptible, the supply chain process on a supply chain focused blockchain network is a much-needed solution for supply chain management problems facing the e-commerce industry today.

An incorruptible blockchain network will provide a transparent supply chain where consumers can see the order flow of the products they buy, helping increase consumer confidence.

**Data security.** One of the problems with existing e-commerce platforms is how data is stored. E-commerce platforms are home to a very large amount of data, most of them collected directly from customers and retailers registered on any given e-commerce platform.

Customer's data is stored on centralized servers where it is vulnerable to online criminals. Some e-commerce companies have suffered attacks from cybercriminals and a substantial amount of data has been stolen. However, with a blockchain based e-commerce platform, it is virtually impossible to suffer such attacks since blockchain platforms are decentralized, which in turn means customer data is also decentralized.

Cybersecurity is one of the most important features for shoppers on the web. Without proper protocols in place, online retailers put themselves and their customers at risk for payment fraud. Smaller stores face even greater e-commerce security risks due to insufficient internet safety from cybercriminals. According to statistics, one out of five small business retailers are victims of credit card fraud every year, with 60 of those stores being forced to close within six months.

The retailers can offer enhanced security to their customers by running background verification for malware and ransomware scripts and removing them from the e-commerce websites thus preventing any attempt of fraudulent activities. It is virtually impossible to hack all the nodes of a blockchain platform, so data on a blockchain based e-commerce platform is considered to be relatively safe.

**Transparent marketplace.** This is considered one of the biggest problems faced by existing e-commerce platforms. Many complaints have been reported against giant e-commerce stores by other retailers. With that, the President of the United States, Donald J. Trump, also recently tweeted about Amazon's transparency concerns since big name e-commerce stores like Amazon are known for cutting off direct contact between consumers and sellers, and sometimes disabling a merchant's page with little or no explanation.

With blockchain based e-commerce platforms like Bitboost, transparency is the "watchword." Bitboost is a decentralized marketplace that facilitates online transactions between buyers and sellers in a frictionless and transparent manner.

With these solutions offered by blockchain technology to help solve the inherent problems of the e-commerce industry, industry leaders like Amazon, Alibaba, and EBay have already responded by working on blockchain research and development while others like Walmart and Unilever are working on blockchain projects with large tech company IBM.

E-commerce companies will try to do one thing: utilize blockchain technology to solve the issues their current e-commerce platforms face, and to solve these issues as soon as they can.

Another amazing tool utilized through blockchain technology to help create an amazing user experience is Artificial Intelligence. Artificial Intelligence will help blockchain based e-commerce platform users facilitate system interactions in an even better, more automated way. Reviews and incentive programs will be seamless. Imagine, a blockchain-based e-commerce platform using artificial intelligence?

With e-commerce facilitating B2B and B2C business reaching unprecedented levels amidst the problems faced by the existent e-commerce platforms, a transformed e-commerce industry facilitated by blockchain technology will skyrocket B2B and B2C sales, only this time with happier sellers and buyers. The e-commerce industry will become a more efficient and transparent one as this technology continues to roll out. We can expect to see approximately seventy percent of this milestone to be achieved within the next 5 years.

See more at: <https://thenextweb.com/contributors/2018/06/15/how-blockchain-will-transform-the-e-commerce-industry-over-the-next-few-years>)

## **TOPIC X. GREEN TECHNOLOGIES**

### ***How Big Data Drives Ford's Green Technology Investments***

By Heather Clancy

When it comes to choosing where to place green technology bets, Ford Motor Co. leaves little to chance.

The automaker has heavily invested in Big Data technologies and analytics to guide scientific decisions about everything from realistic fuel economy targets and green routing services to the potential availability of rare earth minerals used for powertrains and batteries.

“The company’s investments in the field of Big Data analytics have continually increased during the last 15 years”, John Viera, global director for sustainability and vehicle environmental matters, told attendees of the recent Net Impact conference in San Jose, Calif.

These decisions are made by the company's Research and Innovation Centre, established in the late 1990s. The group started out small but is now building out not just to provide insights based on information that could affect Ford decisions – such as weather trends or climate science findings – but also to develop new services and products based on the information that Ford is collecting through its on-board sensors and diagnostics systems, Viera said.

Some Ford vehicles, such as the Ford Fusion Energi, already produce up to 25 gigabytes of data per hour, although that could increase to 250 gigabytes, Viera estimated.

Today, much of this sort of information exists in isolation, but increasingly it will be communicated, with the permission of vehicle owners, into cloud data centres where it can be analysed and used to inform future services, according to Ford executives.

“Our challenge is that we have different pockets of how we store this data. We're trying to sort this out and answer, ‘What is the solution set?’ ” Viera said.

The impact of Ford's investment in Big Data capabilities already has been far-reaching. The insights that this group is producing, for example, were used to project the right production levels for Ford vehicles of all power types, based on potential climate impact over the next 50 years. It was also used to determine that Ford is better off investing in several types of alternative engine power approaches, including all-electric, biodiesel, hybrid and plug-in electric, compressed natural gas (CNG) and liquid petroleum gas (LPG).

Looking into the future, the data being collected from Ford's fleet will be used to help automate so-called green routing services that automatically optimize a vehicle's speed to minimize its impact on local air conditions, said John Ginder, manager of systems analytics and environmental sciences, research and environmental engineering. These profiles might be triggered automatically, perhaps, if someone drives into a "green zone" near hospitals, schools or high-density residential areas.

From a production standpoint, Ford also is closely watching the impact of these innovations across its supply chain, said Tim Wallington, Ford climate scientist and senior technical leader for environmental sciences. In particular, the company tracks the demand and availability of rare earth elements, lithium and platinum group metals.

“We are looking for the best ways to meet the rather significant climate change challenge in a cost-effective way,” Wallington said.

See more at: <https://www.greenbiz.com/blog/2013/10/28/how-big-data-drives-fords-green-technology-investments>

### ***What is a Sustainable City?***

A sustainable city or “eco-city” is a city which has been designed with environmental concerns in mind. A large percentage of the human population around the world lives in cities and urban areas, underscoring the need for sustainable practices in these environments. Sustainable cities aim to change the way they operate for the benefit of future generations, ensuring that they do not put a strain on resources which will cause such resources to vanish before future generations have an opportunity to benefit from them.

Sustainability is a complex topic. On a basic level, it involves practices which are designed to be sustainable in the long term, meaning that people can continue using these practices without harming the environment, and possibly with some benefit to the environment. On a city-wide level, sustainability encompasses a wide variety of changes, all of which are intended to reduce the environmental impact of the city as a whole. These changes can include individual lifestyle changes made by citizens as well as city-wide shifts in policy.

One goal of a sustainable city is to reduce needs and reliance on surrounding areas. In addition to being environmentally sustainable, this can also be economically beneficial, and may allow a city to be more secure in the event of a natural or civil emergency. Reduction of reliance on surrounding areas includes growing food in a city, reducing water needs and reusing water as much as possible, and generating energy inside the city. The city may become independent of the surrounding area, reducing strain on outlying communities.

A sustainable city must also think about what it is putting out into the surrounding environment. Sustainable cities want to reduce waste in addition to lowering pollution. This is especially important in cities with limited processing capacity for things like waste, as such materials may be pushed onto surrounding communities unless the city takes responsibility for them.

Some examples of things a sustainable city might implement include: green roofs, rooftop gardens, solar panels, bike lanes, better public transit, water recycling, centralized recycling facilities, energy efficient heating and cooling systems for large buildings, reuse of building materials, changes to the workweek which reduce congestion, tougher air quality controls, permeable pavement, wind energy, and community service programs. These changes may not have immediate effects and they can take years or decades to implement, but over time, they can have a cumulative benefit. Just installing green roofs in a sustainable city, for example, can radically reduce the rise in temperature commonly associated with cities.

For instance, Swedish cities have taken climate change to task, drastically helping to reduce the country's greenhouse gas emissions. There are some key initiatives of Swedish cities:

Sweden's shift from oil to district heating in the early 1990's is perhaps the single most important factor in explaining the country's reduced greenhouse gas (GHG) emissions, both in the housing and service sector. Today, district heating accounts for more than 80 per cent of the heat and hot water provided to Sweden's apartment blocks.

Back in 1996, Växjö became the first city in the world to set the goal of becoming fossil-fuel free by 2030. Since then, the city has backed up words with actions and is often referred to as 'Europe's greenest city'. The key to Växjö's achievements in reducing CO2 emissions is that more than 90 per cent of the energy used for heating in the city, and about half its electricity, comes from trees. Waste from the local forest industry – branches, bark and sawdust – is burned to generate heat and power.

In Umeå's Ålidhem district some 400 residential apartments – built in the 1960s and 1970s – have been refurbished with the goal of reducing their energy consumption by 50 per cent.

The geothermal system in place at Stockholm's Central Station captures body heat from over 250,000 daily commuters. The heat is sourced into water via a heat regulator and the heated water is then pumped into the nearby Kungsbrohuset to provide heating. The cooling of the building is provided by water from the nearby Klara Lake, making maximum use of the surrounding environment.

See more at: <https://sweden.se/nature/7-examples-of-sustainability-in-sweden/>

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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



**Навчальне видання**

**Красненко Оксана Миколаївна**  
**Кучерява Людмила Василівна**  
**Ребенко Марина Юріївна**

# **PROFESSIONAL ENGLISH IN IT**

**Англійська мова для професійної комунікації  
для студентів ІТ- спеціальностей**

**Навчальний посібник**

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Видавець і виготовлювач Національний університет біоресурсів  
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