Session 2013-2014

‘Boot’ For Computer

Best of Outstanding Technology

Department of Computer Science & Engineering
Institute of Engineering and Science
IPS Academy, Indore
2013-2014

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Principal Message

Technical Education is the most potential instrument for socio-economic change. Presently, the engineer is seen as a high-tech player in the global market. Distinct separation is visible in our education between concepts and applications. Most areas of technology now change so rapidly that there is a need for professional institutes to update the knowledge and competence.

Institute of Engineering and Science, IPS Academy is a leading, premium institution devoted to imparting quality engineering education since 1999. The sustained growth with constant academic brilliance achieved by IES is due to a greater commitment from management, dynamic leadership of the president, academically distinctive and experienced faculty, disciplined students and service oriented supporting staff.

The Institute is playing a key role in creating and ambiance for the creation of novel ideas, knowledge, and graduates who will be the leaders of tomorrow. The Institute is convinced that in order to achieve this objective, we will need to pursue a strategy that fosters creativity, supports interdisciplinary research and education. This will also provide the students with an understanding and appreciation not only of the process of knowledge creation, but also of the process by which technology and knowledge may be used to create wealth as well as achieve social economic goals.

I am delighted to note that the engineering graduates of this institute have been able to demonstrate their capable identities in different spheres of life and occupied prestigious position within the country and abroad. The excellence of any institute is a measure of achievements made by the students and faculty.

Dr. Archana Keerti Chowdhary
Principal

HOD Message

Today we find that information technology has become overwhelmingly pervasive, while its parent, computing science, has become correspondingly hard to find. While many CS educational institutions have shifted focus from core CS. This is the single most important attribute of the education offered here. Our department has remained true to the vision on which it was founded.

There are several ways to present the canonical core of computer science. Over the years we have developed a distinct style and method that bridges the theory - practice divide while remaining grounded in the core. Technology changes rapidly, especially in the field of computing, whereas the science, if it changes at all, does so much more gradually.

Our Department has produced hundreds of professionals and has established a name for itself in the country and abroad. They have consistently excelled in the highly competitive industrial environment, Best Employer/ awards in top-ranking companies. Learning is a continuous process and does not end with the acquisition of a degree, especially because steady and rapid advances in computing technologies shorten the life of tools and techniques prevalent today. Therefore we do not aim to make our students walking manuals of any language or package. Instead, they are given a strong foundation in computer science and problem-solving techniques, and are made adaptable to changes.

We believe that this approach to teaching-learning, coupled with practical experience gained during Industrial Training in reputed organizations, equips our students to handle the challenges posed by the software industry.

Dr. Namrata Tapaswi

Professor and Head CSE Department

Editorial

E-Magazine Faculty Coordinator

Ms. Shaba Parveen khan

Mr. Pratik jain

E-Magazine Student Editorial Board

Dinesh Kushwah

Ayushi Tugnawat

Shifa Ali

To the Readers

*In continuation of our endeavors to inform, educate as well as provide an opportunity to deserving people. This edition of Magazine '**Boot for Computer'** is the premier chronicler of computing technologies, covering the latest discoveries, innovations, and research that inspire and influence the field. Every year, we bring readers in-depth stories of emerging areas of computer science, new trends in IT, and practical research applications. Faculty and students choose this to debate technology implications, public policies, engineering challenges, and market trends.*

Besides that it doesn't forget its primary objective that is to promote computer science & engineering from its grass root levels. We hope that this edition would be enjoyable as well as informative.

Editors...

Programme Education Objectives

The educational objectives of the Computer Science & Engineering programs are as follows:

1. To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies.
2. To develop the skills among students to analyze real world problem & implement with computer engineering solution and in multidisciplinary projects
3. To provide students with solid foundation in mathematical, scientific and engineering fundamentals to solve engineering problems and required also to pursue higher studies.
4. To develop the ability to work with the core competence of computer science & engineering i.e. software engineering, hardware structure & networking concepts so that one can find feasible solution to real world problems
5. To inseminate in student's professional and ethical attitude, effective communication skills, team work skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context.
6. To motivate students perseverance for lifelong learning and to introduce them to professional ethics and codes of professional practice

Programme Outcomes

An engineering program defines a set of specific program outcomes that relate to its educational objectives, including the items a-k listed below. We regularly review the courses in our curriculum to make sure that all these items are covered, and try to measure whether our students are successfully attaining the following goals:

a. Graduates will demonstrate knowledge of mathematics, science and allied engineering in computer science & engineering.

b. Graduates will demonstrate ability to analysis, design and implement the problems as per user requirements and specification.

c. Graduates will possess strong fundamental concepts on database technologies, operating system, compiler design, networking, data structure, software engineering.

d. Graduates will be able to demonstrate with excellent programming, analytical, logical and problem solving skills.

e. Graduates will demonstrate and ability to visualize and work on laboratory and multidisciplinary tasks.

f. Graduates will demonstrate skills to use modern engineering tools, softwares and equipment to analyze problems.

g. Graduates will posses leadership and management skills with best professional ethical practices.

h. Graduates will be able to communicate effectively in both verbal and written form.

i. Graduates will have the confidence to apply computer science and engineering solution for the welfare of human being.

j. Graduates will enhance their self confidence and capable of being a kaizen.

k. Graduates can participate and succeed in competition examination like GATE, GRE, IES etc.

CSE Department Information

Name and address of the department:

Department of Computer Science & Engineering
Institute of Engineering and Science, IPS Academy
Knowledge Village
Rajendra Nagar, A.B.Road, Indore (M.P) PIN-452012

Head of the Department

Dr. Namrata Tapaswi
HOD, Computer Science & Engineering
Phone: 0731- 4014853
e-mail: hod.compsc@ipsacademy.org

History of the department:

The Department of Computer Science & Engineering was established in the year 1999 offering Bachelor of Engineering (BE) with intake 60, it was increased to 120 in year 2012 and again intake was increased to 180 in year 2014. The programme is intended to educate students on the applications of scientific knowledge for practical purposes involving activities like modeling, analysis, design and other associated fields of core courses in Computer Science & Engineering education. It intends to equip graduates with profound theoretical knowledge and rich hands on experience.

Vision & Mission of the Department

Vision

Attaining global recognition in computer science and engineering education, research and training to meet the growing needs of the industry and society

Mission

Provide quality undergraduate and postgraduate education, in both the theoretical and applied foundations of computer science, and train students to effectively apply this education to solve real-world problems, thus amplifying their potential for lifelong high-quality careers.

Department Faculty Details

 Prof. Namrata Tapaswi HOD & Professor	 Mr. Jayesh Gangarade Associate Professor	 Mr. Arvind Upadhyay Associate Professor	 Mrs. Swati Tiwari Associate Professor
 Mr.Neeraj Shrivastava Associate Professor	 Mr. Sunil Nimawat Assistant Professor	 Mr.Sourabh Jain Assistant Professor	 Ms.Shruti Sharma Assistant Professor

 Mr.Deepak Shukla Assistant Professor	 Ms.Nisha Bhalse Assistant Professor	 Ms.Shweta Gangrade Assistant Professor	 Mr.Vijay Choudhary Assistant Professor
 Mr.Yagyapal Yadav Assistant Professor	 Mr.Neeraj Mehta Assistant Professor	 Mr.Ved Kumar Gupta Assistant Professor	 Ms.Anjali Verma Assistant Professor
 Mr. Anil Panwar Assistant Professor	 Ms.Barkha Sahu Assistant Professor	 Ms.Vaishali Gupta Assistant Professor	 Ms.Shaba P Khan Assistant Professor

 Mr.Sudhir Kumar Patidar Assistant Professor	 Mr.Pratik Jain Assistant Professor	 Ms. Neha Gupta Assistant Professor	 Ms.Vijeta Jaiswal Assistant Professor

Department Events

Two faculty development programs were organized in which three days program on Entrepreneurship in the month of October 2013, one day program on Ubuntu in the month of January 2014. One day Seminar on Recent Trends & Technology in Computer Engineering in the month of August 2013. Twenty Three different Workshops were organized on different topics covering Cyber Security, JAVA, C/C++, LINUX, Scilab, Tux Typing, Blendar, Cloud Computing & Security, Basic Computer Skills, Netbeans, Android, and Introduction to design of algorithm.

Eighteen expert lectures were organized in which one day program on Research Methodology by Ms. Vaishali Gupta in the month of April 2014, one day program on Research Methodology by Ms. Richa Tiwari Gupta in the month of April 2014, Two programs on Internet Technology & Network management by Dr. Piyush Shukla in the month of March 2014, four programs on Computer Architecture by Dr. Mahesh Motwani in the month of March 2014, Seven programs on Internet Technology & Network management by Dr. Rupam Gupta in the month of February & March 2014, one day program on Computer Networking by Mr. Aditya Sethi in the month of March 2014.
One Industrial Visit program was organized by Ypsilon Solution Pvt. Ltd., Indore in the month of April 2014. Ten days Industrial Tours was organized by CSE in the month of April 2014.

Three Training programs were organized in which half month program on Core JAVA in the month of June 2014, Two week program on C & C++ in the month of June 2014, Four week program on Java in the month of April 2014.

Eleven Other Events were organized on Cyber security, Database Fundamentals Information Storage Management, Cloud Infrastructure Services, Major Project Competition Cum Exhibition also known as Udaan in the month of April 2014, one day program on Minor Project Competition Cum Exhibition also known as Udaan in the month of April 2014.

Membership of Professional Societies

Department of Computer science & engineering is having the membership of Computer society of India (CSI). Two programs were organized under the banner of CSI in which one week program on National Seminar on "Rececnt Trends & Technology in Computer Engineering by Dr. Pushpak Bhattacharya, Director, IIT Patna & Dr. N.S. Choudhary, Dean - Research and Development, IIT Indore in the month of August 2013, one day program on Paper Presentation(envisage 14) by Dr. Atul Kahate,Oracle Financial Services Software Ltd, Pune in the month of November 2014.

Sports News

Students had received winner & runner up awards in different sports activities which were National Techno Cultural Fest Football Competition, All India National Level Aquatics (Swimming) Competition, All India National Level Aquatics (Diving) Competition, Swimming Competition (02- Students), Cricket (Girls-10), Badminton (05-Students), Volleyball (08-Students), Shot Put (08-Students), Throw Ball (11-Students).

Placements

Students were placed in top companies in the year 2013. 8 Students got placed in Tata Consultancy Services(TCS), 5 students got placed in CSC, 3 students in Mu Sigma and one student each in MMF Infotech, Systango and Tally.

Faculty Members Achievements

Head of Department, Prof. Namrata Tapaswi had been awarded by special award for copyrighted software on “NLP tool for Sanskrit Language”.

In the Department, Paper published in Journals is fifteen in numbers. Journals are International Organization of Science Research-Journal of Computer Engineering , International Journal of Electronics Communication and Computer Engineering , International journal of emerging tech. & advanced engineering., International journal of Computer science & mobile computing , International Journal of Engineering and Innovative Technology, International Journal Of Computer Architecture And Mobility, International Journal of Computer Applications, International Journal of Emerging Technology and Advanced Engineering, International Journal of Electronics Communication and Computer Engineering, International Journal of Emerging Technology and Advanced Engineering, International Journal Of Computer Architecture And Mobility, International journal of Engineering & Computer science, International journal of Engineering Research & Technology, International Journal of Computer Science and Information Technologies & International journal of Engineering and Computer.

Ten papers were presented in Seminars/Conferences conducted on different areas under International conference on cloud big data & trust, International conference & symposium on NLP13 (International Conference on Advances in Computing, Communications and Informatics) IEEE, IEEE (International Conference on Computer and Communication Technology), DRDO-Defence Scientific Information and Documentation Centre, ICACNI 2013, springer, International conference on cloud big data & trust, International conference on cloud big data & trust, International conference on cloud big data & trust, Fourth International Conference on Advanced Computing & Communication Technologies 2014.

Highlighed topics were A survey of use of SaaS of cloud in Education, Intrusion Detection & Classification in Manet using network characteristic & PNN algorithm,

Subjective & Objective evaluation of english to urdu machine translation, Rule based stemmer in urdu, अंग्रेजी ऊर्दू मशीन अनुवाद का मूल्यांकन, Evalution of English to Urdu Machine Translation, A survey of use of SaaS of cloud in Education, Dual Security for computing Secure cloud bursting, brokerage & aggregation using cryptography, Dual Security for computing Secure cloud bursting, brokerage & aggregation using cryptography, Coronary Heart Diseses Prediction System Based on Association Rule Mining with Fuzzy Discriminant Support.One Expert Lecture have been Delivered by department Faculties in Seminars and Workshop on Awareness of Computers.

Seven Seminars & Workshops were attended by the faculty members on different areas like Recent Trends & Technology in Computer engineering, Network design using NS-2, Wipro mission 10X , Network Enumeration & Security , Coordinators Workshop on Cyber Security , Coordinators Workshop on Computer Networking , Computer Networking. Two SDPs/FDPs were attended by the faculty members on Entrepreneurship & Ubuntu.

Students Achievements

Ms. Chitra Jain & Ms. Muskan Mishra had been awarded for Social Work achievements in SWARANJALI'2014. Four students had received Vice Chancellor Scholarship from Rajjv Gandhi Technical University, Bhopal (M.P.). Nine Academic Awards distributed to winner & runner up in "UDAAN2014"Competition Cum Exhibition, "UDAAN2014" Major Project Competition Cum Exhibition, "Envisage 2014" Lan Gaming & "Envisage 2014" Quiz Competition C, C++.

In the department, Papers published in Journals were thirteen in numbers. Journals are IOSR-JCE, IJETAE, IJEIT, IJCSMC, IJECS, IJETAE, IJCAM, IJLTETC, IJERA, IJEAT, International Journal of Innovative Research in Science, Engineering and Technology, International Journal of Computer Science and Information Technologies, IJCATM.

One Paper was presented in the International Conference on Advanced Computing & Communication Technologies. Thirty Three Workshops/Seminars were Attended on different topics like Linux, Scilab, Netbeans, JAVA, Internet Technology & Networking, Computer Architecture, Computer Networking, Communication Skills, Workshop on Tux Typing, Workshop on Firefox & Tux Typing, Workshop on Firefox, C& C++ Workshop, "Linux, C & C++", Spoken Tutorial Workshop associated by IIT Mumbai on "Blender", Installation of LINUX Operating System, Recent Trends & Technology in Computer Engineering.

1. Gesture Recognition, Voice Command & Holography Technology

Gesture Recognition

Means a device (Computer, Smartphone, Tablets etc.) can get input with motion of our body's part. Gesture Recognition is sensor based technology with camera as a input device for using this technology. It is so advanced technology in present world we can see this technology in latest smart T.V., Laptops, Ultra books etc. A very easy interaction with smart TVs, you have so much information, so many applications, all the casual games, browsing. We see new UIs UI [user interfaces] coming out in these devices that are giving a "wow" experience. When you raise your finger the first time, you go, "Wow." I control iTunes. When my computer is on, I just move finger a small movement to the right; I shuffle to the next song.

Correct. The new Kinect is not Prime Sense. Microsoft acquired Canasta a few years ago. They moved from structured light to time-of-flight -- a different method of active illumination, where you have infrared or lasers illuminating the room, then the sensors can see where the objects are in space and track them.

We do that with very efficient performance. When you're working with mobile device or TV, you have very limited CPU power you can consume. They're not putting specific hardware in for that, so you're allowed to take very little MHz [processor horsepower] from the device.

Currently we work with tier-one OEMs [original equipment manufacturers like computer makers] and very big chip companies that are embedding our technology into their offerings. We have very flexible algorithms that can set in application processor, sit on chip on a camera, it can sit on a GPU. With AMD

and ARM, we are their gesture-control vendor

running on the GPU not the CPU, which gives us a lot of extra capabilities?

We are diversifying and starting to develop downloadable apps and work with developers, opening an SDK [software developer kit] to create a greater buzz and ecosystem.

We're shipping with major vendors, like Sony vaio laptops, Lenovo with the X1 Carbon and tablets and Toshiba PCs. Philips TVs are coming out with us. HiSense, Oppo, an up-and coming phone maker..

We can more improve gaming by using this technology in games like super smart gaming. And Voice Command System means that a devices (Computer, Smart phone, Tablets etc.) can take input as human voice and according to voice generate output. We can see to this technology in Microsoft operating systems (Windows 7,Windows 8 & Windows 8.1etc.), MacOS , Google Voice Search in Android, Apple iPhones voice commands etc. We can operate this in voice recognition system in Windows.

We can do it so advanced than we can operate our personal computer by our voice only think about this technogies .By combination, It is the future for computers & mobiles phones.

Now I am going to talking about hologram technologies which very advanced technologie in the world. 3D Holographic Projection in which 3d projection is shown in the air a device is made by AV concept in which we can type anything according to light which we see from .

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A high-definition holographic projection system based off of the Pepper's Ghost illusion, which is used all the time in haunted houses, theme parks, dark rides, and in theater. Of course, we've updated it with 21st century technology to create a three-dimensional, life-size illusion that moves and interacts within a live stage setting. That means a whole new way of giving presentations and engaging audiences. Imagine a product launch where you can show your product's features via a 3D holographic display without using clunky 3D glasses. Where this technology really excels is in live presentations. One of our most notable uses of holographic projection was to revivify the great Tupac Shakur for a Snoop Dogg performance at the 2012 Coachella Music Festival—but the versatility of 3D holographic projection is limitless. Whether holographic projection is used to bring back a legendary musician or to teleconference around the globe, innovation like this makes the impossible nearly tangible.

Salman Khan (0808CS111046)

2. First Step to Android Application Development

As most of us are familiar of android operating system which is based on the Linux kernel and designed primarily for touch screen mobile devices such as Smartphone's and tablet computers.

Development of application for an android platform is not that much difficult as most of us thought of it. First of all one best part of android is that it is an open source platform, therefore for any application development for android devices you not need to purchase any of the paid software. Each and every thing required for development an android app. is available on internet free of cost. You only have to put some of your effort.

BASIC REQUIRMENTS

- First of all you need an IDE (Integrated development environment) and **Eclipse** fulfills this requirement. Download: http://www.eclipse.org/downloads/
- Android SDK (Software development kit) Download: http://developer.android.com/sdk/index.html?utm_source=weibolife
- ADT Plugin for eclipse Download: http://developer.android.com/tools/sdk/eclipse-adt.html

Now we need to make our eclipse IDE capable of developing Android apps. For this purpose we need to install the ADT plugin and SDK manager in Eclipse IDE.

This is quite tricky, let's see how to do this:

- Adding ADT plugin: Start eclipse IDE>>Help>>Install new software>>
- Click on Add button
- Name: ADT plugin
- http: http://developer.android.com/tools/sdk/eclipse-adt.html
- Adding SDK manager: Start eclipse IDE>>Window>>Preferences>>
- SDK Location: "Provide the location of SDK manager stored in your PC >>SDK Manager (Application)"

Now you are ready to go…

Your eclipse IDE is now capable of developing the first Android Application

- Go to File>>New>>Android Application Project
- Just follow the instruction and your first project is in front of you

Some important tips:

- Src: Source code that contain java files for logical operation
- Gen: contain R.java file which contain hexadecimal code for identification of each widgets use in the application
- Res: Resource contain image, xml, GUI information (all designing part)
- Android Manifest.xml: It is controlling file that contain the information about the permission taken by a programmer for using various phone services such as internet, camera, calling, messaging

To learn various programming concept about android application development you can refer various online tutorials, few of them which I fount very useful are:

- http://thenewboston.org/list.php?cat=6
- http://stackoverflow.com/questions/tagged/android
- http://www.codeproject.com/Articles/462534/Beginning-Android-Application-Development-Hello-An
- http://developer.android.com/training/basics/firstapp/index.html
- http://developer.android.com/index.html

Arpit Saxena(0808CS101010)

3. Nanotechnology

Nanotechnology (sometimes shortened to "nanotech") is the manipulation of matter on an atomic, molecular, and supramolecular scale. The earliest, widespread description of nanotechnology referred to the particular technological goal of precisely manipulating atoms and molecules for fabrication of macro scale products, also now referred to as molecular nanotechnology. A more generalized description of nanotechnology was subsequently established by the National Nanotechnology Initiative, which defines nanotechnology as the

manipulation of matter with at least one dimension sized from 1 to 100 nanometers. This definition reflects the fact that quantum mechanical effects are important at this quantum-realm scale, and so the definition shifted from a particular technological goal to a research category inclusive of all types of research and technologies that deal with the special properties of matter that occur below the given size threshold. It is therefore common to see the plural form "nanotechnologies" as well as "nanoscale technologies" to refer to the broad range of research and applications whose common trait is size. Because of the variety of potential applications (including industrial and military), governments have invested billions of dollars in nanotechnology research.

Nanotechnology as defined by size is naturally very broad, including fields of science as diverse as surface science, organic chemistry, molecular biology, semiconductor physics, micro fabrication, etc. The associated research and applications are equally diverse, ranging from extensions of conventional device physics to completely new approaches based upon molecular self-assembly, from developing new materials with dimensions on the nanoscale to direct control of matter on the atomic scale.

Nanotechnology may be able to create many new materials and devices with a vast range of applications, such as in medicine, electronics, biomaterials and energy production. On the other hand, nanotechnology raises many of the same issues as any new technology, including concerns about the toxicity and environmental impact of nonmaterials, and their potential effects on global economics, as well as speculation about various doomsday scenarios. These concerns have led to a debate among advocacy groups and governments on whether special regulation of nanotechnology is warranted.

Origins

The concepts that seeded nanotechnology were first discussed in 1959 by renowned physicist Richard Feynman in his talk There's Plenty of Room at the Bottom, in which he described the possibility of synthesis via direct manipulation of atoms. The term "nano-technology" was first used by Norio Taniguchi in 1974, though it was not widely known.

Inspired by Feynman's concepts, K. Eric Drexler independently used the term "nanotechnology" in his 1986 book Engines of Creation: The Coming Era of Nanotechnology, which proposed the Idea of a nanoscale "assembler" which would be able to build a copy of itself and of other items of arbitrary complexity with atomic control. Also in 1986, Drexler co-founded The Foresight Institute (with which he is no longer affiliated) to help increase public awareness and understanding of nanotechnology concepts and implications.

Fundamental concept

Nanotechnology is the engineering of functional systems at the molecular scale. This covers both current work and concepts that are more advanced. In its original sense, nanotechnology refers to the projected ability to construct items from the bottom up, using techniques and tools being Developed today to make complete, high performance products.One nanometer (nm) is one billionth, or 10^{-9}, of a meter. By comparison, typical carbon-carbon bond lengths, or the spacing between these atoms in a molecule, are in the range 0.12–0.15 nm, and a DNA double-helix has a diameter around 2 nm. On the other hand, the smallest cellular life-forms, the bacteria of the genus Mycoplasma, are around 200 nm in length. By convention, nanotechnology is taken as the scale range 1 to 100 nm following the definition used by the National Nanotechnology Initiative in the US. The lower limit is set by the size of atoms (hydrogen has the smallest atoms, which are approximately a quarter of a nm diameter) since nanotechnology must build its devices from atoms and molecules. The upper limit is more or less arbitrary but is around the size that phenomena not observed in larger structures start to become apparent and can be made use of in the nano device. These new phenomena make nanotechnology distinct from devices which are merely miniaturized versions of an equivalent macroscopic device; such devices are on a larger scale and come under the description of micro technology.

Tools and techniques

There are several important modern developments. The atomic force microscope (AFM) and the Scanning Tunneling Microscope (STM) are two early versions of scanning probes that

launched nanotechnology. There are other types of scanning probe microscopy. Although conceptually similar to the scanning co focal microscope developed by Marvin Minsky in 1961 and the scanning acoustic microscope (SAM) developed by Calvin Quate and coworkers in the 1970s, newer scanning probe microscopes have much higher resolution, since they are not limited by the wavelength of sound or light. The tip of a scanning probe can also be used to manipulate nanostructures (a process called positional assembly). Feature-oriented scanning methodology suggested by Rostislav Lapshin appears to be a promising way to implement these nanomanipulations in automatic mode. However, this is still a slow process because of low scanning velocity of the microscope. Various techniques of nanolithography such as optical lithography, X-ray lithography dip pen nanolithography, electron beam lithography or nanoimprint lithography were also developed. Lithography is a top-down fabrication technique where a bulk material is reduced in size to nanoscale pattern.

Sakshi Jain(0808CS121086)

4. Coronal Mass Ejection

A **coronal mass ejection** (**CME**) is a massive burst of solar wind and magnetic fields rising above the solar corona or being released into space. Coronal mass ejections release huge quantities of matter and electromagnetic radiation into space above the sun's surface, either near the corona (sometimes called a solar prominence), or farther into the planet system, or beyond (interplanetary CME). The ejected material is a plasma consisting primarily of electrons and protons, but may contain small quantities of heavier elements such as helium, oxygen, and even iron. The theory of heavier element emissions during a CME is speculative information and requires further verification. It is highly unlikely that a CME contains any substantial amount of heavier elements, especially considering that the sun has not yet arrived at the point of helium flash and thus cannot begin to fuse elements heavier than helium.

Coronal mass ejections are associated with enormous changes and disturbances in the coronal magnetic field. They are usually observed with a white-light coronagraph.

Cause

Recent scientific research has shown that the phenomenon of magnetic reconnection is responsible for CME and solar flares.

Magnetic reconnection is the name given to the rearrangement of magnetic field lines when two oppositely directed magnetic fields are brought together. This rearrangement is accompanied with a sudden release of energy stored in the original oppositely directed fields.

On the sun, magnetic reconnection may happen on solar arcades—a series of closely occurring loops of magnetic lines of force. These lines of force quickly reconnect into a low arcade of loops, leaving a helix of magnetic field unconnected to the rest of the arcade. The sudden release of energy in this reconnection causes the solar flare. The unconnected magnetic helical field and the material that it contains may violently expand outwards forming a CME.This also explains why CMEs and solar flares typically erupt from what are known as the active regions on the sun where magnetic fields are much stronger on average.

Impact on Earth

When the ejection is directed towards the Earth and reaches it as an interplanetary CME (ICME), the shock wave of the traveling mass of Solar Energetic Particles causes a geomagnetic storm that may disrupt the Earth's magnetosphere, compressing it on the day side and extending the night-side magnetic tail. When the magnetosphere reconnects on the night side, it releases power on the order of terawatt scale, which is directed back toward the Earth's upper atmosphere.

Solar Energetic Particles can cause particularly strong aurorae in large regions around Earth's magnetic poles. These are also known as the Northern Lights (aurora borealis) in the northern hemisphere, and the Southern Lights (aurora australis) in the southern hemisphere. Coronal mass ejections, along with solar flares of other origin, can disrupt radio transmissions and cause damage to satellites and electrical transmission line facilities, resulting in potentially massive and long-lasting power outages. Humans at high altitudes, as in airplanes or space stations, risk exposure to relatively intense so-called cosmic rays. Cosmic

rays are potentially lethal in high quantities. The energy absorbed by astronauts is not reduced by a typical spacecraft shield design and, if any protection is provided, it would result from changes in the microscopic in homogeneity of the energy absorption events.

Physical properties

A typical coronal mass ejection may have any or all of three distinctive features: a cavity of low electron density, a dense core (the prominence, which appears as a bright region on coronagraph images embedded in this cavity), and a bright leading edge.

Most ejections originate from active regions on the Sun's surface, such as groupings of sunspots associated with frequent flares. These regions have closed magnetic field lines, in which the magnetic field strength is large enough to contain the plasma. These field lines must be broken or weakened for the ejection to escape from the sun. However, CMEs may also be initiated in quiet surface regions, although in many cases the quiet region was recently active. During solar minimum, CMEs form primarily in the coronal streamer belt near the solar magnetic equator. During solar maximum, they originate from active regions whose latitudinal distribution is more homogeneous.

Coronal mass ejections reach velocities between 20km/s to 3200km/s with an average speed of 489km/s, based on SOHO/LASCO measurements between 1996 and 2003. The average mass is 1.6×10^{12}kg. The values are only lower limits, because coronagraph measurements provide only two-dimensional data analysis. The frequency of ejections depends on the phase of the solar cycle: from about one every fifth day near the solar minimum to 3.5 per day near the solar maximum. These values are also lower limits because ejections propagating away from Earth (backside CMEs) can usually not be detected by coronagraphs.

Association with other solar phenomena

Coronal mass ejections are often associated with other forms of solar activity, most notably:

- Solar flares
- Eruptive prominence and X-ray sigmoids

- Coronal dimming (long-term brightness decrease on the solar surface)
- EIT and Moreton waves
- Coronal waves (bright fronts propagating from the location of the eruption)
- Post-eruptive arcades

The association of a CME with some of those phenomena is common but not fully understood. For example, CMEs and flares are normally closely related, but there was confusion about this point caused by the events originating beyond the limb. For such events no flare could be detected. Most weak flares do not have associated CMEs; most powerful ones do. Some CMEs occur without any flare-like manifestation, but these are the weaker and slower ones.It is now thought that CMEs and associated flares are caused by a common event (the CME peak acceleration and the flare impulsive phase generally coincide). In general, all of these events (including the CME) are thought to be the result of a large-scale restructuring of the magnetic field; the presence or absence of a CME during one of these restructures would reflect the coronal environment of the process (i.e., can the eruption be confined by overlying magnetic structure, or will it simply break through and enter the solar wind).

Aditya Purohit (0808CS111004)

5. Big Data Analytics & SAS: An Overview

Big data is form of large unstructured data which cannot be handled by a normal Relational Database Management System. Big data is now a reality: The volume, variety and velocity of data coming into your organization continue to reach unprecedented levels. This phenomenal growth means that not only must you understand big data in order to decipher the information that truly counts, but you also must understand the possibilities of what you can do with big data analytics.

What is big data analytics? Big data analytics is the process of examining big data to uncover hidden patterns, unknown correlations and other useful information that can be used to make

better decisions. With big data analytics, data scientists and others can analyze huge volumes of data that conventional analytics and business intelligence solutions can't touch. Consider this; it's possible that your organization could accumulate (if it hasn't already) billions of rows of data with hundreds of millions of data combinations in multiple data stores and abundant formats. High-performance analytics is necessary to process that much data in order to figure out what's important and what isn't. Enter big data analytics.

Why collect and store terabytes of data if you can't analyze it in full context? Or if you have to wait hours or days to get results? With new advances in computing technology, there's no need to avoid tackling even the most difficult and challenging business problems. For simpler and faster processing of only relevant data, you can use high-performance analytics. Using high-performance data mining, predictive analytics, text mining, forecasting and optimization on big data enables you to continuously drive innovation and make the best possible decisions. In addition, organizations are discovering that the unique properties of machine learning are ideally suited to addressing their fast-paced big data needs in new ways.

Big data and analytics are the next competitive advantages that businesses will have over their competitors, according to John Hagerty, program director of IBM."We're seeing a fundamental shift internally; where big data and analytics is fuelling interactions from management processes to the way applications work within an organization. It is also strengthening a business' potential engagement with customers. In some ways, it has become an engine to help drive a business forward."

Now, you've got data. You've got questions. But how do you find the answers you need to solve your most difficult problems? It's easy. SAS Analytics. Because with SAS, you can reveal patterns and anomalies. Identify variables and relationships. Predict future events. Select the best courses of action. You can use data and analytics to get new insights and make decisions based on facts you've discovered. That leads to success.

SAS (Statistical Analysis System) is a software suite developed by SAS

Institute for advanced analytics, business intelligence, data management, and predictive analytics. It is the largest market-share holder for advanced analytics.

SAS was developed at North Carolina State University from 1966 until 1976, when SAS Institute was incorporated. SAS was further developed in the 1980s and 1990s with the addition of new statistical procedures, additional components and the introduction of JMP. A point-and-click interface was added in version 9 in 2004. A social media analytics product was added in 2010.

SAS is a software suite that can mine, alter, manage and retrieve data from a variety of sources and perform statistical analysis on it. SAS provides a graphical point-and-click user interface for non-technical users and more advanced options through the SAS programming language. SAS programs have a DATA step, which retrieves and manipulates data, usually creating a SAS data set, and a PROC step, which analyzes the data.

Each step consists of a series of statements. The DATA step has executable statements that result in the software taking an action, and declarative statements that provide instructions to read a data set or alter the data's appearance. The DATA step has two phases, compilation and execution. In the compilation phase, declarative statements are processed and syntax errors are identified. Afterwards, the execution phase processes each executable statement sequentially. Data sets are organized into tables with rows called "observations" and columns called "variables". Additionally, each piece of data has a descriptor and a value.

The PROC step consists of PROC statements that call upon named procedures. Procedures perform analysis and reporting on data sets to produce statistics, analyses and graphics. There are more than 300 procedures and each one contains a substantial body of programming and statistical work. PROC statements can also display results, sort data or perform other operations. SAS Macros are pieces of code or variables that are coded once and referenced to perform repetitive tasks.

SAS data can be published in HTML, PDF, Excel and other formats using the

Output Delivery System, which was first introduced in 2007. The SAS Enterprise Guide is SAS' point-and-click interface. It generates code to manipulate data or perform analysis automatically and does not require SAS programming experience to use.

In a nutshell, bigdata analytics is the latest trend in the industry. For the advanced analysis of this large unstructured set of data, SAS is a useful and efficient tool. Knowledge of SAS is a prerequisite nowadays, if a person is interested in the field of analytics.

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6. Era of Smartphone's

A **Smartphone**, or **smart phone**, is a mobile phone with more advanced computing capability and connectivity than basic feature phones.

Early Smartphone's typically combined the features of a mobile phone with those of another popular consumer device, such as personal (PDA), a media player, a digital camera, and/or a GPS navigation unit. Modern Smartphone's include all of those features plus the features of a touch screen computer, including web browsing, Wi-Fi, and 3rd-party apps and accessories.

The most popular Smartphone's today are powered by Google's Android and Apple's iOS m obile operating systems.

Early years of mobile phones

Devices that combined telephony and computing were first conceptualized in 1973, and were offered for sale beginning in 1993. The term "Smartphone" first appeared in 1997, when Ericsson described its GS 88 "Penelope" concept as a Smart Phone.

Forerunners

The first mobile phone to incorporate PDA features was an IBM prototype developed in 1992 and demonstrated that year at the COMDEX computer industry trade show. A refined version of the product was marketed to consumers in 1994 by BellSouth under the name Simon Personal Communicator. The Simon was the first device that can be properly referred to as a "Smartphone", even though that term

was not yet coined. In addition to its ability to make and receive cellular phone calls, Simon was also able to send and receive faxes and e-mails through its touch screen display.

PDAs

In the late 1990s, many mobile phone users carried a separate dedicated PDA device, running early versions of operating systems such as Palm OS, BlackBerry OS or Windows CE/Pocket PC.[1] These operating systems would later evolve into mobile operating systems.

In 1996, Nokia released the Nokia 9000 which became their best-selling phone of that time. It was a palmtop-style phone combined with a PDA from HP. In early prototypes, the two devices were fixed together via a hinge in what became known as a clamshell design. When opened, the display was on the inside top surface and with a physical QWERTY keyboard on the bottom. Email and text-based web browsing was provided by the GEOS V3.0 operating system.

In early 2000, the Ericsson R380 was released by Ericsson Mobile Communications and was the first device marketed as a "smartphone". It combined the functions of a mobile phone and a personal digital assistant (PDA), supported limited web browsing with a resistive touchscreen utilizing a stylus.

In early 2001, Palm, Inc. introduced the Kyocera 6035, which combined a PDA with a mobile phone and operated on Verizon. It also supported limited web browsing.

Smartphone before Android, iOS, and Blackberry, typically ran on Symbian, which was originally developed by Psion. It was the world's most widely used Smartphone operating system until Q4 2010.

How to Pick Your First Smartphone: Choosing an Operating System, Although it might seem that iPhones and Droids are everywhere these days, a majority of people are still using simpler phones. Looking at all the options, those who are ready to make the move up might feel a bit overwhelmed. Bright hand is here to help! The first step is deciding which operating system you would prefer. If you were choosing a PC, the options would be PC or Mac, but with Smartphone’s there are more

possibilities: Android, iPhone, BlackBerry, and Windows Phone. This is an important first step because it will significantly affect which models you can choose from. Making a snap decision without much thought behind it can result in you getting a phone you don't really care for and are committed to using for years.

Google Android OS

The most widely used mobile operating system today is Android. It's used on dozens of devices from just about every wireless carrier, and you can find it on models from Samsung, Motorola, HTC, Sony, and more. These have a variety of designs, with a range of screen sizes and resolutions, with physical keyboards and without. Android is highly customizable, allowing you to tweak its appearance and operation in many ways. And there are hundreds of thousands of apps for it, running the gamut from games to business software. Perhaps the best way to summarize Android is to say that it's the closest thing available to the "Windows" of the smartphone market: it's the most popular and most widely available mobile OS.

Apple iPhone/iOS

Apple has a completely different philosophy. It puts all its focus on one Smartphone model, seeking to make the latest iPhone the best device it can possibly be. The only company that makes iOS-based devices is Apple, and it tightly integrates its hardware and software. The result is a product that many consider superior, as long as they are willing to accept the limitations: Apple allows very little modification in the user interface, and there's little range in the hardware options. One of the strengths of the iPhone is the huge selection of third-party software available for it. This means that there are myriad productivity and entertainment options. Apple keeps iOS as a closed system, but that allows it to carefully control the user experience, which its designers try to make as intuitive and easy to use as possible.

RIM BlackBerry

Canada's Research in Motion once dominated Smartphone sales in N. America, but that was in the days before Android and the iPhone. In the past year or so, sales of BlackBerry models have dropped significantly.

The main reasons for this is this operating system has not kept up in many of the features most consumers are looking for in an advanced phone: its web browser is slow and primitive compared to its rivals, and the selection of third-party apps is much smaller.

Still, the BlackBerry has an advantage or two. It's preferred by those who only want a Smartphone for handling their email on the go, as that's its primary focus. Also, the BlackBerry OS is the most secure of any of the mobile operating systems.

Microsoft Windows Phone

Those who are big fans of Windows should be happy to know that Microsoft makes a version for smart phones as well. This has been embraced by the European handset giant Nokia, and their partnership is working to make this operating system more competitive with its more popular rivals. HTC and Samsung also make Windows phones.

At this point, there are only a handful of devices based on this operating system, and therefore there's not a wide array of design options. Still, Microsoft makes sure that all the ones available have a fairly robust feature set.There aren't as many apps on the market for Windows Phone, but the number is growning.

Rather than the icon-based user interface all its rivals use, Microsoft created a tiles-based UI for this OS. The company liked this so much, it's making it a part of Widows 8, so those who get a Windows Phone will soon have a smartphone and a PC with the same look and feel.

Conclusion

Although Android is suitable for beginners and advanced users alike, Android offers more for those that like to tinker with their smartphone than iOS does. The iPhone, on the other hand, is generally preferred by those who want a device that "just works".

BlackBerry is a good option for those who are just looking for a secure way to exchange email while on the go, while Windows Phone should appeal to those who are fans of Microsoft.

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7. Edward Snowden: how the spy story of the age leaked out

As he pulled a small black suitcase and carried a selection of laptop bags over his shoulders, no one would have paid much attention to Ed Snowden as he arrived at Hong Kong International Airport. But Snowden was not your average tourist or businessman. In all, he was carrying four computers that enabled him to gain access to some of the US government's most highly-classified secrets.

Today, he is the world's most famous spy, whistleblower and fugitive, responsible for the biggest intelligence breach in recent US history. News organizations around the globe have described him as "America's Most Wanted". Members of Congress have denounced him as a "defector" whose actions amount to treason and have demanded he be punished to the fullest extent of the law. His supporters argue that his actions have opened up a much-needed debate on the balance between Security and privacy in the modern world. So is the whistleblower or traitor? That debate is still raging.

Snowden, aged 29, had flown to Hong Kong from Hawaii, where he had been working for the defence contractor Booz Allen Hamilton at the National Security Agency, the biggest spy surveillance organisation in the world. Since Monday morning, he has gone underground. Hong Kong-based journalists, joined by the international press, have been hunting for him. At the height of the search, reporters recruited Twitter followers to see if they could successfully identify the lighting and other hotel furnishings shown in the video in which he went public. They did: the $330-a-night Mira Hotel, on Nathan Road, the busy main shopping drag in Kowloon district.

Knowing it was only a matter of time before he was found, Snowden checked out at lunchtime on Monday. It is thought he is now in a safe house.

What happens now? The US is on the verge of pressing criminal charges

against him and that would lead to extradition proceedings, with a view to bringing him back to the US for trial and eventually jail.

If America is planning to jail for life Bradley Manning, who was behind the 2010 WikiLeaks release of tens of thousands of state department memos, what retribution lies in store for Snowden, who is guilty of leaking on a much bigger scale? The documents Manning released were merely "classified". Snowden's were not only "Top Secret", but circulation was extremely limited. Snowden said this was a turning point for him, confirming his belief that traditional media outlets could not be trusted. He looked around for alternative journalists, those who were both anti-establishment and at home with blogging and other social media. The member of this generation that he most trusted was the Guardian commentator Glenn Greenwald.

In January, Snowden reached out to a documentary filmmaker and journalist, Laura Poitras, and they began to correspond. In mid-February, he sent an email to Greenwald, who lives in Brazil, suggesting he might want to set up a method for receiving and sending encrypted emails. He even made a YouTube video for Greenwald, to take him step-by-step through the process of encryption. Greenwald did not know the identity of the person offering the leaks and was unsure if they were genuine. He took no action. In March, in New York, he received a call from Poitras, who convinced him that he needed to take this more seriously.

Greenwald and Snowden set up a secure communications system and the first of the documents arrived, dealing with the NSA's secret Prism programme, which gathers up information from the world's leading technology companies.

Greenwald flew to New York to talk to Guardian editors on 31 May; the next day, he and Poitras flew to Hong Kong. (I met the two for the first time in the New York office, accompanied them to Hong Kong and joined them in

interviewing Snowden over the best part of a week, and writing articles based on the leaked documents and the interviews).

Neither Greenwald nor Poetries even knew what Snowden looked like. "He had some elaborate scheme to meet," Greenwald said. Snowden told him to go to a specific location on the third floor of the hotel and ask loudly for directions to a restaurant. Greenwald assumed Snowden was lurking in the background, listening in.

They went to a room that, Greenwald recalled, contained a large fake alligator. Snowden made himself known. He had told Greenwald that "I would know it was him because he would be carrying a Rubik's Cube". Both Greenwald and Poetries were shocked the first time they saw the 29-year-old. Greenwald said:

I had expected a 60-year-old grizzled veteran, someone in the higher echelons of the intelligence service. I thought: 'This is going to be a wasted trip.'

After an hour of listening to Snowden, Greenwald changed his mind. "I completely believed him," he said.

The interviews were conducted in Snowden's room, which overlooked Kowloon Park. Snowden and the journalists, complete with camera equipment, crammed into the tiny space. He had been there for two weeks, having meals sent up. He did not have much with him: some clothes, a book, four computers, that Rubik's Cube. He was becoming worried about the costs and especially the chance that his credit cards would be blocked.

Even though he was well-versed in surveillance techniques, he would not have been hard to find – having signed in under his own name, using his own credit cards.

The interviews, combined with the leaked documents, provided the Guardian with four scoops in quick succession, from order showing that the US government had forced the telecoms giant Verizonto hand over the phone records of millions of Americans, to the previously undisclosed programmed, Prism.

The Prism story was also published independently by the Washington Post after Poitras, a freelance journalist, had earlier approached the investigative reporter Barton Gellman, who took the story to the paper. Once on the ground in

Hong Kong, however, Poitras began working with the Guardian team.

Snowden's decision to go public has mystified many. Why come out? He had, he said, seen at first hand the impact on colleagues of leak inquiries involving anonymous sources and he did not want to put his colleagues through another ordeal.

So what are the options available to him now? In the interviews, he praised Hong Kong as a place with a strong tradition of free speech and a working judicial system, in spite of having been returned to Chinese sovereignty. But these courts, judging by examples of past extradition cases, tend to lean towards being helpful towards the US.

Snowden would likely argue he is not guilty of a crime and claim the charges are politically motivated. He has been hailed as a hero by some and a criminal by others. He was denigrated in columns in the New York Times and Washington Post. The Post columnist Richard Cohen, though he has never met Snowden, wrote: "He is not paranoiac; he is merely narcissistic." In the New York Times, David Brooks offered up psychological analysis, writing:Though thoughtful, morally engaged and deeply committed to his beliefs, he appears to be a product of one of the more unfortunate trends of the age: the atomization of society, the loosening of social bonds, the apparently growing share of young men in their 20s who are living technological existences in the fuzzy land between their childhood institutions and adult family commitments.

On Sunday night, Snowden gave the last of what had been almost a week's worth of interviews. It was his final night in that hotel room: the final night before his old life gave way to a new and uncertain one. He sat on his bed, arms folded, television news on without the sound, and spoke about the debate he had started, homing in on a comment Obama had made on Friday, in response to the leaks.

"You can't have 100% security and then also have 100% privacy and zero inconvenience," the president said. Society had to make choices, he added. Snowden challenged this, saying the problem was that the Obama administration had denied society the chance to have that discussion. He disputed that there had to be a trade-off

between security and privacy, describing the very idea of a trade-off as a fundamental assault on the US constitution.

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8. Free Amazon Web Services -and How to Make the Most of them

If you avoid some gotchas and keep a close eye on resource usage, you can have a handy server in the Amazon cloud for free.

The best way to think of the free tier to Amazon Web Services is as a stepping-stone. It's a way to get your feet wet with the basic mechanisms of AWS and EC2; to understand Amazon's way of handling virtual machine instances, storage, data, and networking; and to create something that can eventually be hosted on a full-blown, for-pay AWS instance. It's also a way to learn how to manage and constrain AWS usage -- if you're not careful you may end up paying for your "free" AWS usage after all. In this article, we'll look at what the free tier offers you and on what terms, then take a closer peek at what's possible or practical within those constraints.

In the long run, any serious AWS user will want to take fuller advantage of what the Amazon cloud has to offer -- but why not make the most of the free resources in the meantime? The free tier is a great way to find one's legs with AWS, start some projects, and maybe even build a functional application or three.

As a side note, one of the more ominous statements in Amazon's documentation about the free tier is this little warning: "We may stop accepting new registrations for the Offer at any time." This may be boilerplate CYA on Amazon's part, but if you're thinking about setting up a free-tier account, you might as well do it now and get in on the action while it's available.

What do you get for your $0 a month?

The AWS Free Usage Tier provides you with a level of usage for many AWS components that is often just enough to get up and running. But even if it doesn't give you all the resources you might

want to create something truly useful, you can certainly create something functional. Just don't expect it to scale well for unrestricted public use. Here's a rundown of some of the most useful AWS components and what you get with them on the free tier.

Server. You can run a micro instance of a Linux or Windows Server machine on EC2, configured with 613MB of RAM, for 750 hours per month. That's an entire month of free, continuous CPU usage.

Amazon maintains a catalog of AMIs (Amazon Machine Images), which let you run a slew of different Linux and Windows systems -- among them Ubuntu Server 12.04 and 12.10, Microsoft Windows Server 2008 and 2012, and Amazon's own Amazon Linux AMI.

Not every AMI is eligible to be run on the free tier (even when you use a micro instance), but the ones that can be are clearly marked. The AWS Marketplace also features tons of third-party application appliances and server available as AMI instances -- but again, not all can be run on the free tire. A broad range of machine instances is available for AWS. Those eligible for the free tier are marked with a gold star.

Storage. An EC2 instance isn't much use without storage space. On the free tier you're allowed 30GB of Elastic Block Storage, 5GB of Amazon S3 storage, 2 million I/Os, and 1GB of snapshot storage.

Note the limits on I/O usage. This is where things can get complicated, because Amazon charges for I/O. Outside of the free tier, Amazon charges 10 cents per 1 million I/O requests per month, and the amount of I/O used by a given instance can vary widely depending on what you're using it for. (We'll offer tips on managing this later.)

Databases. Among Amazon's Relational Database Services (RDS), you have your pick of MySQL, Oracle BYOL, or Microsoft SQL Server Express, each with 750 hours of usage per month, 20GB of storage, 10 million I/Os, and 20GB of backup storage. For those who prefer NoSQL, Amazon offers it in the form of DynamoDB, but with only 100MB of storage on the free tier. Here again, estimating I/O can be tricky, but there's more than enough available to experiment with a low-traffic, database-

driven site and not run into major overage.

Data transfer. This part is easy: 15GB of outbound bandwidth across all AWS functions -- period. For perspective, my personal site with some 5,000 visitors per month consumes about 1.2GB of bandwidth in that time. For a relatively simple -- or nonpublic -- website, 15GB should be more than enough.

What are the limits?

Now the bad news. Amazon has attached tight strings to the way the free tier works. Aside from the usage limits outlined above, there are a bunch of other restrictions.

Core services are free for only 12 months. Most of the key AWS services -- including EC2, S3, and RDS -- are restricted to 12 months of free use after your initial sign-up. After that, it's pay as you go at the usual rates. On the plus side, some of the other services -- DynamoDB, Simple Workflow, Simple Queue Service, Simple Notification Service, Amazon Elastic Transcoder, and CloudWatch -- are still eligible for the free tier after the first year.

Expect your CPU (and bandwidth) to be throttled. Micro instances are designed to supply maximum CPU in intermittent bursts. They don't supply a full, continuous instance of what Amazon calls a "compute unit" -- you need to move up to the M1 Small instance to get that. This makes a micro instance "well suited for lower throughput applications and websites that require additional compute cycles periodically," as Amazon's documentation puts it.

If you run applications that occasionally spike the CPU at 100 percent, they should be fine. Apps that peg the CPU at 100 percent for long periods of time will run briefly at 100 percent, then be throttled. Note that the internal statistics for a throttled machine will still report the CPU as running at 100 percent, so don't be fooled. You can monitor usage statistics through Amazon's EC2 Dashboard, but you'll get better granularity of stats from inside the running machine.

Windows Server instances on the free tier may be a tight fit. Depending on what you plan to do, the amount of memory apportioned to a Windows Server instance may not be enough to run anything terribly ambitious. If you're not doing more than serving up static

Web pages, it should be fine. I was able to install MySQL/Apache instances on such a machine (via the AMPPS Web stack) and run it with about 20 percent RAM free.

On the plus side, if you're using a database via an AWS-hosted database instance (RDS), the database is launched entirely apart from the machine you're running. With RDS, you don't have to worry about running a database server on the actual instance you're using (and thus gobbling up that much more memory with it).

You don't get a consistent IP address by default. Because of the way AWS provisions addresses, instances do not come with a static IP address or a consistent private DNS name automatically. This makes it tough to host a free site for use by the outside world without some DNS trickery, as resetting the instance you're using will cause its IP address to also reset. Fortunately, this limitation is easy to overcome. If you want a machine to be consistently reachable by the general public, you can use EC2 Elastic IP Addresses to provision a static IP for a free instance. Bear in mind that if you reserve an address and don't actually associate it with an instance, you'll be charged a small fee.

Best practices with the free tier clearly; the free tier has many gotchas. The resource limits make it all too easy to run up charges if you're not careful. As you strive to make the most of your micro instance, keep these guidelines in mind.

Keep an eye on your billing. It should go without saying, but check in regularly with your AWS account activity page to see if you're running up charges you're not aware of. By default Amazon doesn't warn you if you've exceeded the free tier; you're just silently billed for any usage that isn't covered. If you want to be alerted to what your estimated usage is going to be and create alarms to warn you if you might exceed your budget, Amazon provides a billing alert system for your use. However, the number of alarms and notifications you can generate is limited by the free tier.

Keep an eye on your I/O usage. If you're using the server for yourself, you're not likely to run up a big I/O usage bill. But if you make your server public, that could change everything dramatically.

Figuring out the I/O usage for your instances isn't difficult, but it requires diligence and scrutiny. The EC2 management console provides monitoring tools, although the ones in the free tier aren't as granular as you otherwise get. You can't poll a free instance at more than five-minute intervals, whereas you get one-minute polling with for-pay instances.You can also poll I/O usage from within the instance itself, using the OS's own tools. Here's one way to do it on Linux. In Windows you can use the Disk Transfers/Sec performance counter.You can track your service charges through Amazon's reporting system, which also allows you to download the gory details in CSV/XML formats.

Assign an elastic address to save yourself a lot of headache. An elastic address doesn't add a significant amount to your bill, and it allows for easier connections to your system. This goes double for Windows instances, because the Remote Desktop connection tool stores the connection address and password together. Each time your site is provisioned with a new IP address, you have to create an entirely new Remote Desktop connection to reach it. **Back up items in the cloud.** You never know when the server you'll be working with may bomb on you or have to be re-initialized. It's better to have any pertinent data already in Amazon's cloud instead of needing to be tediously re-uploaded. An EBS Snapshot is one really convenient way to do this, although you get only 1GB of snapshot storage on the free tier. Alternatively, you can attach an EBS volume and back up files directly to it, the way you'd perform backups from a conventional system to an external drive.

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9. Hacking the Internet – bringing down infrastructure

Why should hackers try to disable computers when they might be able to set their sights higher? Routers can be just as vulnerable as servers, so why not bring down the entire Internet?

The US Department for Homeland Security (DHS) was set up in November 2002 with the primary responsibility of protecting the USA and its territories from terrorist attacks, accidents, and natural disasters. However, its remit has slowly spread in recent years to cover the nation's Critical National Infrastructure, which includes the structure of the Internet itself. Surprisingly perhaps, the DHS has never really got to grips with raising the security of the Internet's own architecture – the integral global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to serve several billion users worldwide.

This may seem at odds with the heightened sense of cyber-security that has arisen over the last decade, but anecdotal evidence suggests that this stems from the widely-held misunderstanding that the Internet is so diverse as to be resilient to anything other than an extreme national catastrophe, such as a nuclear strike. Not so: the Internet is nowhere near as robust as some might want to believe.

Whilst the beginnings of the Internet can be traced back to October 1969 when the first two nodes of what would become the ARPANET were interconnected on the US West Coast, the Internet of 2013 is best described as a mesh of computer networks that are interconnected by a common set of protocols and standards.

Any assumption that the Internet has perpetuated the original aim to establish an ultimately robust, fault-tolerant communication system – one that operates via computer networks, and would be largely unaffected by large-scale military offensive action – is not wholly accurate.

Widespread concerns over how resilient the Internet would be to a concerted attack by persons unknown surfaced when the first wide-scale distributed denial of service (DDoS) attacks started taking place in late 2010 – driven largely by the hacktivist group now known as Anonymous. Anonymous made use of a DDoS attack application known as LOIC (Low-Orbit Ion Cannon), which is based on an open-source network stress-testing package first developed by Praetox Technologies.

LOIC moved the concept of a multi-user DDoS attack out of the text books and into real-world environments, using a

five-pronged attack strategy based on the 'maxing out' of Internet computational resources, including bandwidth, disk space, and/or processor time.

One of Praetox Technologies' least-known DDoS attack vectors involves the disruption of configuration information, such as routing information, on the Internet. The good news is that this attack vector – known also as 'DNS poisoning' – seems never to have made it into the LOIC software or its successors. The even better news is that, following some DNS routing screw-ups, the Internet is now relatively immune to routing table/DNS attacks.

Many observers think of DDoS attacks as requiring major bandwidth resources – in the hands of 'Black Hat' (malicious) hackers – in order to mount. However, as Anonymous has proved with LOIC, several hundred users' minor bandwidth can be married together to stage a wide-band DDoS attack. Then there are 'slow and low' attacks, which force a server's IP/transactional resources to time out – the broadband equivalent of busying-out multiple trunk/international lines in the old days of 'phreaking' (telephone system hacking) – to consider.

Preparing for cyber attack

It's worth noting that almost all of the attacks reported by DDoS remediation specialists such as Akamai, Arbor Networks, and Prolexic, have focused on attacks on major corporations. It is logical to predict, however, that the scale of DDoS attacks could ratchet up with the current state-sponsored cyber espionage attacks gravitating toward national DDoS attacks at some point.

attacks intended to bring down the Internet infrastructure, as opposed to compromising servers and other computer devices that hang off the end? This issue receives much less attention than the latter in the general debate over cyber vulnerabilities.

The fragility of the Internet's architecture – on a local country level – was highlighted last March when DDoS attacks of around 300 GB/s were seen on the servers of Spamhaus, the not-for-profit anti-spam security organisation. Though not massive on a country capacity basis, it was sufficient to slow down and even freeze access to the Spamhaus site on multiple European country networks at peak times for days – with much European country Internet

services slowed down as a result. Spamhaus was able to assuage most of the effects of the attack by working with CloudFlare, a US-based cloud security specialist. A Dutch national was arrested in Spain in connection with allegedly orchestrating the attacks. The 35-year-old male suspect was found to have been working from a bunker in north-eastern Spain and also had a van, equipped with 3G and 4G cellular services, that was said to be capable of hacking into networks anywhere in the country.The man is reportedly linked with Cyberbunker, a Dutch organisation housed in a five-storey NATO bunker that advertises itself as a 'hosting provider'. As with the open-source LOIC software developed by Anonymous, the Spamhaus incident proves that multiple servers are not always needed to orchestrate a major attack that can cause painful regional brown-outs on the Internet.

Hack the Internet Service Provider

Before examining this possibility further it is important to note that the Internet infrastructure is not entirely without protection. As it is highly unlikely that a hacker could successfully subvert national peering points in individual countries – London's Telehouse centre's, for example – due to physical and electronic constraints, we must first start to look at how to subvert an Internet Service Provider's resources.

It is unlikely that any sensible, diligent ISP would allow anyone other than a senior employee or engineer to access their main switching room, but a switching console – in the shape of a supposed secure Web interface – might become accessible to a knowledgeable, skilled, well-motivated hacker. That switching console would never be accessible using conventional means, but it could be made accessible by adroitly hacking into the communications infrastructure of the Internet on the users' side of the ISP's system.

The primary attack vector in this instance would be the DSLAM – digital subscriber line access module – and its allied digital concentrators at the local telephone exchange facility. DSLAMs are network devices, often located in the telephone exchanges of the telecommunications operators, which connect multiple customer digital subscriber line (DSL) interfaces to a high-speed digital communications

channel using sophisticated multiplexing techniques.

A typical DSLAM aggregates the DSL lines over its very-high capacity asynchronous transfer mode (ATM), Frame Relay, and/or IP network connections. The aggregated traffic is then directed to an ISP's backbone switch, normally at speeds of up to 10 GB/s.

In use, a DSLAM typically acts like a network switch, as its functionality is at Layer 2 of the OSI (Open Systems Interconnection) model, a conceptual model that characterizes and standardises the internal functions of communication systems by partitioning them into abstraction 'layers'. This means that a DSLAM cannot normally re-route traffic between multiple IP networks, only between ISP devices, and end-user connection points. However, since the DSLAM traffic is then switched to a broadband remote access (BRA) server where the end-user traffic is then routed across the ISP's network and out on to the Internet, it follows that subverting the DSLAM at the software level would allow access to the basic infrastructure of the Internet that is not normally accessible to consumers or business ISP customers.

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10. Holographic screen

A holographic screen is a display technology that uses coated glass media for the projection surface of a video projector. "Holographic" refers to the coating that bundles light using formed microlenses. The lens design and attributes match the holographic area. The lenses may appear similar to the fresnel lenses used in overhead projectors. The resulting effect is that of a free-space display, because the image carrier appears very transparent. Additionally, the beam manipulation by the lenses can be used to make the image appear to be floating in front of or behind the glass, rather than directly on it. However, this display is only two-dimensional and not true three-dimensional. It is unclear if such a technology will be able to provide acceptable three-dimensional images in the future. The display design can use either front or rear projection, in which one or more video projectors are directed at the glass plate. Each projector's beam widens as it approaches the surface and

then is bundled again by the lenses' arrangement on the glass.

This forms a virtual point of origin, so that the image source appears to be an imaginary object somewhere close to the glass. In rear projection (the common use case), the light passes through the glass; in front projection it is reflected.

Interactive holographic screens add gesture support to holographic screens. These systems contain three basic components:

A projector, a computer, two films. The computer sends the image to the projector. The projector generates light beams which form the image on the screen.

When the user touches the screen, a tactile membrane film reacts to these movements, generating electrical impulses that are sent back to the computer.

The computer interprets the received impulses and modifies the projected image according to the information.

The projector generates the beams of light that will form the image on the screen's film, which is adhered to the crystal support.

These crystal lenses can be a maximum of 16 millimeters (0.63 in) across.

The projector is usually located behind the screen and must be placed a certain angle above or below the user's line of sight to avoid the dazzling the user.

Therefore, it must be trapezoidal projector, so it can compensate for the deforming of the images at this angle of displacement.

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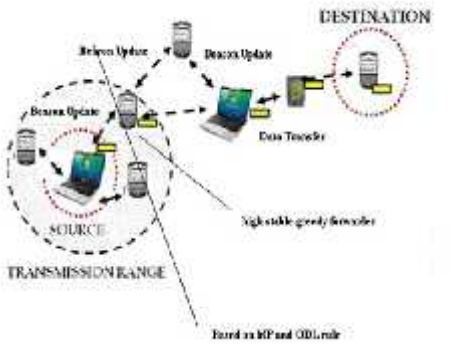
11. Review of Energy Awareness in TORA Protocol

Mobile AdHoc Network (MANET) is the self organizing network.

The nodes employed in the creation of network can move freely and are usually operated through battery power.

The amount of battery capacity of nodes is limited and the nodes get discharged when they transmit or receive packet. TORA routing protocol create multiple routes from any source to destination.

Usually the shortest path is selected for forwarding the packets which may lead overuse of some nodes and they become dead very soon which may decrease the lifetime of network. In this paper a new approach is used in which only that path will be selected for forwarding packet which has energy of nodes above some threshold level.



Wireless ad-hoc networks are composed of autonomous nodes that are self-managed without any infrastructure. The most important characteristic of such networks is the independence of any fixed infrastructure or centralized administration. An Ad Hoc network is capable of operating autonomously and is completely self organizing and self-configuring. Therefore, it can be rapid and easily deployable. Another important property of an Ad Hoc network is multi-hop capability. In this way, ad-hoc networks have a dynamic topology such that nodes can easily join or leave the network at any time. Mobile AdHoc network is used to create network where\there is no infrastructure like in case of disaster, military area etc. these networks does not need any base station for transferring data from source to destination.

TORA is an on demand routing protocol that creates multiple loop free routes from source to destination. The TORA protocol creates a DAG (Directed Acyclic Graph) directed towards destination while creating route. A directed acyclic graph is a directed graph that contains no cycles. A rooted tree is a special kind of directed graph. The

TORA protocol is based on the Link Reversal Algorithm to manage link in case of link failure between nodes. Whenever link of any node fails it checks for its remaining outgoing links, if it doesn't have any outgoing link then it reverse some of its incoming link to maintain the DAG. The TORA protocol assigns a height factor to each node a, where the height of the destination node is zero and it increases while moving toward the source node. The height to the nodes is assigned on the basis of quintuple discussed later. It creates routes by setting "height" metric of each node. Data packets "flow" from nodes having higher height to nodes of lower height, and eventually reach the destination, which has zero height with respect to itself. A directed acyclic graph (DAG) rooted at the destination is created in every route query/reply process. There are three basic functions of TORA protocol 1. Route Creation: creation of route from source to destination, 2. Route Maintenance: maintain the route in case of link failure or when some become dead, 3. Route Erasure: when there is a case of network partition then this operation is used to erase the old route and create a new one. To perform these operations it uses QRY, UDP, CLR packets respectively. When a new route is required by the source node, it broadcasts a route query (QRY) to its neighbors. The QRY packet is then re-broadcast by neighbors until it reaches the destination.

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12. Affective computing and its applications in the apparel retail industry

"Any sufficiently advanced technology is indistinguishable from magic", said Arthur C. Clarke, author of many science fictions. Technology has an important role to play in transforming businesses in a big way. With the growing usage of smart phones and tablets, apparel retailers want to use technology to their advantage to stay ahead in the times of fierce competition. For apparel retailers and in the fashion industry understanding consumer behavior is a direct route to achieving higher revenues and better sales. Data analytics and sensors are a few methods used in the sector for making better decisions. Lately advances in the field of

neuroscience can reveal a great deal about emotions that are at the very crux of human decision making. Essentially emotions trigger the way individuals engage with brands and products rather than cognitive thoughts.

Conventionally used techniques like surveys and focus groups do not measure emotional responses accurately and are prone to biases. They fail to capture honest, unfiltered, and spontaneous feelings. It would be so much simpler if just by reading the facial expressions, gestures, voices, heart rates, and sweat to identify the emotions of an individual. Enter affective computing, a technology that does just that through personal devices like laptops, phones, and tablets. Affective computing can be defined as the study and development of systems and gadgets which recognize, process, integrate, and stimulate human affects. It is an amalgamation of three different disciplines namely psychology, cognitive science, and computer science. The affective computing technology aims at interpreting the emotional state of human beings and according to which it adapts its behavior by providing an appropriate response.

By availing such a novel technology at their disposal, the apparel e- tailors can track human emotions and use such information to develop garments, sales, marketing, and service. The clothing e-commerce using affective computing can provide a shopping experience just like an individual will have in-store by using an interactive technology like this. There are immense possibilities for e-tailors in the fashion world. By reading emotions of consumers they can automatically adapt their merchandises in real time depending on the mood of the shopper.

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13. OLED Display Technology

During the last two decades, organic light-emitting diodes (**OLEDs**) have attracted considerable interest owing to their promising applications. They have already made inroads into the displays used for mobiles, PDAs and OLED TVs are also available in the market. Soon, OLEDs will be replacing incandescent and fluorescent lamps.

OLEDs, based on electroluminescence, are energy conversion devices. They convert electricity into light. Electroluminescence is the emission of light from materials in an electric field. In 1960, hole injection into an organic crystal was first observed by Martin Pope and his group in anthracite. Three years later, they also observed electroluminescence (EL) from single crystal anthracite and an impurity-doped one under direct current. Despite the high quantum efficiency obtained with such organic crystals, no applications emerged due to the requirement of high working voltage (above 400 V) for visible emission. Subsequently, Helfrich and Schneider achieved double injection recombination electroluminescence in single crystal anthracite using electron and hole injecting electrodes with voltages reduced to ~60 V for observable emission.

In 1987, Van Slyke and C. Tang from Eastman Kodak developed a novel hetero structure- double layered device containing active "small molecules". The two thin-film organic layers independently were responsible for hole and electron transport. The device provided good brightness (>1000 cd/m^2), low operating voltages (<10V) and respectable luminous efficiency (1.5 lm/W), research gained the momentum. Additionally, the device showed rectifier behavior, giving rise to the term OLED (organic light emitting diode).

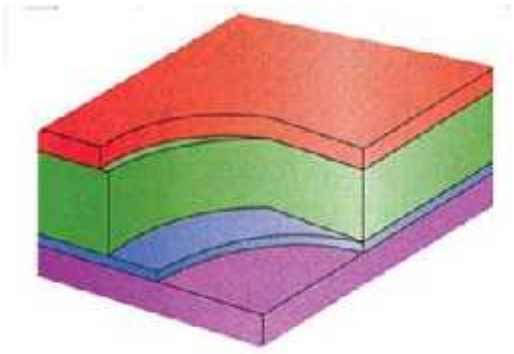
This discovery stimulated explosive development of this field.

OLED –WHAT IS OLED?

OLED is an emissive technology; they emit light instead of diffusing or reflecting a secondary source. OLED is an acronym for

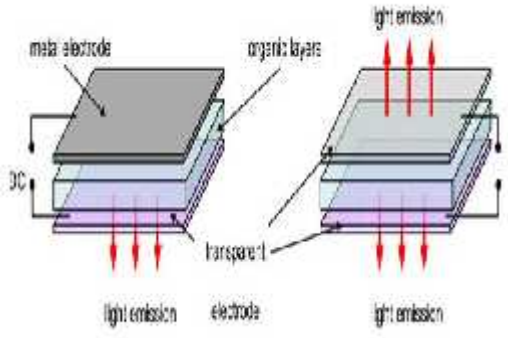
Organic Light Emitting Diode.

OLED is a self light-emitting technology which consists of a number of semiconducting organic layers sandwiched between two electrodes at least one of them being transparent. Transparent electrode is composed of electric conductive transparent Indium Tin Oxide (ITO) coated glass substrate.



A simplified device structure is shown in following figure. The device on the left has one transparent electrode and emits light on one side only.

The device on the right uses both the electrodes as transparent ones and it emits light in both top and bottom direction.



OLEDs are extremely thin, practically 2- dimensional multi-layer devices. The thickness of all the active layers put together is of the order of a 100 nm.

This is extremely useful in space critical applications, such as in aircrafts.

Also, these devices can work in subzero temperatures and hence can be significance for military applications as well.

OLED devices have no restriction on the size and shape. Every conceivable shape, including flexible ones, can be provided.

The devices can be in form of fibers, and woven to fabrics. They can be bent, rolled into films or it can constitute the surface of spheres. For lighting applications, thin glass substrates can be used.

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14. Continuous Speech Recognition System in Hindi

To make Information Technology (IT) relevant to rural India, voice access to a variety of computer based services is imperative. Although many speech interfaces are already available, the need is for speech interfaces in local Indian languages. Application specific Hindi speech recognition systems are required to make computer aided teaching, a reality in rural schools.

Application specific voice interfaces in local languages will go a long way in reaching the benefits of technology to rural India. A continuous speech recognition system in Hindi tailored to aid teaching Geometry in Primary schools is the goal of the work. In this system, used the Mel Frequency Cepstral Coefficients as speech feature parameters and Hidden Markov Modeling to model the acoustic features. Hidden Markov Modeling Tool Kit −3.4 was used both for feature extraction and model generation. The Julius recognizer which is language independent was used for decoding. A speaker independent system is implemented and results are useful for Indian people.

Automatic speech recognition has progressed tremendously in the last two decades. There are several commercial Automatic Speech Recognition (ASR) systems developed, the most popular among them are Dragon Naturally Speaking, IBM Via voice and Microsoft SAPI. IBM Research Laboratory of India has developed a Hindi Speech Recognition system which has been trained on 40 hours of audio data and has a trigram language model that is trained with 3 million words.

Speech recognition is the process of converting an acoustic signal, captured by a microphone or a telephone into a set of words. The recognized words can be the final result for applications such as commands and control, data entry, and document preparation. They can also serve as the input to further linguistic processing in order to achieve speech understanding. Speech signal is analog. In the first place analog electrical signals are converted to digital signals. This is done in two steps, sampling and quantization. So a typical representation of a speech signal is a stream of 8-bit numbers at the rate of 10,000 numbers per second. Once the signal conversion is complete, background noise is filtered to keep signal to noise ratio high. The signal is pre-emphasized and then speech parameters are extracted.

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15. OpenStack: Open Source Cloud

OpenStack is a set of software tools for building and managing cloud computing platforms for public and private clouds.

Backed by some of the biggest companies in software development and hosting, as well as thousands of individual community members, many think that OpenStack is the future of cloud computing. OpenStack is managed by the OpenStack Foundation, a non-profit which oversees both development and community-building around the project.

Introduction to OpenStack

OpenStack lets users deploy virtual machines and other instances which handle different tasks for managing a cloud environment on the fly. It makes horizontal scaling easy, which means that tasks which benefit from running concurrently can easily serve more or less users on the fly by just spinning up more instances. For example, a mobile application which needs to communicate with a remote server might be able to divide the work of communicating with each user across many different instances, all communicating with one another but scaling quickly and easily as the application gains more users.

And most importantly, OpenStack is open source software, which means that anyone who chooses to can access the source code, make any changes or modifications they need, and freely share these changes back out to the community at large. It also means that OpenStack has the benefit of thousands of developers all over the world working in tandem to develop the strongest, most robust, and most secure product that they can.

How is OpenStack used in a cloud environment?

The cloud is all about providing computing for end users in a remote environment, where the actual software runs as a service on reliable and scalable servers rather than on each end users computer. Cloud computing can refer to a lot of different things, but typically the industry talks about running different items "as a service"—software, platforms, and infrastructure. OpenStack falls into the latter category and is considered Infrastructure as a Service (IaaS). Providing infrastructure means

that OpenStack makes it easy for users to quickly add new instance, upon which other cloud components can run. Typically, the infrastructure then runs a "platform" upon which a developer can create software applications which are delivered to the end users.

What are the components of OpenStack?

OpenStack is made up of many different moving parts. Because of its open nature, anyone can add additional components to OpenStack to help it to meet their needs. But the OpenStack community has collaboratively identified nine key components that are a part of the "core" of OpenStack, which are distributed as a part of any OpenStack system and officially maintained by the OpenStack community.

- **Nova** is the primary computing engine behind OpenStack. It is used for deploying and managing large numbers of virtual machines and other instances to handle computing tasks.
- **Swift** is a storage system for objects and files. Rather than the traditional idea of a referring to files by their location on a disk drive, developers can instead refer to a unique identifier referring to the file or piece of information and let OpenStack decide where to store this information. This makes scaling easy, as developers don't have the worry about the capacity on a single system behind the software. It also allows the system, rather than the developer, to worry about how best to make sure that data is backed up in case of the failure of a machine or network connection.
- **Cinder** is a block storage component, which is more analogous to the traditional notion of a computer being able to access specific locations on a disk drive. This more traditional way of accessing files might be important in scenarios in which data access speed is the most important consideration.
- **Neutron** provides the networking capability for OpenStack. It helps to ensure that each of the components of an OpenStack deployment can communicate with one another quickly and efficiently.
- **Horizon** is the dashboard behind OpenStack. It is the only graphical interface to OpenStack, so for users wanting to give OpenStack a try, this may be the first component they actually "see." Developers can access all of the

components of OpenStack individually through an application programming interface (API), but the dashboard provides system administrators a look at what is going on in the cloud, and to manage it as needed.

- **Keystone** provides identity services for OpenStack. It is essentially a central list of all of the users of the OpenStack cloud, mapped against all of the services provided by the cloud which they have permission to use. It provides multiple means of access, meaning developers can easily map their existing user access methods against Keystone.
- **Glance** provides image services to OpenStack.

  In this case, "images" refers to images (or virtual copies) of hard disks. Glance allows these images to be used as templates when deploying new virtual machine instances.
- **Ceilometer** provides telemetry services, which allow the cloud to provide billing services to individual users of the cloud.

  It also keeps a verifiable count of each user's system usage of each of the various components of an OpenStack cloud. Think metering and usage reporting.
- **Heat** is the orchestration component of Open Stack, which allows developers to store the requirements of a cloud application in a file that defines what resources are necessary for that application.

  In this way, it helps to manage the infrastructure needed for a cloud service to run.

Who is Open Stack for?

You may be an OpenStack user right now and not even know it!

As more and more companies begin to adopt OpenStack as a part of their cloud toolkit, the universe of applications running on an OpenStack backend is ever-expanding.

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16. Viruses are Good Thing!!

What scares you most about getting that virus?

Is it the prospect of witnessing your system's gradual decay, one nagging symptom following another until one day the whole thing comes to a halt? Is it the self-recrimination, all the useless

dwelling on how much easier things would have been if only you'd protected yourself, if only you'd been more careful about whom you associated with?

Or is it not, in fact, something deeper? Could it be that what scares you most about the virus is not any particular effect it might have, but simply its assertive, alien presence, its intrusive otherness? Inserting itself into a complicated choreography of subsystems all designed to serve your needs and carry out your will, the virus hews to its own agenda of survival and reproduction. Its oblivious self-interest violates the unity of purpose that defines your system as yours. The virus just isn't, well, you. Doesn't that scare you?

And does it really matter whether the virus in question is a biological or an electronic one? It should, of course. The analogy that gives computer viruses their name is apt enough to make comparing bioviruses and their digital analogs an interesting proposition, but it falls short in one key respect. Simply put, the only way to fully understand the phenomenon of autonomously reproducing computer programs is to take into account their one essential difference from organic life forms: they are products not of nature but of culture, brought forth not by the blind workings of a universe indifferent to our aims, but by the conscious effort of human beings like ourselves.

Why then, after a decade of coexistence with computer viruses, does our default response to them remain a mix of bafflement and dread? Can it be that we somehow refuse to recognize in them the traces of our fellow earthlings' shaping hands and minds? And if we could shake those hands and get acquainted with those minds, would their creations scare us any less?

These are not idle questions. Overcoming our fear of computer viruses may be the most important step we can take toward the future of information processing. Someday the Net will be the summation of the world's total computing resources. All computers will link up into a chaotic digital soup in which everything is connected - indirectly or directly - to everything else. It will be an ecology of computing machines, and managing it will require an ecological approach.

Many of the most promising visions of how to coordinate the far-flung communication and computing cycles of

this emerging platform converge on a controversial solution: the use of self-replicators that roam the Net. Free-ranging, self-replicating programs, autonomous Net agents, digital organisms - whatever they are called, there's an old fashion word for them: computer viruses.

Today three very different groups of heretics are creating computer viruses. They have almost nothing to do with each other. There are scientists interested in the abstract behaviors of self-replicating codes, there are developers interested in harnessing the power of self-replicating programs, and there are unnamed renegades of the virus-writing underground.

Although they share no common experience, all these heretics respect a computer virus for its irrepressible mobility, for the self-centered autonomy it wrests from a computer environment, and for the surprising agility with which it explores opportunities and possibilities. In short, virus enthusiasts relate to the virus as a fascinating and powerful life form, whether for the fertile creation of yet more powerful digital devices, as an entity for study in itself, or, in the case of one renegade coder, for reckless individual expression.

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17. Google Cloud Messaging

Google Cloud Messaging (GCM) is a service that enables developers to send data from servers to both Androidapplications or Chrome apps and extensions.Introduction to OpenStack.

The service provides a simple, lightweight mechanism that servers can use to tell mobile applications to contact the server directly, to fetch updated application or user data. The service handles all aspects of queueing of messages and delivery to the target application running on the target device.

The free service has the ability to send a lightweight message informing the Android application of new data to be fetched from the server. Larger messages

can be sent with up to 4 KB of payload data. Each notification message size is limited to 1024 bytes, and Google limits the number of messages a sender sends in aggregate, and the number of messages a sender sends to a specific device.

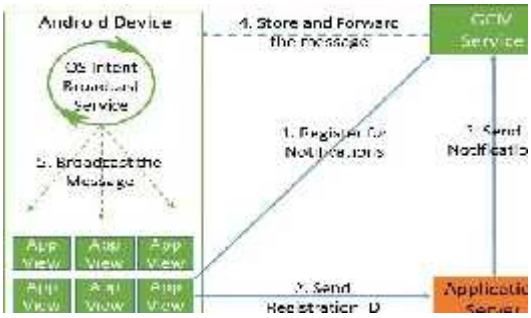
Applications on an Android device don't need to be running to receive messages. The system will wake up the application via a mechanism called Intent Broadcast when the message arrives, as long as the application is set up with the proper broadcast receiver and permissions. GCM does not provide any built-in user interface or other handling for message data. Instead, it simply passes raw message data received straight to the application, which has full control of how to handle it. For example, the application might post a notification, display a custom user interface, or silently sync data.GCM first launched as Google's

Android Cloud to Device Messaging

(C2DM) service, first featured in Android 2.2 byGoogle.The transition to **Google Cloud Messaging** was first announced when the Android service was unveiled on June 27, 2012, at Google I/O. The Chrome service was announced before Google I/O 2013 in a blog post titled 'Building efficient apps and extensions with push messaging.

At [I/O] 2015, Google announced a new SDK and iOS support.

Functional Diagram of Google Clod Messaging Technology



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18. Network Simulater-2

Network Simulator:

NS is a discrete event simulator targeted at networking research. It provides substantial support for TCP routing and multicast protocols over wired and wireless networks. Using Xgraph (A plotting program) we can create graphical representation of simulation results. All the work is done under Linux platform, preferably ubuntu.

About NS2

NS is an object oriented simulator, written in C++, with an OTcl interpreter as a frontend. ns uses two languages because simulator has two different kinds of things it needs to do. On one hand, detailed simulations of protocols require a systems programming language which can efficiently manipulate bytes, packet headers, and implement algorithms that run over large data sets. For these tasks run-time speed is important and turn-around time (run simulation, find bug, fix bug, recompile, re-run) is less important.

On the other hand, a large part of network research involves slightly varying parameters or configurations, or quickly exploring a number of scenarios. In these cases, iteration time (change the model and re-run) is more important. Since configuration runs once (at the beginning of the simulation), run-time of this part of the task is less important.

NS meets both of these needs with two languages, C++ and OTcl .C++ is fast to run but slower to change, making it suitable for detailed protocol implementation. OTcl runs much slower but can be changed very quickly (and interactively), making it ideal for simulation configuration. In NS-2, the frontend of the program is written in TCL (Tool Command Language). The backend of NS-2 simulator is written in C++ and when the tcl program is compiled, a trace file and namfile are created which define the movement pattern of the nodes and keeps track of the number of packets sent, number of hops between 2 nodes, connection type etc at each instance of time. In addition to these, a scenario file defining the destination of mobile nodes along with their speeds and a connection pattern file (CBR file) defining the connection pattern, topology and packet type are also used to create the trace files and nam files which are then used by the simulator to simulate the network.

Also the network parameters can be explicitly mentioned during the creation of the scenario and connection-pattern files using the library functions of the simulator.

Defining Global Variable

set ns_ [new Simulator]#creates a new simulator instance

set topo [new Topography]#creates a new topology

$topo load_flatgrid 670 670#defines it in

670X670 area

Here set command is used to create a global variable. The first argument is the variable name (ns_, topo, etc.). the second argument is used to get the value of the variable. It may be a constant or a function whose return value is assigned to the variable. To access a variable we use $var_name, where var_name is the name of the variable.

Defining Standard NS/NAM Trace

To run the output of the program in an animator we need a nam file, and to analyze the output we need trace file. So the program must output certain files called nam file and trace file. We can do so by the following commands:

Set tracefd [open demo.tr w]

$ns_ trace-all $tracefd

Set namtrace [open demo.nam w]

$ns_ namtrace-all-wireless $namtrace 670 670

The above commands open two files called demo.tr and demo.nam and initialize them.

Traffic and movement

We can also define the traffic and movement pattern in separate files called CBR file and scenario file respectively. Cbr file can be created by using a tcl program called cbrgen.tcl which is present in the directory ”ns-2/indep-utils/cmu-scen-gen/”. To define the movement we use an exe file called setdest present in the folder“ns-2/indep-utils/cmu-scen-gen/setdest/”.

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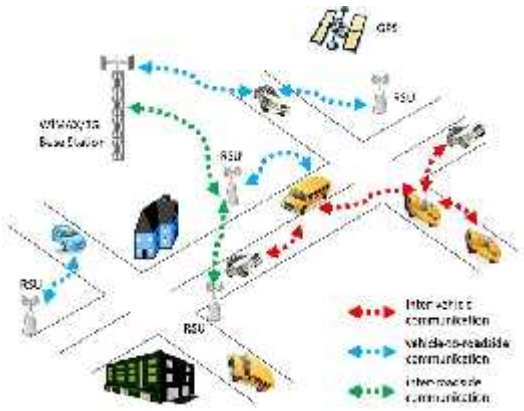
19. Intelligent vehicular ad hoc networks (InVANETs)

Intelligent vehicular ad hoc networks (InVANETs)

use WiFi IEEE 802.11p (WAVE standard) and WiMAX IEEE 802.16 for easy and effective communication between vehicles with dynamic mobility. Effective measures such as media communication between vehicles can be enabled as well methods to track automotive vehicles. InVANET is not foreseen to replace current mobile (cellular phone) communication standards.



"Older" designs within the IEEE 802.11 scope may refer just to IEEE 802.11b/g. More recent designs refer to the latest issues of IEEE 802.11p (WAVE, draft status). Due to inherent lag times, only the latter one in the IEEE 802.11 scope is capable of coping with the typical dynamics of vehicle operation.

Automotive vehicular information can be viewed on electronic maps using the Internet or specialized software. The advantage of WiFi based navigation system function is that it can effectively locate a vehicle which is inside big campuses like universities, airports, and tunnels. InVANET can be used as part of automotive electronics, which has to identify an optimally minimal path for navigation with minimal traffic intensity. The system can also be used as a city guide to locate and identify landmarks in a new city.

Communication capabilities in vehicles are the basis of an envisioned InVANET or intelligent transportation systems (ITS). Vehicles are enabled to communicate among themselves (vehicle-to-vehicle, V2V) and via roadside access points (vehicle-to-roadside, V2R) also called as Road Side Units (RSUs). Vehicular communication is expected to contribute to safer and more efficient roads by providing timely information to drivers, and also to make travel more convenient. The integration of V2V and V2R communication is beneficial because V2R provides better service sparse networks and long distance communication, whereas V2V enables direct communication for small to medium distances/areas and at locations where roadside access points are not available.

Providing vehicle–vehicle and vehicle–roadside communication can considerably improve traffic safety and comfort of driving and traveling. For communication in vehicular ad hoc networks, position-based routing has emerged as a promising candidate. For Internet access, Mobile IPv6 is a widely accepted solution to provide session continuity and reachability to the

Internet for mobile nodes. While integrated solutions for usage of Mobile IPv6 in (non-vehicular) mobile ad hoc networks exist, a solution has been proposed that, built upon a Mobile IPv6 proxy-based architecture, selects the optimal communication mode (direct in-vehicle, vehicle–vehicle, and vehicle–roadside communication) and provides dynamic switching between vehicle–vehicle and vehicle–roadside communication mode during a communication session in case that more than one communication mode is simultaneously available.

Currently there is ongoing research in the field of InVANETs for several scenarios. The main interest is in applications for traffic scenarios, mobile phone systems, sensor networks and future combat systems. Recent research has focused on topology related problems such as range optimization, routing mechanisms, or address systems, as well as security issues like traceability or encryption. In addition, there are very specific research interests such as the effects of directional antennas for InVANETs and minimal power consumption for sensor networks. Most of this research aims either at a general approach to wireless networks in a broad setting or focus on an extremely specific issue.

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20. Software as a Service (SaaS)

Cloud Software as a Service (SaaS) is basically a term that refers to software in the cloud. It represents the capability provided to the consumer to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through an interface such as a web browser (e.g. web-based email like Gmail is a form of SaaS provided by Google). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities. SaaS systems have some defining characteristics:

Availability via web browser

SaaS software never requires the installation of software on your laptop or desktop. You access it through a web

browser using open standards or a browser plug-in.

On-demand availability

You should not have to go through a sales process to gain access to SaaS based software. Once you have access, you should be able to go back into the software any time, from anywhere.

Payment terms based on usage

SaaS does not need any infrastructure investment or complex setup, so you should not have to pay any massive setup fees. You should simply pay for the parts of the service you use as you use them. When you no longer need those services, you simply stop paying.

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21. Infrastructure as a Service (IaaS)

The focus of this tutorial is on the IaaS service model. Amazon Web Services (AWS) is one of the major players in this area.

The AWS is based on pure virtualization, it owns all the hardware and controls the network infrastructure and you own everything from the guest operating system up. You request virtual Instances on-demand and let them go when you are done. AppNexus represents a different approach to this problem. As with AWS, AppNexus enables you to gain access to servers on demand.

However, it provides dedicated servers with virtualization on top. You have the confidence in Knowing that your applications are not fighting with anyone else for resources and that you can meet any requirements that demand full control over all physical server resources. Hybrid computing takes advantage of approaches, offering virtualization when appropriate and a dedicated hardware when appropriate.

In addition, most hybrid vendors such as Rackspace and GoGrid base their model on the idea that users still want a traditional data center and dedicated storage, but they just want it in the cloud. This tutorial focuses on the Amazon AWS and provides a practical example about using the Amazon EC2 IaaS solution.

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22. Advanced Data Recovery

Data recovery refers to accessing logically or physically damaged data or over written data without the use any functioning backup.

The advanced data recovery has two different methods where the first method - Part replacement deals with the recovery from physically and or logically damaged data.

In case of physical and/or logical damage usually the drive electronics or the system information gets altered from the normal values setting these to the previous sates or replacing the electronics or system information with certain values that can be matched with almost all such values of any specific dive is enough to recover the data.

The methods and challenges are discussed for replacing, or refreshing firmware and system area information and for replacing all or some part of the drive electronics. The second method of data recovery the Magnetic recovery deals with the recovery of the over written data.

The magnetic recovery uses the Magnetic Force Microscopy for recovery of over written data. The backbone of the magnetic recovery is the interesting fact that the magnetic memory always remembers whatever is written on it till it is forced for a degauss under strong magnetic field. The method of recovery using Magnetic Force Microscopy and its challenges are discussed. As far as the cyber forensics is considered the recovery of data after physical damage and over writing is of great importance. The most common methods of deletion and recovery using the journal are discussed along with the challenges.

The indomitable and invincible spirit of human being paved the way to the advent of computer systems. The seemingly impossible and boring tasks to mankind were implemented relentlessly through the computers. Human beings became the crown of all creations on earth through the various advancements achieved through his hard work for which the computers were also responsible. From a meager position of a data storage and calculating device, the computers emerged soon as the glorifying aid which took mankind to the heights of development. All those facilities provided by the computers made the man roll in riches. The increasing needs and pace of life

demanded much needed advancements to the computer world. In the sphere of data storage, data recovery became important.

Data recovery is the process of salvaging data from damaged, failed, corrupted, or inaccessible secondary storage media when it cannot be accessed normally. Often the data are being salvaged from storage media such as hard disk drives, storage tapes, CD's, DVDs, RAID and other electronics. Recovery may be required due to physical damage to the storage device or logical damage to the file system that prevents it from being mounted by the host operating system.The loss of data can be due to logical and physical damages or due to over writing of data. And there are different ways to tackle all these three conditions. Go through the attached report for design and implementation of Advanced Data Recovery.

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