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# 3D PASSWORD FOR MORE SECURE AUTHENTICATION

Manisha Patel

Secure authentication scheme is one of the most important requirements of current times, considering the fact that more and more activities are being online, let it be shopping, data access from clouds, etc. No doubt there are several authentication schemes already available and being used worldwide, however these preexisting password and authentication schemes have several vulnerabilities

## Drawbacks for Preexisting Password Mechanisms

Summarily, textual passwords are guessable; drawback of applying biometrics is its intrusiveness upon a user's personal characteristic, Smart Cards and Tokens can be stolen and duplicated as well for illegal use, weakness of Graphical Passwords is that the server needs to store the seeds of the portfolio images of each user in plain text. Also, the process of selecting a set of pictures from the picture database can be tedious and time consuming for the user

## INTRODUCTION

normally the authentication scheme the user undergoes is particularly very lenient or very strict. Throughout the years authentication has been a very interesting approach. With all the means of technology developing, it can be very easy for 'others' to fabricate or to steal identity or to hack someone's password. Therefore many algorithms have come up each with an interesting approach toward calculation of a secret key. The algorithms are such based to pick a random number in the range of  $10^6$  and therefore the possibilities of the same number coming is rare.

Users nowadays are provided with major password stereotypes such as textual passwords, biometric scanning, tokens or cards (such as an ATM) etc. Mostly textual passwords follow an encryption algorithm as mentioned above. Biometric scanning is your "natural" signature and Cards or Tokens prove your validity. But some people hate the fact to carry around their cards, some refuse to undergo strong IR exposure to their retinas (Biometric scanning). Mostly textual passwords, nowadays, are

kept very simple say a word from the dictionary or their pet names, girlfriends etc. Ten years back Klein performed such tests and he could crack 10-15 passwords per day. Now with the technology change, fast processors and many tools on the Internet this has become a Child's Play.

## WORKING

therefore we preset our idea, the 3D passwords which are more customizable, and very interesting way of authentication.

Now the passwords are based on the fact of Human memory. Generally simple passwords are set so as to quickly recall them. The human memory, in our scheme has to undergo the facts of Recognition, Recalling, Biometrics or Token based authentication.

Once implemented and you log in to a secure site, the 3D password GUI opens up. This is an additional textual password which the user can simply put. Once he goes through the first authentication, a 3D virtual room will open on the screen.

In our case, let's say a virtual garage. Now in a day to day garage one will find all sorts of tools, equipment, etc. Each of them having a unique properties. The user will then interact with these properties accordingly. Each object in the 3D space, can be moved around in an (x, y, z) plane. That's the moving attribute of each object. This property is common to all the objects in the space. Suppose a user logs in and enters the garage. He sees and picks a screw-driver (initial position in xyz coordinates (5,5,5)) and moves it 5 places to his right (in XY plane i.e. (10,5,5)). That can be identified as an authentication.

Only the true user understands and recognizes the object which he has to choose among many. This is the Recall and Recognition part of human memory coming into play. Interestingly, a password can be set as approaching a radio and setting its frequency to number only the user knows.

Security can be enhanced by the fact of including Cards and Biometric scanner as input. There can be levels of authentication a user can undergo. More the confidentiality more the complexity. In that scenario a virtual environment can be developed as a globe, a city or simply a garage.

### **EXPECTED FUNCTIONALITIES**

1. The user can decide his own authentication schemes. If he's comfortable with Recall and Recognition methods then he can choose the 3d authentication just used above.
2. The authentication can be improved since the unauthorized persons will not interact with the same object as a legitimate user would. We can also include a timer. Higher the security higher the timer. Say after 20 seconds a weak password will be thrown out.
3. The 3D environment can change according to

users request.

4. It would be difficult to crack using regular techniques. Since all the algorithms follow steps to authenticate, our project has no fixed number of steps. Hence to calculate all those possibilities and decipher them is not easy.
5. Can be used in critical areas such as Nuclear Reactors, Missile Guiding Systems etc.
6. Added with biometrics and card verification, the scheme becomes almost unbreakable.

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# ARTIFICIAL INTELLIGENCE PROGRAMMING

Jay Bhosale

## 1.0. INTRODUCTION

Artificial Intelligence (Artificial Intelligence.) is a very broad research area that focuses on "Making computers think like people" and includes disciplines such as Neural Networks, Genetic Algorithms, Decision Trees, Frame Systems and Expert Systems. John McCarthy at MIT, who coined the term in 1956, defines it as "the science and engineering of making intelligent machines." [1]

## 2.0. WHERE IS IT USED?

Artificial Intelligence in the field of programming include many day-to-day examples like a text-sensitive spell checker and grammar checker software usually found in most of today's document editors or a low-cost entertaining chess-playing software commonly available for tablet computers. The more recently popular Kinect which provides a 3D body-motion interface for the Xbox 360 uses algorithms that emerged from lengthy Artificial Intelligence research, but few consumers realize the technology source.

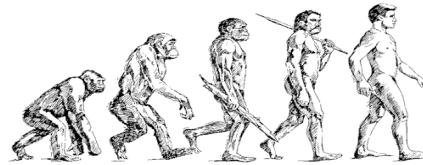
## 3.0. IS IT DIFFERENT FROM TRADITIONAL PROGRAMMING STYLE?

Yes, unlike our usual object oriented style of programming, artificial intelligence programming deals with making the algorithm think and take decisions automatically based on certain factors and eventually find an optimal solution to a problem. An excellent theoretical application would be an example inspired by J. Hynek's publication which demonstrated how a formula can be easily deduced for the total circuit resistance  $R$  based on Kirchhoff's and Ohm's law:  $R = R1 * R2 / R1 + R2 \Omega$  using artificial program [2]. While assuming that the formula has yet to be discovered the aim of that example was to use genetic programming to find the best function in symbolic form which can best approximate the known formula for calculating the total resistance.

## 4.0. WHAT ARE THE DIFFERENT TYPES OF ARTIFICIAL INTELLIGENCE ALGORITHMS?

## 4.1. EVOLUTIONARY ALGORITHM (EA) -

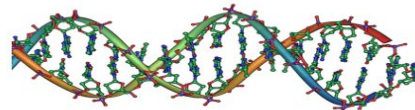
A generic population-based metaheuristic optimization algorithm. An EA uses some mechanisms inspired by biological evolution: reproduction, mutation, recombination, and selection. By applying this survival of the fittest concept only the best candidate solutions are chosen using recombination or mutation.



EA include four major paradigms i.e. Genetic algorithm, genetic programming, evolutionary programming, evolutionary strategy and neuroevolution.

### 4.1.1. GENETIC ALGORITHM (GA) -

GA is a search heuristic that mimics the process of natural evolution. Genetic algorithms are inspired by Darwin's theory about evolution.



GA is started with a set of solutions (represented by chromosomes) called population. Solutions from one population are taken and used to form a new population. This is motivated by a hope, that the new population will be better than the old one. Solutions which are selected to form new solutions (offspring) are selected according to their fitness - the more suitable they are the more chances they have to reproduce. This is repeated until some condition (for example number of populations or improvement of the best solution) is satisfied.

*Example of GE implementation:*

A genetic algorithm developed jointly by engineers from General Electric and Rensselaer Polytechnic Institute produced a high-performance jet engine turbine design that was three times better than a human-designed configuration and 50% better than a configuration designed by an expert system by successfully navigating a solution space containing more than 10387 possibilities. Conventional methods for designing such turbines are a central part of engineering projects that can take up to five years and cost over \$2 billion; the genetic algorithm discovered this solution after two days on a typical engineering desktop workstation (Holland 1992, p.72). [6]

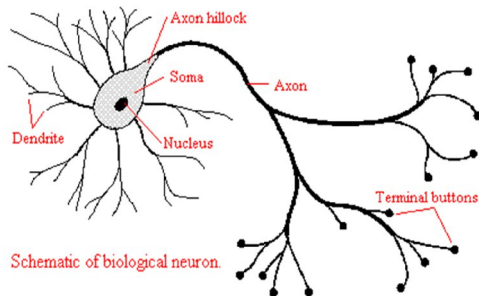
#### 4.2. NATURAL LANGUAGE PROCESSING -

Programming computers to understand natural human languages. Natural language processing is a very attractive method of human-computer interaction. Natural language understanding is sometimes referred to as an AI-complete problem because it seems to require extensive knowledge about the outside world and the ability to manipulate it. Modern NLP algorithms are grounded in machine learning, especially statistical machine learning. Research into modern statistical NLP algorithms requires an understanding of a number of disparate fields, including linguistics, computer science, and statistics. For a discussion of the types of algorithms currently used in NLP.

*Example of Natural language Processing:*

An automated online assistant providing customer service on a web page, an example of an application where natural language processing is a major component. [8]

#### 4.3. NEURAL NETWORKS -



Systems that simulate intelligence by attempting to reproduce the types of physical connections that occur in our brains. A neural network consists of an interconnected group of artificial neurons, and it

processes information using a connectionist approach to computation. In most cases an Artificial Neural network is an adaptive system that changes its structure based on external or internal information that flows through the network during the learning phase. Modern neural networks are non-linear statistical data modelling tools. They are usually used to model complex relationships between inputs and outputs or to find *patterns* in data.

*Example of Neural networks implementation:*

Neural Networks are used for a wide range of application problem like radar interpretation or bomb detection and many more.[3]

**4.4. EXPERT SYSTEMS** - An expert system is a computer system that emulates the decision-making ability of a human expert. Expert systems are designed to solve complex problems by reasoning about knowledge, like an expert, and not by following the procedure of a developer as is the case in conventional programming. An expert system has a unique structure, different from traditional programs. It is divided into two parts, one fixed, independent of the expert system: the inference engine, and one variable: the knowledge base. To run an expert system, the engine reasons about the knowledge base like a human.

*Example of Expert Systems implementation:*

Highly interactive or conversational applications, IVR, voice server, chatterbox etc. [7]

#### 5.0. SO WHICH ARTIFICIAL INTELLIGENCE ALGORITHM TO USE?

**5.1.** Its answer depends on what kind of a problem it is. Such as, if it's a scheduling, searching, optimization problem like the Travelling salesman problem, University timetabling or systems that must adapt to constantly changing conditions then Genetic algorithms or Expert systems are well suited to solve such problems.

Likewise neural networks can also be used to efficiently solve many problems that are intractable or difficult using other Artificial Intelligence programming techniques.

**5.2.** Proper and exhaustive documentation, books or online tutorials also play an important factor in

choosing a particular algorithm. As a lowly documented Application Programming Interface (API) would be difficult to follow and work with.

## **6.0. MY EXPERIENCE ON USING ARTIFICIAL INTELLIGENCE PROGRAM**

My field of research in Artificial intelligence has been more with Expert Systems as I first stumbled upon it rather I would say unintentionally or forcefully, when me and my project group members were told to make a scheduling software as our second year college project. This projects success was very critical as it would be my admission requirements for Aston University, Birmingham, UK which I was aiming for. In the end I successfully implemented an expert system licensed by JBoss named Drools Expert & Drools Planner.

## **7.0. SO WHAT IS THIS DROOLS EXPERT?**

Drools – Drools Expert is a Artificial Intelligence knowledge based Expert System which uses a Rule Engine, using a rule-based approach to implement an Expert System and is more correctly classified as a Production Rule System.

The term Rule Engine is quite ambiguous in that it can be any system that uses rules, in any form that can be applied to data to produce outcomes. This includes simple systems like form validation and dynamic expression engines. The process of matching the new or existing facts against Production Rules is called Pattern Matching, which is performed by the Inference Engine.

There are a number of algorithms used for Pattern Matching by Inference Engines. Including: Linear, Rete, Treat, Leaps. Drools implements and extends the Rete algorithm. The Drools Rete implementation is called ReteOO, signifying that Drools has an enhanced and optimized implementation of the Rete algorithm for object oriented system. [5]

## **7.1. ADVANTAGES OF A RULE ENGINE**

**7.1.1. DECLARATIVE PROGRAMMING** - Rule engines allow you to say "What to do", not "How to do it".

**I.** The key advantage of this point is that using rules can make it easy to express solutions to difficult

problems and consequently have those solutions verified. Rules are much easier to read than code.

**II.** Rule systems are capable of solving very, very hard problems, providing an explanation of how the solution was arrived at and why each "decision" along the way was made (not so easy with other of Artificial Intelligence systems like neural networks or the human brain.

**7.1.2. LOGIC AND DATA SEPARATION** - Your data is in your domain objects, the logic is in the rules. Instead of the logic being spread across many domain objects or controllers, it can all be organized in one or more very distinct rules files.

**7.1.3. SPEED AND SCALABILITY** - The Rete algorithm, the Leaps algorithm, and their descendants such as Drools' ReteOO, provide very efficient ways of matching rule patterns to your domain object data.

**7.1.4. CENTRALIZATION OF KNOWLEDGE** - By using rules, you create a repository of knowledge (a knowledge base) which is executable. This means it's a single point of truth, for business policy, for instance. Ideally rules are so readable that they can also serve as documentation.

**7.1.5. TOOL INTEGRATION** - Tools such as Eclipse (and in future, Web based user interfaces) provides ways to edit and manage rules and get immediate feedback, validation and content assistance. Auditing and debugging tools are also available.

**7.1.6. EXPLANATION FACILITY** - Rule systems effectively provide an "explanation facility" by being able to log the decisions made by the rule engine along with why the decisions were made.

**7.1.7. UNDERSTANDABLE RULES** - By creating object models and, optionally, Domain Specific Languages that model your problem domain you can set yourself up to write rules that are very close to natural language. They lend themselves to logic that is understandable to, possibly nontechnical, domain experts as they are expressed in their language, with all the program plumbing, the technical know-how being hidden away in the usual code.

## **7.2. WHEN SHOULD YOU USE A RULE ENGINE?**

The shortest answer to this is "when there is no satisfactory traditional programming approach to solve the problem."



Drools expert system was best suited for my project's problem of scheduling were traditional programming would make the program too complex and a logical nightmare to manage or explain.

### 8.0. CONCLUSION

Finally from my experience I would say that even though names like Genetic, Evolutionary, and Expert systems sound scary at first, they are actually not all that difficult once you take the effort to have a read. It's true that you would be spending a few more hours on learning this new way of programming but in the end it will only helps you to actually reduce your software development time and end up with an efficient and a fast program guaranteed to impress.

### 9.0. Project's Source

Individuals interested in knowing the working of my Scheduling application can ask for it by mailing me at [dbzloaded@gmail.com](mailto:dbzloaded@gmail.com).

Project Specs – Custom made

Presentation/Demonstrations Scheduler for Aston University, Birmingham, U.K.

TECH used - Java Standard Edition 1.7, Drools Planner v5.3 & Drools Expert v5.4b.

To get its complete source code you can ask for it by mailing me at [dbzloaded@gmail.com](mailto:dbzloaded@gmail.com).

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# COMPUTERS THAT YOU CAN WEAR

Shailendra Mane

It's an exciting time for the wearable-computing industry. Venture capitalist Marc Andreessen declared in a [recent interview](#) that wearable computers were the next big thing for Silicon Valley, and the past few months have seen a flurry of new product announcements in the arena.

A device that records everything you see for later playback, a bracelet that comfortably and discreetly monitors your health, Dick Tracy's watch phone--these devices aren't just coming soon, they're here.

For instance, [WIMM Labs](#) announced just this week a new line of Android-powered devices small enough to fit on your wrist but powerful enough to help you keep track of your calendar, the weather, and more. As our own Ed Oswald was quick to point out, however, we've had the technology for these kinds of devices for years. Microsoft's similar [SPOT watch launched](#) way back in 2003.

[Wearable computing](#) has already become part of our lives. What else is on the way? Travis Bogard, vice president of product management and strategy for Jawbone, says that the next few years should see wearable computing expand to new areas as consumers become more comfortable with the idea.

Jawbone is best known for its line of Bluetooth headsets, but recently it announced [Up](#), a bracelet that will launch by the end of the year. The discreet device will keep tabs on what you eat and how you sleep, and it will monitor your movement to help you see how much exercise you get. You'll be able to stay on top of all that information via a phone app that lets you check your data throughout the day.

As exotic as these devices may seem, in many ways they're just a natural extension of a wearable-computing lifestyle that has already found adherents. Over 3 million runners currently use the Nike+[iPod](#) system to keep track of their exercise. The small [Nike+ sensor](#), which costs \$20, fits into the heel of a running shoe and records how far and how strenuously you run. The device, coupled with an attractive Web interface, has helped runners log over 420 million miles' worth of exercise since it debuted in 2006.

The Nike+ system is just the tip of the iceberg for the wearable-health industry. For several years, companies such as BodyMedia, with its \$180 [FIT armband](#), and Apex Fitness, with the \$200

[BodyBugg system](#), have offered devices that can monitor how many calories you burn during the day and, with the help of an online food journal, help you lose weight.

## What's Next?

The next step for wearable computing may be a focus on the design of wearable-computing devices. Traditionally, wearable computing has valued function over form--but with smaller and more comfortable devices such as the Up and the Nike+ on the market, that's changing. Jawbone's Travis Bogard says the end goal is to take wearable computing from a novelty to an almost invisible part of our daily lives. "You want to be able to stay connected with all that information, and you want to do it in a way that can get onto the body in a seamless way," Bogard says.

Jawbone has some experience in that area. From the very beginning, the company has seen its [Bluetooth headsets](#) as wearable computers. "In a world where you're out there mobile and moving around, in that mobile world, the reality is that we use our hands and eyes to navigate," Bogard says.

Some wearable-computing concepts obstruct the user's vision with complicated overlays, or occupy the user's hands with miniature keyboards. Such designs keep users from interacting with the world normally. Bogard says Jawbone thinks of its headphones as a solution to this problem. "Audio is interesting because it doesn't use up those resources," he says. And freeing people to use their eyes and hands normally is "a key element of interacting with computing without having to be so physically engaged with it."

Bogard argues that every time you put on a Bluetooth headset, you're already taking part in the wearable-computing revolution. The experience is just so commonplace, and so comfortable, that we don't even notice it anymore.

But for Bogard, at least, that isn't just a side effect of good design--it's the goal. Bogard believes good design should be invisible to the end user, and only when it becomes a natural extension of ourselves will the technology really take off.

## Wearable Computing's History

That approach is a far cry from the common vision of the wearable computer in the public imagination. Though some experts define wearable computing so broadly as to include the pocket watch, the idea—as it is commonly understood today—was born in the early 1980s as academics created complicated proof-of-concept rigs that covered the whole body.

Though the early experiments stretched the definition of "portable" (an early model by wearable-computing pioneer Steve Mann had to be carried around in a backpack), the efforts also helped to shape the public perception of the wearable computer. To most people, the term usually refers to an extensive rig that looks, frankly, a little embarrassing. These systems have more in common with the Borg from *Star Trek* than with a Bluetooth headset.

Of course, even experimental systems have become smaller and less noticeable over the years. In 1994, Steve Mann created a new wearable-computing system and began an ambitious project to transmit his whole life, live, for two years. By then his system was a rather bulky series of boxes that hung off his belt. After the experiment ended, Mann slimmed his system down even more. By the late 1990s, his rig consisted of a particularly large pair of sunglasses attached to a single small box hooked onto his belt.

Today the ability to record everything you see is available to the average consumer: The \$200 [Looxcie 2](#), a small camera about the size of a Bluetooth headset, fits over your ear and lets you record up to 10 hours of POV footage that you can download to your computer for a daily log of your activities.

As computing technology continues to get smaller and more powerful, the possibilities for wearable computing can only expand. Travis Bogard likens the state of the industry to that of the personal computer in the late 1980s. Now that wearable technology is such an integral part of our lives, we need to explore what exactly these new portable computers can do.

Although the possibilities for the industry are exciting, the most fascinating thing about the wearable-computing future may be that it has already arrived.

### **WIMM Labs launches a computing platform you can wear.**

Wearable computers will be the next big thing, at least that's what [WIMM Labs](#) is hoping.

The Los Altos company unveiled its Android-based wearable computing platform today, which is driven by a one-inch by one-inch Module that will serve as the centerpiece for WIMM's "micro apps." The tiny device can be embedded in many consumer products, including watches and keychains, and the platform will serve as an easy entry for developers interested in wearable computing.

"There's an increasing demand for digital experiences that are faster, easier and more relevant," WIMM CEO Dave Mooring said in a statement today. "WIMM Labs integrates information into your daily life in the form of useful, subtle glances."

Yes, it looks like an iPod Nano (which can also be transformed into a high-tech watch), but WIMM's solution differs since it was made with wearable computing in mind. WIMM's Module features a 1.4-inch capacitive touchscreen, Wi-Fi, Bluetooth, magnetometer and accelerometer. Oh, and it's waterproof, too.

You won't be reading your email on such a small screen, but it allows for a new wave of always-on computing applications — like serving as a heart-rate monitor — that's difficult to achieve with current devices. WIMM's devices could also serve as a quick way to read information from your phone without actually pulling it out of your pocket or purse. Conceivably, calendar alerts and text messages could appear on the device. The company is already working with a handful of developers to create apps for the platform and will release a developer kit in a few weeks.

WIMM's wearable platform isn't being marketed directly to consumers, instead it has partnerships with other manufacturers to bring WIMM-powered devices out by the end of the year. Once licensed, the devices could sell anywhere from \$200 to \$2000.

### **Hardware, apps and services**

The WIMM Platform integrates hardware, app tools and web services into a highly scalable product development model. It can quickly take you from product incubation and testing to full-scale manufacturing and sales. And the product categories it's perfect for are endless: health, fitness, mobile payments, fashion, enterprise, travel, entertainment, communications and others

## **Technology**

### **The technology behind the possibilities**

What makes the WIMM Platform tick? Behind the capacitive touch screen is an OS distilled from open-source Google Android™. Core capabilities include Wi-Fi and Bluetooth™ connectivity, an accelerometer, magnetometer, vibrating alarm and more. A 14-pin WIMM water-resistant connector is smart-accessory ready.

### Technical Specs

- BI-MODAL DISPLAY
- CAPACITIVE TOUCH SCREEN
- WI-FI
- BLUETOOTH
  
- ACCELEROMETER
- MAGNETOMETER
- AUDIBLE AND TACTILE ALERTS
  
- UP TO 32GB MEMORY
- SPLASH RESISTANT
- 32×36×12.5mm
- 22g

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# ETHICAL HACKING

Manali Drandale

Ethical hacking, also known as penetration tests, intrusion testing or red teaming, is increasingly being used by government and industry organizations to identify security risks. Ethical hackers, sometimes called white hats, are hackers that use penetration testing or security system attacks at the request of an organization in order to identify flaws or vulnerabilities before actual malicious hackers are able to exploit them. Ethical hackers duplicate the same attack methods as criminal hackers, but they report their findings back to the client. Ethical hacking was first used primarily in the government and technology sectors, although many large companies are now requesting penetration tests. Other companies, such as IBM, keep employee teams of ethical hackers.

“An ethical hacker is a computer and network expert who attacks a security system on behalf of its owners, seeking vulnerabilities that a malicious hacker could exploit. Ethical hackers use the same methods as their less-principled counterparts but report problems instead of taking advantage of them.” Ethical hackers usually have a professional background as programmers or network administrators, and usually have a variety of skills including: the ability to write programs in many programming languages; knowledge of assembly language; and some programming ability. Ethical hackers also benefit from knowledge of a variety of systems, especially Microsoft Windows and Linux. Ethical hackers must have in-depth networking knowledge and at least a basic understanding of TCP/IP protocols. Ethical hackers can obtain the Certified Ethical Hacker (CEH) certification and EC-Council Certified Security Analyst (ECSA) certifications from EC-Council. The Licensed Penetration Tester (LPT) certification requires candidates to agree to a code of ethics and provide evidence of professional security experience.

Security experts provide findings on security vulnerabilities, and also recommendations for clients to remediate security issues and improve overall security. Some services provided by hackers include: application testing, which identifies design and logic flaws; war dialing, which identifies unauthorized modems on a network; network testing which looks for security flaws on external and internal networks, systems and devices; wireless security assessments that evaluate the security of a company's wireless infrastructure and system hardening which assesses

configuration issues and vulnerabilities to measure overall network security.

There are four basic hacks that are used by ethical hackers:

- **IP Hack:** the company provides hackers with an IP address to try to attack with little other background information.
- **Application Hack:** A more in-depth hack that tries to penetrate deep into databases or shut down production servers.
- **Physical Infrastructure Hack:** Hackers try to physically gain access to facilities and systems looking for confidential information. Ethical hackers use technical methods as well as social engineering techniques for these hacks.
- **Wireless Hack:** Hackers target wireless access points and report findings of weak entry points back to clients

The cost for ethical hacking services can also vary greatly based on the complexity of the network, system or application. The scope of the engagement and travel expenses may also increase service costs. Security expert Bruce Schneier explains that “penetration testing is a broad term” and can be one of many services including documenting network vulnerabilities, performing remote attacks, penetrating a data center or attempting social engineering attacks. Schneier also says that penetration testing services offer many different scanning tools and white-hat hackers with different skill levels. All of these factors could affect the total cost of penetration testing services. Web sites of companies that provide testing services all say that pricing information will be unique to each job based on size and complexity and recommend contacting the company with specific job details for pricing information. Companies also agree that most organizations outsource their penetration testing projects because of the high cost of training or acquiring skilled penetration testers. The development of automated penetration testing software has provided companies with a low cost alternative to outsourcing security testing.

Government Agencies are increasingly using third-party companies to perform vulnerability assessments penetration testing, and some such as the Department of Defense have personnel that complete the Certified Ethical Hacker certification courses. As part of a set of security guidelines for

protecting federal information systems, the National Institute of Standards and Technology (NIST) recommends that federal agencies conduct regular penetration tests. The NIST's *Guide for Assessing Security Controls in Federal Information Systems*, which was published in March 2008, says that government agencies should train selected personnel in penetration testing tools and techniques that should be frequently updated to include emerging vulnerabilities. The NIST also recommends using the more cost-effective automated penetration tools. Executive managing director of computer forensics consultants Stroz Friedberg, Scott Larson was the former head of the FBI's National Infrastructure and Computer Investigations division reports that many agencies already conduct penetration tests. Larson says that government agencies should go through outside auditors for testing.

Certified Ethical Hackers are professionals that have completed the EC-Council CEH Program. The Certified Ethical Hacker certification requires participants to attend an Ethical Hacking and Countermeasures Course and pass the Ethical Hacking and Countermeasures Exam offered by EC-Council.

The CEH certification course work includes legal/ethic issues overviews and training on common hacking tools including: Foot printing Techniques, Scanning ,Enumeration System Hacking, Trojans and Backdoors ,Sniffers, Denial of Service, Session Hijacking, CEH Hacking Web Servers, Web Application Vulnerabilities, Web Based Password Cracking, SQL Injection, Hacking Wireless Networks, Virus and Worms, Physical Security, Hacking Linux, IDS, Firewalls and Honeypots, Buffer Overflows Cryptography, Penetration Testing Methodologies. A full, current course outline is available from the EC-Council site.

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# FOOTPRINTING: TRACKING YOUR TRAILS!

Bhavesh Naik

## INTRODUCTION:

The first task in gathering information and hacking the target system involves “FOOTPRINTING”. Information warfare comes along with battle plans or surveillance techniques. A strategic map used in battle would be a close analogy to a footprint.

Footprinting can be non-intrusive i.e. it does not rely on actively engaging with the target. It is like detective finding out address, telephone numbers, picking locks, etc. There is no single methodology for footprinting, as an attacker can choose several routes to trace information.

This target may be on local network or internet. The type of information gathered depends on how the organization addresses various aspects of security. Information gathered during the footprinting phase can be used as springboard to narrow the attack methodology used. An attacker spends around 90% of the time in profiling an organization and other 10% in launching the attack.

Thus we may say that, ”Footprinting is the process of accumulating data regarding a specific network environment, usually for the purpose of finding ways to intrude into that environment.”

## FOOTPRINTING METHODOLOGY:

This activity can broadly divided into 7 phases:

1. Unearth the initial information.
2. Locate the network range.
3. Ascertain active machines.
4. Discover open ports/access points.
5. Detect operating system.
6. Uncover services on ports.
7. Map the network.

The attacker would first unearth the initial information (such as domain), locate the network range of the target system (using tools such as nslookup, and whois), and ascertain the active machines (e.g., by pinging the machine), discover open ports or access points (using tools such as port scanners), detect operating systems (e.g., querying with telnet), uncover services on ports, and ultimately map the network.

## NEED FOR FOOTPRINTING:

Footprinting is important to gather about the technologies being used. It should be performed in an efficient manner to identify the vulnerabilities. Without proper methodologies of footprinting, key points of critical information about any technology and organization can be ignored. It can be difficult task when identifying security postures.

Footprinting helps to eliminate several hacking techniques and allow the attacker to choose the best fit to access the system. This not only speeds up the attack process, but also helps the attacker to cover his tracks, by leaving a smaller or minimal footprint behind.

Footprinting is required to ensure that the isolated information repositories that are critical to the attack are not overlooked or left undiscovered. It merely comprises of one aspect of entire information gathering process, but it is considered as one of the most important stages of a mature hack.

### Information which attacker seeks:

#### ➤ INTERNET

- ✓ Domain name
- ✓ ACL
- ✓ TCP/UDP services
- ✓ IP address
- ✓ IDS running
- ✓ Network blocks
- ✓ System architecture

#### ➤ REMOTE ACCESS

- ✓ Analog/digital phone numbers
- ✓ Remote system types
- ✓ Authentication mechanism

#### ➤ INTRANET

- ✓ Networking protocols used
- ✓ System enumeration

#### ➤ EXTRANET

- ✓ Type of connection
- ✓ Connection origination and destination

## TOOLS...LETS BEGIN !!:

1. Geo-Locating IP-Address

➤ Tool: WhereIsIP

An IP address is a unique number that devices use in order to identify and communicate with each other on a network utilizing internet protocol standard. The address ranges from 1.0.0.0 to 255.255.255.255.

This tool (WhereIsIP) helps to find out the geographical location of an IP address, domain name, ICQ contacts, websites, and E-Mail sender.

FEATURES:

1. Powerful Internet address geographical location analysis ability.
2. Domain name research function; it can reverse-resolve an IP address to domain name.

II. Tracing Target Systems

➤ Command line: 1. Windows: *TRACERT*  
<IP-Address>

2. LINUX/UNIX: *TRACEROUTE*  
<IP-Address>

The best way to find the route to a target system is to use the 'Traceroute' utility provided with most operating system. The traceroute can detail the path the IP packet travels between two systems. It can trace the number of routers the packet travels through. It works by exploiting a feature of Internet Protocol called 'Time To Live (TTL)'.

III. Competitive Intelligence Gathering

Competitive intelligence gathering is the process of accumulating information about the competitor from resource such as internet that can later be analyzed as business intelligence. Information from individual experts can be gathered from various discussion groups or news groups on internet. It can be carried out by either employing people to search for the information or by utilizing a commercial Database service, which incurs a lower cost than employing the personnel to do the same thing.

Some of the above sites provide advanced counterintelligence (CI), counterterrorism (CT), and security training, analysis, and consulting.

➤ WhoIs Lookup Tool: LanWhoIs

With WhoIs lookup, you can get personal details and contact information about the domain.

LanWhoIs helps to find out who, where, and when the domain is registered or which site you are interested in. It will answer all the questions about domains (sites) holders or IP Address.

ADVANTAGES:

1. Updates group results.
2. Reveals the result of query, prints, and saves in HTML file.
3. Socks 4, 4a, 5 proxy server support.
4. Organizes custom query to any server.

CONCLUSION:

Footprinting is the blueprint of security profile of an organization, undertaken in methodological manner.

Passive information gathering is done by finding out freely available details over the internet.

Footprinting is necessary to methodologically and systematically ensure that all pieces of information related to aforementioned technologies are identified.

Footprinting can be used for evil as well as for good intentions. It is solely based upon user's action.

One can say that it is like two faces of the same coin. White Hat hackers may use this information for securing their networks or upgrading their defenses against cyber crooks on the other hand cyber criminals or rival companies may use the same information to breach an organizations security to gain sensitive information or to bring down services of rivalries.

With the proliferation of new technologies and web development concepts, the web itself has become an unsafe place.

With a few mouse clicks and freely available tools over the internet a novice can analyze and retrieve useful information regarding a target and thereby risking the organization.

With many security issues on the rise security experts need to have up to date information regarding this issues.



Even the safest of the safest security implications, can ever be fully secured, there are very smart hackers out there in wild who are responsible for security breaching, finding out exploits which can compromise confidentiality of the organization. It is better to be prepared for worst!!

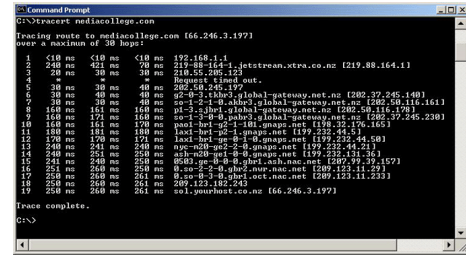


Figure 3:

Traceroute

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FastTrack Volume 05/Issue 06A

EC-Council Official Curriculum Volume

1



Figure 1: WhereIsIP

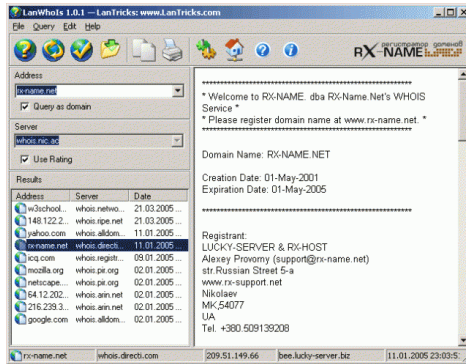


Figure 2: LANWhois

# NEURAL COMPUTING

Sailee Chitre

**Neural computing** is one of the most interesting and rapidly growing areas of research, attracting researchers from a wide variety of scientific disciplines. There are many situations in business and finance which satisfy these criteria, and this area is probably the one in which neural networks have been used most widely so far, and with a great deal of success. Neural computing can be compared with the human brain. Why? Because human brain is the most superficial thinking element.

## History and Theoretical Background

### Biological Basis of Neural Networks

Artificial Neural Networks attempt to model the functioning of the human brain. The human brain for example consists of billions of individual cells called neurones. It is believed by many that all knowledge and experience is encoded by the connections that exist between neurones. Given that the human brain consists of such a large number of neurones (so many that it is impossible to count them with any certainty), the quantity and nature of the connections between neurones is, at present levels of understanding, almost impossible to assess.

The issues as to whether information is actually encoded at neural connections are argued by several researchers. The assumption that one can encode knowledge neurally has led to some interesting and challenging algorithms for the solution of AI problems, including the Perceptron, the Multilayer Perceptron (MLP), Hopfield Network etc.

### Neural Computing Network Technique:

MCCULLOUGH-PITTS MODEL (binary decision neuron (BDN))

This early neural model (dating back in its original form to 1943) has been extremely influential both in biological neural modelling and in artificial

## Understanding the Neurone

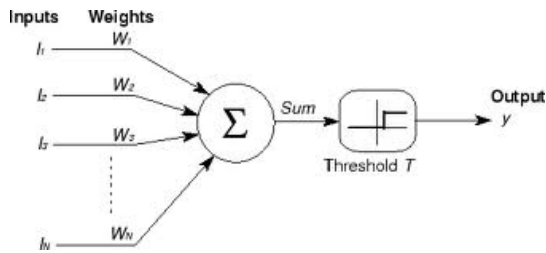
Intelligence is arguably encoded at the connections between neurones (the synapses), but before examining what happens at these connections, we need to understand how the neurone functions. Modern computers use a single, highly complex processing unit (eg. Intel Pentium) which performs a large number of different functions. All of the processing on a conventional computer is handled by this single unit, which processes commands at great speed.

The human brain is different in that it has billions of simple processing units (neurones). Each of these units is slow when compared to say a Pentium 4 but only ever performs one simple task. A neurone activates (fires) or remains inactive. One may observe in this a kind of binary logic, where activation may be denoted by a '1', and inactivation by a '0'. Neurones can be modelled as simple switches therefore, the only problem remains in understanding what determines whether a neurone fires.

Neurones can be modelled as simple input-output devices, linked together in a network. Input is received from neurones found lower down a processing chain, and the output transmitted to neurones higher up the chain. When a neurone fires, it passes information up the processing chain.

This innate simplicity makes neurones fairly straightforward entities to model, it is in modeling the connections that the greatest challenges occur.

neural networks. Although nowadays neurologists work with much more elaborate neural models, most artificial neural network processing units are still very strongly based on the McCullough-Pitts BDN.



The neuron has  $n$  binary inputs  $x_j \in \{0,1\}$  and a binary output  $y$ :

$y = 1$  'ON'

$x, y = 0$  'OFF'

Each input signal  $x_j$  is multiplied by a weight  $w_j$  which is effectively the synaptic strength in this model.

$w_j < 0 \leftrightarrow$  input  $j$  has an inhibitory effect ;  $w_j > 0 \leftrightarrow$  input  $j$  has an excitatory effect

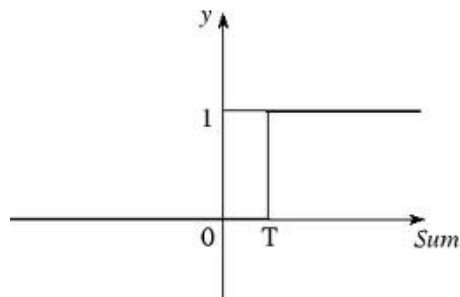
The weighted signals are summed, and this sum is then compared to a threshold  $s$ :

$$y=0 \text{ if } \sum_{j=1}^n w_j x_j \leq s$$

$$y=1 \text{ if } \sum_{j=1}^n w_j x_j > s$$

This equation can be written as  $y =$

$\theta(\sum_{j=1}^n w_j x_j - s)$  where  $\theta(x)$  is the step (or Heaviside) function.



It can also be useful to write this as  $y = \theta(a)$  with the activation  $a$  defined as

$$a = \sum_{j=1}^n w_j x_j - s$$

as this separates the roles of the BDN activation function (whose linear form is still shared by

almost all common neural network models) and the firing function  $\theta(a)$ , the step form of which has since been replaced by an alternative, smoother form in more computationally powerful modern neural network models.

### Why use Neural networks? Why use Neural Networks?

Only a small number of the problems we encounter on a daily basis can be solved by an objective set of steps. The vast majority of solutions to problems are not only subjective and based on individual experience, but also on circumstances surrounding a problem. A good example of this kind of problem is a Route Optimization Problem.

In a Route Optimization Problem, software-programming techniques, such as Neural Networks, can be used to enable a computer system to determine the fastest and most accurate solution when finding the optimal route from point A to Point B when many paths are offered. For example, a driver in route to a destination may access a GPS. With the help of Neural Networks, the system would not only be able to give directions, but also be able to determine the fastest route based on such mitigating factors as weather and traffic.

### Applications:

- Neural networks in medicine e.g. cardiograms, CAT scans, ultrasonic scans, etc
- Autonomous Walker & Swimming Eel
- Neural network in practice( sales forecasting, industrial process

control, customer research, data validation, risk management, target marketing)

- Robocup: Robot World Cup
- Speechreading (Lipreading)
  
- Detection and Tracking of Moving Targets
- Facial Animation
- Behavioral Animation and Evolution of Behavior
- Artificial Life for Graphics, Animation, Multimedia, and Virtual Reality

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### **Do you know?**

#### Detecting credit card fraud

Neural networks have been used for a number of years to identify spending patterns that might indicate a stolen credit card, both here and in the US. The network scans for patterns of card usage that differ in a significant way from what might have been expected for that customer based on their past use of their card -- someone who had only used their card rarely who then appeared to be on a day's spending spree of lakhs of amount would trigger an alert in the system leading to the de-authorisation of that card. (Obviously this could sometimes happen to an innocent customer too )

The system needs to be set up in such a way as to minimise such false positives, but these can never be totally avoided.

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# ORGANIC LIGHT EMITTING DIODE DISPLAY TECHNOLOGY

Angad Anand

## 1. Introduction

And OLED(Organic Light emitting diode) in which the emissive layer of organic compounds emits light when an electric current passes through it.

## 2. Basic facts about OLEDs

There are two main families of OLEDs. The first one and made commercially famous by Samsung was AMOLEDs (Active Matrix OLEDs) and the second type are PMOLEDs (Passive Matrix OLEDs). OLED displays are considered superior to LCDs(Liquid crystal displays) because in an OLED you can switch each pixel on and off as each pixel acts as an independent LED. So unlike an LCD which needs an external light source, an LED screen does not and as a result the blacks produced are very deep and this results in a dramatic increase in contrast ratio and as a result an increase in overall image quality.

## 3. LCD v/s OLED

OLEDs are often considered superior to LCDs when it comes to basic functioning and performance. As listed below :-

**3.1 Low power consumption** – due to the lack of powered backlighting, OLEDs are supposed to be more energy efficient than regular LCDs

**3.2 Brightness** – since it is light-emitting, OLED is potentially the brighter technology. The very high contrast ratios also contribute to the brighter impression

**3.3 Higher contrast ratio** – black colour from OLED screens is indeed black, due to the simple fact that the pixel is off at that time, whereas the LCD backlighting is still on, producing greyish black. The contrast ratio of AMOLED displays is extremely high

**3.4 High and stable colour gamut** – the emissive

displays have much wider colour gamut reproduction, and this cannot be easily improved in LCD

**3.5 Faster response times** – the organic diodes fire up and emit light immediately when current is applied, whereas with LCDs, some motion blur might be present with fast moving objects

**3.6 Wider viewing angles** – LCD suffers from picture deterioration when viewed from certain angles, due to the nature of the direction in which light travels through the liquid crystals, while OLED screens' brightness and colour gamut are left intact up to almost 180 degrees of viewing

**3.7 Wider operational temperatures** – OLED screens will keep shooting photons after its LCD brethren has frozen or overheated.

## 4. Why OLED is considered better than LCD for portable devices.

An OLED screen consumes comparatively less power than an LCD.

OLEDs do not need an external light source, hence an OLED screen will need much less space and can be used to reduce a lot of weight and size of a device.

Comparatively an OLED screen has a faster response time.

Since an OLED screen has much wider viewing angles than an LCD hence it provides a much pleasanter viewing experience.

## 5. Disadvantages of OLEDs.

**5.1 Current Costs** – Costs of production of OLED screen are presently very high. It starts with the same production cost of a standard LCD then it adds an expensive, time consuming process.

Involving the use of use of Low-Temperature Polysilicon backplanes and these backplanes require laser annealing.

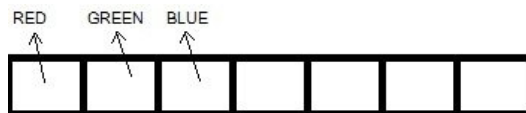
**5.2 Life Span** – OLED materials which produce blue light degrades much faster as compared to other colour producing pixels. This causes a variation in colour output which can result in an overall loss in image quality. To overcome this manufacturers make the RGB(Red Green Blue) subpixels of different sizes. A Blue OLED pixel lasts for about 62,000 hours and a Green OLED pixel lasts for about 198,00 hours.(Experiment conducted in 2007)

**5.3 Outdoor visibility** – Unlike LCDs which are partially reflexive OLEDs rely completely on converting electricity to light. This results in a loss in outdoor visibility. This could require a dramatic increase in power consumption to make images and text completely visible in direct sunlight.

**5.4 UV Sensitivity** – OLEDs can be damaged by prolonged exposure to ultra violet light. A prolonged exposure to UV light can result in dead spots or dimming of the screens maximum brightness. To avoid this we use a UV filter over the OLED display, consequently adding to the weight of the device as a whole.

**6. Pentile Matrix SubPixel Arrangement to counter variable subPixel degradation.**

Owing to the variable degradation of subpixels of different colours, classic subpixel design is commonly referred to as RGB where one red, one green and one blue subpixel are combined to form a pixel and have the ability to display any colour. But, in a display which used Pentile Matrix SubPixel Arrangement, the pixels are either arranged in RGBG (Red Green Blue Green) or RGBW (Red Green Blue White).



Fig(i) : Basic LCD SubPixel arrangement.

**6.1 RG-BG** – In a screen laden with RGBG, it contains one third pixels as compared to a conventional RGB-RGB screen, with a green pixel interleaved with alternating blue and red pixels. We also know that the human eye is most sensitive to

the green colour so despite containing one third less subpixels, the PenTile matrix arrangement does not result in any loss of resolution. Used commercially first by the *Samsung Galaxy S (SGH i9000)*



Fig(ii) : RG-BG SubPixel arrangement.

**6.2 RGBW** – The RGBW layout uses red, green, blue and white subpixels to present high resolution displays. And since the PenTile matrix architecture is biometric, in other words it is designed keeping in mind the complex relationship between the brain and the eye, the combined effect of the subpixels optimally matches the biological mechanisms of the human eye. Similarly, like RG-BG RGBW arrangement also uses the “Two subpixels per pixel” arrangement which results in a 33% drop of physical subpixel count but, without loss in resolution visible to the human eye. Used commercially first by *Motorola Droid Bionic*.



Fig(iii) : RGBW Subpixel arrangement.

**8. Conclusion**

OLED display technology has come a long way since it was first discovered in the early 1950s.

It moves us one step closer to achieving a complete biometric display

Since existing display architectures are based on bio-mechanics the viewing experience is extremely pleasant.

They do not strain our eyes as CRT displays do. And host a higher contrast ratio than any LED-lit LCD screen.

And with the development of the PenTile Matrix family we can achieve higher resolutions with fewer subpixels resulting in lower production costs in the future.

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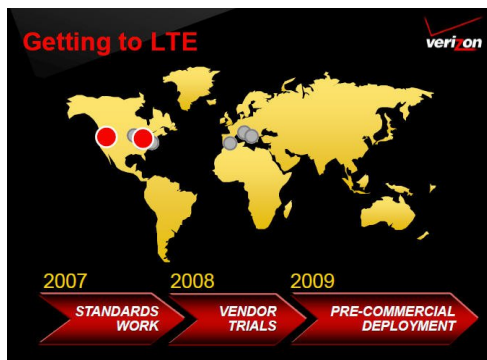
# VERIZON 4G LTE NETWORK

Dhawal Jain

Verizon Wireless is actually the fourth U.S. carrier to call its network 4G, after T-Mobile, Sprint, and MetroPCS. The four carriers use very different technologies, none of which are technically 4G. Sprint has a WiMAX network, T-Mobile's network is HSPA+ and MetroPCS's is LTE, but a much slower variant than Verizon is using.

Verizon 4G LTE is currently available in over 165 cities and over 111 major airports and aggressively expanding 4G LTE network to cover our entire existing nationwide 3G footprint by the end of 2013. The company serves 107.7 million total wireless connections, including 90.7 million retail customers. Headquartered in Basking Ridge, N.J., with nearly 83,000 employees nationwide, Verizon Wireless is a joint venture of Verizon Communications (NYSE, NASDAQ: VZ) and Vodafone (LSE, NASDAQ: VOD)

As the first wireless company in the world to broadly deploy game-changing 4G LTE technology, Verizon Wireless is committed to building its 4G network with the same performance and reliability for which it has long been recognized. Verizon Wireless' consistent focus on reliability is based on rigid engineering standards and a disciplined deployment approach year after year. The company's 700 MHz spectrum gives Verizon Wireless specific advantages with 4G, including a contiguous, nationwide network license.



With Verizon gearing up to launch its LTE-based 4G network in several cities, two of the USB modems that will be offered have surfaced on the company's Testman site, which are the LG VL600 and the Pantech UML290.

Cons

Tight data caps. Only currently available on two USB modems. No Mac support.

- **What is LTE?**

LTE (Long Term Evolution) is the next generation of wireless which uses an IP (Internet Protocol) based infrastructure. LTE will help enable Verizon Wireless to continue to meet increasing customer demands for a higher bandwidth, low latency service that works broadly in the United States and globally. This will help Verizon Wireless meet consumer demand for mobilizing the many applications consumers frequently use when tethered to high-bandwidth wired networks.

- **What is 4G?**

4G is the fourth generation of wireless. 2G brought us digital voice and text messaging. 3G brought us Smartphones, fast web browsing and apps. With 4G, business applications that used to require wired networks will be unleashed, and it will be lightning fast.

A 4G system is expected to provide a comprehensive and secure all-IP based mobile broadband solution to laptop computer wireless modems, smartphones, and other mobile devices. Facilities such as ultra-broadband Internet access, IP telephony, gaming services, and streamed multimedia may be provided to users.

- **BENEFITS**

**1. Faster data rates and reduced latency.**

You will have more responsive wireless Internet connections, enabling you to use multimedia-based applications such as video conferencing and real time security camera monitoring. You'll also have the ability to work remotely on matters that traditionally confined you to your office.

**2. Global adoption.**

Over 130+ wireless carriers worldwide have chosen LTE as their 4G technology. This means in the future, customers will be able to travel from country to country using the same device, just as GSM has been widely adopted worldwide today.

**3. Future availability of more 4G devices and applications.**



Because LTE has been selected by carriers worldwide, there will be a wide array of devices and applications from wireless manufacturers to support the vast adoption and demand for LTE and innovative applications. These innovations will promote maximum efficiency for businesses and consumers.

#### 4.Backward compatibility with existing 3G network.

Your Mobile Broadband connections are maintained even in non-4G coverage locations. This enables you to experience 4G in launch markets, yet still stay connected to America’s largest and most reliable 3G network in other places.

4G Mobile Broadband service supports **Windows 7®, Vista® and XP®**.

#### Coverage and Speed

Since its launch on Dec. 5, 2010, Verizon Wireless' 4G LTE network has won numerous technology and consumer choice awards, including being named the nation's "Fastest 4G Network Yet" by Popular Science's 2011 Best of What's New Awards and ranking No. 1 on PC World's 100 Best Products of 2011.

As you can see from the chart below, the Verizon 4G LTE walloped the competition with an average download speed of 9.46 Mbps down (max speed of over 37 Mbps!) and 1.35 up. Big Red’s network performed the best in nearly every region except for “Rural America” where AT&T was the king.

With average speeds of 3.70 Mbps down and 1.09 up, the T-Mobile HSPA+ 4G network performed the second best in the nation, according to the test. AT&T and Sprint were about even – Sprint had faster download speeds and AT&T had faster upload speeds.

So, it’s clear that Verizon 4G LTE is the big winner when it comes to speeds.

Carrier	Mobile Speed Index	3G Success (%)	D/L Speed (Mbps)		U/L Speed (Mbps)		UDP Stream Success (%)	
			Avg	Max	Avg	Max	Voice/Music	Video
			AT&T	63	90.20	2.44	12.97	0.82
Cricket	22	75.85	0.60	2.15	0.45	1.00	86.09	74.66
MetroPCS	29	87.32	1.62	6.30	1.07	2.22	86.61	79.07
Sprint 3G	37	65.14	0.48	2.22	0.35	1.02	71.31	48.75
Sprint 4G	47	98.14	2.99	10.46	0.75	1.03	56.57	68.67
T-Mobile	75	87.13	3.70	15.23	1.09	3.04	76.98	61.06
Verizon 3G	53	85.41	0.70	2.49	0.58	1.02	90.13	78.25
<b>Verizon 4G</b>	<b>93</b>	<b>87.41</b>	<b>9.46</b>	<b>37.66</b>	<b>1.35</b>	<b>2.33</b>	<b>93.65</b>	<b>86.49</b>

#### FEATURES AND REQUIREMENTS

##### Features

- 4G LTE Mobile Broadband and Mobile Broadband capable
- Connects with up to Five Wi-Fi® Enabled Devices
- Chipset: MDM9600
- Slim, durable and compact design
- 4G SIM Card compatible
- Service Status Indicator (LED) –4 Color
- VPN Compatible
- Auto Connect

##### Technology Bands

- CDMA 1xEV-DO Rev. A/Rev. 0: 800/1900 MHz
- LTE CDMA (700MHz)

##### System Requirements

- WiFi802.11b/g/n connectivity
- One Type A USB Port – FOR CHARGING PURPOSES ONLY with included Wall/USB Charger

##### Specifications

- Dimensions: 2.32"(H) x 3.54"(W) x 0.45"(D)
- Weight: 2.7 oz.
- Battery: (1500mAh)
- Usage: Up to 216 mins.;
- Standby: Up to 9hrs.
- SAR:1.13W/kg – Body

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# MeeGo

Nivedita Tikadar

## INTRODUCTION:

MeeGo is a Linux-based open source mobile operating system project. Primarily targeted at mobile devices and information appliances in the consumer electronics market, MeeGo is designed to act as an operating system for hardware platforms such as netbooks, entry-level desktops, nettops, tablet computers, mobile computing and communications devices, in-vehicle infotainment devices, SmartTV / ConnectedTV, IPTV-boxes, smart phones, and other embedded systems. MeeGo is currently hosted by the Linux Foundation.

## History

It was first announced at Mobile World Congress in February 2010 by Intel and Nokia in a joint press conference. The stated aim is to merge the efforts of Intel's Moblin and Nokia's Maemo former projects into one new common project. According to Intel, MeeGo was developed because Microsoft did not offer comprehensive Windows 7 support for the Atom processor. Aminocom and Novell also play a large part in the MeeGo effort, working with the Linux Foundation on their build infrastructure and official MeeGo products. Amino was responsible for extending MeeGo to TV devices, while Novell is increasingly introducing technology that was originally developed for openSUSE, (including Open Build Service, ZYpp for package management, and other system management tools). In November 2010, AMD also joined the alliance of companies that are actively developing MeeGo. Harmattan, originally slated to become Maemo 6, is now considered to be a MeeGo instance (though not a MeeGo product), and Nokia is giving up the Maemo branding for Harmattan on the Nokia N9 and beyond (Maemo 5, aka Fremantle, and previous versions will still be referred to as Maemo). On 27 September 2011 it was announced by Intel employee Imad Sousou that in collaboration with Samsung MeeGo will be replaced by Tizen during 2012. Nokia in turn is said to develop its own successor Meltami targeted at feature phones. Community developers from the Mer project however plan to continue MeeGo without Intel and Nokia. So far it is not clear

whether they will be allowed to continue to use the MeeGo trademark.

## Overview

MeeGo is intended to run on a variety of hardware platforms including handhelds, in-car devices, netbooks and televisions.[20] All platforms share the MeeGo core, with different “User Experience” (“UX”) layers for each type of device.

## User interfaces

Within the MeeGo project there are several **graphical user interfaces** – internally called *User Experiences* (“UX”).

## Netbook

The Netbook UX is a continuation of the Moblin interface. It is written using the Clutter-based Mx toolkit, and uses the Mutter window manager.

MeeGo’s netbook version uses several Linux applications in the background, such as Evolution (Email, calendar), Empathy (instant messaging), Gwibber (microblogging), Chromium (web browser), and Banshee (multimedia player), all integrated into the graphical user interface.

## Handset



### Handset UX from MeeGo 1.1 “Day 1”

The Handset UX is based on Qt, but GTK+ and Clutter will be included to provide compatibility for Moblin applications. To support the hundreds of Hildon-based Maemo applications, users have to install the Hildon library ported by the maemo.org community. Depending on the device, applications will be provided from either the Intel AppUp or the Nokia Ovi digital software distribution systems.

The MeeGo Handset UX’s “Day 1” pre-release was on June 30, 2010. The preview was initially available for the Aava Mobile Intel Moorestown platform, and a ‘kickstart’ file provided for developers to build an image for the Nokia N900.

### Smartphone

MeeGo OS v1.2 Harmattan use in Nokia N9 and N950.

### Tablet



MeeGo’s Tablet UX as a pre-alpha version

Intel demonstrated the Tablet UX on a Moorestown-based tablet PC at COMPUTEX Taipei in early June 2010.

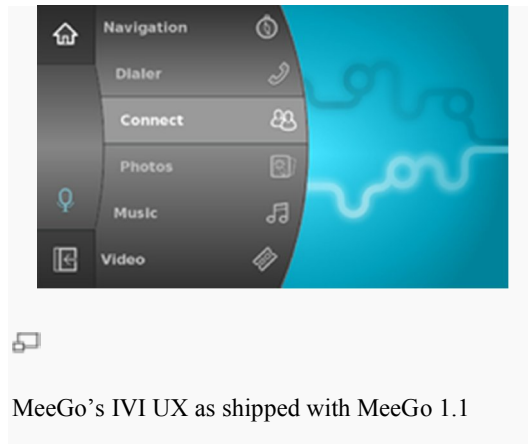
Since then, some information appeared on MeeGo website indicating there will be a Tablet UX part of the MeeGo project, but it is not known if this UX will be the one demonstrated by Intel. This Tablet UX will be fully open source like the rest of the MeeGo project and will be coded with Qt and the MeeGo Touch Framework. Intel has revealed interest in combining Qt with Wayland display server instead of the often seen

Qt/X11 combination in MeeGo Touch in order to utilize the latest graphics technologies supported by Linux kernel, which should improve user experiences and reduce system complexity.

Minimum hardware requirements are currently unknown.

The WeTab runs MeeGo with a custom user interface and has been available since September 2010

### In-Vehicle Infotainment



MeeGo’s IVI UX as shipped with MeeGo 1.1

The GENIVI Alliance, a consortium of several car makers and their industry partners, uses Moblin with Qt as base for its 'GENIVI 1.0 Reference Platform' for In-Vehicle Infotainment (IVI) and automotive navigation system as a uniformed mobile computing platform. Graham Smethurst of GENIVI Alliance and BMW Group announced in April 2010 the switch from Moblin to MeeGo.

## Smart TV

Intel are planning on developing a version of MeeGo for IPTV set top boxes

### **Release Schedule**

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It was announced at the Intel Developer Forum 2010 that MeeGo would follow a six month release schedule. Version 1.0 for Atom netbooks and a code drop for the Nokia N900 became available for download as of Wednesday, 26 May 2010.

Version	Kernel Version	Release date	Notes	Devices Supported (Netbooks)	Devices Supported (Handsets)	Codename
<b>1.0</b>	2.6.33	26 May 2010	Primarily a Netbook release; only a code drop was released for mobile devices (the Nokia N900).	Asus EeePC 901, 1000H, 1001P, 1005HA, 1005PE, 1008HA, Eeetop ET1602, Dell mini10v, Inspiron Mini 1012, Acer Aspire One D250, AO532-21S, Revo GN40, Aspire 5740-6025, Lenovo S10, MSI U100, U130, AE1900, HP mini 210-1044, Toshiba NB302.	Nokia N900 (No handset UX).	Arlington
<b>1.0.1</b>	2.6.33.5	July 2010	Update to MeeGo 1.0; Kernel updated to 2.6.33.5, USB device loading time improved, improved 3D performance, browser enhancements, resolved multiple e-mail client issue, enhanced netbook window manager, improved visuals,	All Netbooks supported by MeeGo 1.0; see above.	None	Boston

			full support for GNOME proxy configuration in the media player, more control over DNS settings.			
<b>1.0.2</b>	2.6.33.5	9 August 2010	Update to MeeGo 1.0; X-Server Update, Connection Manager Update, Package Manager UI Update, Perl Update and several more.	All Netbooks supported by MeeGo 1.0; see above.	None	Cupertino
<b>1.0.3</b>	2.6.33.5	10 September 2010	Update to MeeGo 1.0; several Updates, e.g. Chromium browser, Connection Manager	All Netbooks supported by MeeGo 1.0; see above.	None	Dallas
<b>1.0.4</b>	2.6.33.5	12 October 2010	Update to MeeGo 1.0; several security updates, better support for Lenovo S10-3	All Netbooks supported by MeeGo 1.0; see above.	None	Emeryville
<b>1.0.5</b>	Unknown	28 November 2010	MeeGo core update.	All Netbooks supported by MeeGo 1.0; see above.	None	Fairbanks
<b>1.0.6</b>	Unknown	4 January 2011	MeeGo core update.	All Netbooks supported by MeeGo 1.0; see above.	None	Georgetown
<b>1.0.7</b>	Unknown	24 February	MeeGo Netbook	All Netbooks supported by	None	Honolulu

		2011	software update.	MeeGo 1.0; see above.		
<b>1.1</b>	2.6.35	28 October 2010	Touch-based devices support proposed with the Handset UX	Unknown	Aava and Nokia N900	Irvine
<b>1.1.1</b>	2.6.35	28 November 2010	Several Fixes and Updates	Unknown	Aava and Nokia N900	Jefferson
<b>1.1.2</b>	2.6.35	07 January 2011	Several security issues fixed, update syncevolution and connman	Unknown		Knoxville
<b>1.1.3</b>	2.6.35	24 February 2011	Fixed many important security issues, enabled all programs to access remote files over network and updated translation	Unknown		Lakeside
<b>1.1.99</b>	2.6.35	24 February 2011	Beta testing of MeeGo 1.2 for Nokia N900 and other handsets.	Unknown		Mallard
<b>1.2</b>	2.6.37	19 May 2011		Unknown	Nokia N950(developers only) and Nokia N9	Newark
<b>1.3</b>	2.6.37	October 2011		Unknown		Otsego

## **Project planning**

### **Launch**

In February 2011, Nokia announced a partnership with Microsoft for mobile handsets and the departure of Nokia's MeeGo team manager Alberto Torres, leading to speculation as to Nokia's future participation in

MeeGo development or using Windows Phone by Nokia.

In September 2011, Nokia has begun shipments the first Nokia N9 MeeGo smartphone model, ahead of the Windows Phone 7 launch expected later this year. First MeeGo based tablet WeTab was launched in 2010 by Neofonie.

### **Companies supporting program**

<b>Company</b>	<b>Industry</b>	<b>Support for MeeGo</b>	<b>Targeted Device</b>
Acer	Computer systems and Hardware	Iconia M500 tablet will run MeeGo	Tablets and Notebooks
AMD	Computer systems and Hardware	Will contribute Engineering resources to the open source MeeGo project	Laptops and PCs
Amino	Home Entertainment	The Amino Freedom Jump and Freedom Media Centre products are based on MeeGo	Set Top Box
Asus	Computer Systems and Hardware	The Asus Eee PC X101 will have a MeeGo operating system option	Laptop
Asianux	Software	The MeeGo version of the Midinux 3.0 tablet is based on Asianux Linux	Tablet
basysKom	Software Consulting	Is working on a MeeGo Tablet User Interface	Tablet
Collabora	Software	Provide Consulting for MeeGo	None
CS2C	Software	They are creating a MeeGo Tablet	Tablet
DeviceVM	Computer and Software	Uses MeeGo for Splash Top PC's	PC
EA Mobile	Gaming	Verbally supports MeeGo and has declared its intention to use it for future mobile games	Tablets and Smart Phones
Gameloft	Gaming	Verbally supports MeeGo and has declared its intention to use it for future mobile games	Tablets and Smart Phones

GENIVI Alliance	Auto	Has standardized on MeeGo for auto infotainment (IVI) system.	IVI
GM	Auto	Member of the GENIVI Alliance that has standardized on MeeGo for Automobile Infotainment Systems (IVI)	IVI
Hancom	Computer Software <sup>[80]</sup>	Plans to spread MeeGo to the Korean market	PC and Laptop
Igalia	Software Consulting	Development of MeeGo and Sponsor of MeeGo at the Dublin 2010 conference	From Mobile devices to Desktop
Integrated Computer Solutions	Software Consulting	Develops custom software for MeeGo device suppliers	Embedded and Mobile devices
Intel	Semiconductors	Core sponsor and developer of MeeGo	Smart Phones
Jaguar Land Rover	Auto	They plan to use MeeGo for their New car Infotainment	IVI
Lanedo	Software Consulting	Software Development of MeeGo and Sponsor of MeeGo at the San Francisco 2011 conference	Embedded device to desktops
Linaro	Software	Optimises MeeGo for high performance on ARM	Mobile-devices
Linpus	Software OS	Created the Linpus Lite Computer with a MeeGo OS	Laptops and Netbooks
Mandriva	Software Industry	The Mandriva minis will run on MeeGo	PC and Laptops
Metasys	Computer and Software	Uses a MeeGo based operating system	Laptop PC
Nokia	Telecommunications and Computer Software	Nokia currently has two MeeGo handsets, the N9 and N950.	Smart Phones
PixArt	Software Development	Provides an operating system for the Intel Atom Processor	Desktop PCs
PSA Peugeot Citroen	Auto Manufacturing	They plan to use MeeGo for their New car Infotainment	IVI
Red Flag	Linux OS	Plans on incorporating portions of MeeGo (is it the UI) into their Linux distribution.	Tablet and IVI



ST-Ericsson	Wireless Semi Conductor	The U8500 Platform will include MeeGo	Smart Phones
Tencent	Online Service Provider	Plans to work on Next gen mobile devices and apps, using MeeGo	Smart Phones
TurboLinux	Linux OS	TurboLinux has expressed its support for MeeGo	Smart Phones
Wind River	Mobile Software	Owned by Intel, plans on porting MeeGo to other platforms.	Smart Phones

# A CHANGE FROM IPv4 TO IPv6

Vivek Kapadia

## **Introduction**

The Internet has run out of Internet addresses... sort of. Perhaps you've heard the news the last block of IPv4 addresses have been allocated. The fundamental underlying technology that has powered the Internet Protocol addresses (ever seen a number like 99.44.227.227 on the web? That's an IP address) since the Internet's inception will soon be exhausted.

## **IPv4**

IPv4 stands for Internet Protocol version 4. It is the underlying technology that makes it possible for us to connect to the web. Whenever a device accesses the Internet, it is assigned a unique numerical IP address such as 99.44.227.227. To send data from one computer to another through the web, a data packet must be transferred across the network containing the IP addresses of both the devices.

Without IP addresses, computers would not be able to communicate and send data to each other. It's essential to the infrastructure of the web.

A new technology will take its place though. IPv4's successor is IPv6, a system that will not only offer far more numerical addresses, but will simplify address assignments and additional network security features.

## **IPv6**

IPv6 is the sixth revision to the Internet Protocol and the successor of the IPv4. It functions similarly to the IPv4 in that it provides the unique numerical IP addresses necessary for Internet enabled devices to communicate. However, it does not support one major difference: it utilizes 128 bit addresses. I'll explain why this is important in a while.

The transition from IPv4 to IPv6 is likely to be rough, though. Most people are unfamiliar with IPv4 and IPv6; much less the potential impact to IPv6 may have on their lives.

That's why we've compiled this short guide to IPv4 and the eventual transition to IPv6. We

explain the two versions of IP and why they matter. We also go into details on what you expect in the next few years as billions of websites, businesses and individuals make the switch to the new era of the Internet.

## **Q: Why are we running out of IPv4 addresses?**

A: IPv4 uses 32 bits for its unique Internet addresses. That means it can support  $2^{32}$  IP addresses in total – around 4.29 billion. They may seem a lot, but all 4.29 billion IP addresses have now been assigned to various institutes, leading to the crisis we face today.

Let's be clear though: we haven't run out of addresses quite yet. Many of them are unused and in the hands of institutes like MIT and companies like Ford and IBM. More IPv4 addresses are available to be assigned and more will be traded or sold (since IPv4 addresses are now a scarce resource), but they will become a scarcer commodity over the next two years until it creates problem for the web.

## **Q: How does IPv6 solve his problem?**

A: As previously stated, IPv6 uses 128-bit IP addresses. Therefore, it can support  $2^{128}$  Internet addresses – 340,282,366,920,938,000,000,000,000,000,000,000,000,000,000 of them to be exact. That's a lot of addresses, so many that it requires a hexadecimal system to display the addresses. In other words, there are more than enough IPv6 addresses to keep the Internet operational for a very, very long time.

## **Q: So why don't we just switch?**

A: The depletion of IPv4 addresses was predicted years ago, so the switch has been in progress from the last decade. However, progress has been slow - only a small fraction of the web has switched over to the new protocol. In addition, IPv4 and IPv6 essentially run as parallel networks – exchanging

data between these protocols requires special gateways.

To make the switch, software and routers will have to be changed to support the more advanced network. This will take time and money. The first real test of the IPv6 network will come on June 8, 2011, World IPv6 Day. Google, Facebook and other prominent web companies will test drive the IPv6 network to see what it can handle and what still needs to be done to get the world switched over to the new network.

**Q: How will this affect me?**

A: Initially, it won't have a major impact on your life. Most operating systems actually support IPv6 including Mac OS X 10.2 and Windows XP SP 1. However, many routers and servers don't support it, making a connection between a device with an IPv6 address to a router or a server that only supports IPv4 impossible. IPv6 is also still in its infancy; it has a lots of bugs and security issues that still need to be fixed, which could result in one giant mess. Nobody's sure how much the transition will cost or how long it will take, but it has to be done in order for the web to function as it does today.

**Teaching computers to talk to IPv6 address**

Recently IP v6 day was celebrated where companies such as Google, facebook, Microsoft and Yahoo switched from IP v4 to IP v6 for a day to test it and the tests were pretty successful.

How do we reach the magic moment? How do we teach every server on the Internet to talk to clients on public IPv6 address? How do we teach every client on Internet to talk to servers on public IPv6 address?

Answer: We go through every place that 4-byte IPv4 addresses appear, and allow 16-byte IPv6 addresses in the same place. Several illustrative examples:

- Public IPv4 addresses appear in IP packets sent through the network, such as TCP packets and UDP packets. So we extend the format of IP packets to allow 16-byte addresses, and we change operating systems to handle the new format.

- Public IPv4 addresses appear in “my own address” configuration files in operating systems, and in corresponding parts of the memory inside the operating system. So we extend the file and memory formats to allow 16-byte addresses, and we change the operating system accordingly.
- Public IPv4 addresses appear in routine configuration files in operating systems, and in corresponding parts of memory inside the operating system. So we extend the file and memory formats to allow 16-byte addresses, and we change the operating system accordingly.
- Public IPv4 addresses of servers appears in server configuration files, in corresponding parts of memory inside the server programs, and in the operating system's “listen to this address” function. So we extend the file and memory formats to allow 16-byte addresses, and we change the servers and operating systems accordingly.
- Public IPv4 addresses of servers appear in address records (“A records”) in DNS packets and in DNS software configuration files. So we extend the address-record format in the DNS protocol, we extend the address-record format in DNS software configuration files, and we change all the DNS software accordingly. (Unfortunately, instead of simply allowing 16-byte A records, people introduced new “AAAA records” into the DNS protocol, creating several unnecessary complications in DNS software.)
- Public IPv4 addresses of servers appear in memory inside client applications, such as browsers, and in the “sent a packet/ make a connection” functions in operating systems. So we extend the memory formats to allow 16-byte addresses, and we change the clients and operating systems accordingly.
- Public IPv4 addresses of clients appear in “authorised clients” configuration files in servers, in corresponding parts of memory inside the server programs and in the “who is connecting” functions in operating system. So we extend the file and memory formats to allow 16-byte

addresses, and we change the servers and operating system accordingly.

### Q. What is DNS?

A. DNS or Domain Name System can be defined as a system of identifying networks and computers on those networks by some domain names, for ease of reference by humans.

Commonly used suffixes to specify domain names:

com : commercial organization

edu : educational organization

org : non profit organization

net : network support group

gov : government institution

mil : military group

int : international organization

### Goals of IP v6

- Support billions of hosts, even with inefficient address space allocation.
- Reduce the size of the routing tables.
- Simplify the protocol, to allow routers to process packets faster.
- Provide better security (authentic and privacy) than current IP.
- Pay more attention to type of service, particularly for real-time data.
- Aid multicasting for a host to roam without changing its address.
- Allow the protocol to evolve in the future.
- Permit the old and new protocols to coexist for years.

### Features of IP v6

- Addressing : The most important feature of IPv6 is its longer 128-bit address space, compared to 32-bits for IPv4. While IPv4 is limited to four billion addresses.

- Another major improvement of IP v6 is the simplification of the header. It contains only seven fields (versus 13 in Ipv4). This change allows routers to process packets faster and thus improve throughput.
- Security : It supports authentication, encryption of data, and data integrity. Header authentication can guarantee that a packet is from real source address.
- Another major improvement was better support for options. It is simple for routers to skip over options not intended for them. This feature speeds up packet processing time.
- Flow Control: More than 1 flow can be underway from a source to a destination. Uses a flow field in Ipv6 header to fully specify a flow in combination with the source/destination.
- Traffic can be prioritized across routers.
- IPv6 supports mobile users, unlike IPv4, which assumes that always attach to networks at same place.
- Autoconfiguration reduces system configuration and management.
- Error Control : IPv4 has a checksum field for error control. IPv6 has no such field because the same error control functions are offered by TCP and UDP.
- Quality of Service : The Flow Control and the Priority fields in the IPv6 header are used by a host to identify packets that need special handling by IPv6 routers, such as non-default quality of service or “real-time” service. This capability is important to support applications that require some degree of consistent throughput, delay and jitter.

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# THE WORKING OF BLACKBERRY MESSENGER

Rahul Nayak

## Introduction

### What is blackberry?

A BlackBerry is a handheld wireless created by Research in Motion(RIM).Blackberries read email and calendars from enterprise-class email systems, such as Indians University's Exchange service, and most models also function as cellphones. Blackberries come with complete alphanumeric keyboard, whereas many PDAs do not.

Or imagine running into heavy traffic on the way to an out-of-town family gathering. You know you'll be late, but you don't know who to call. You can use BlackBerry Messenger to contact several relatives at once with an apology and estimated arrival time."That's OK," your sister messages back."We're stuck in the same mess. Just keep us posted."Your dad responds with:"We'll just wait for you here at the restaurant."

BlackBerry Messenger gives BlackBerry users a quick, easy way to sent instant messages to each other using their PIN codes. It's free and, unlike with e-mail, users can carry on several conversations at the same time. They also can chat with a group ,see contact's availability, send files and track message status.

This article covers the feature, advantages and disadvantages of BlackBerry Messenger, How does instant messaging with you BlackBerry work, what are the messaging with your Blackberry work, What are the protocols and mechanisms involved.

### Advantages and Disadvantages of BlackBerry Messenger

BlackBerry Messenger can be definite asset, if you want to exchange messages with other Blackberry users. With it, you can:

- Carry on a real-time conversation with friends and colleagues in several different locations –or carry on several conversations simultaneously.
- Chat with a group.
- Send and receive an unlimited numbers of messages worldwide for free with no premessage charge.

- Get messages without filling up your inbox.
- Know whether a buddy is online availability or busy.
- Let your contacts know your own availability for instant messaging.
- Manage login and contacts as you would if you were using an IM program from your PC.
- Continue using other programs and send and receive e-mails while BlackBerry Messenger is running.
- Invite someone to join your buddy list and start communicating without setting up a separate IM account.
- Be noticed by a specific ringtone or vibration from a particular person.
- BBM conversations are encrypted as the traffic never leaves the BlackBerry infrastructure.
- BBM offer delivery and read notifications.
- BBM can be set up for internal use only on BES enabled handhelds.(Added security).

- BBM doesn't require an "account" to be set up on some public service somewhere which could possibly become compromised.
- BBM can be audited by BES administrators which makes it more attractive than public IM clients in secured environments.
- You can easily send pictures, files, audio, contact info, etc. over BBM.
- BBM is per-loaded on all BlackBerry devices.
- BBM is "always on" and doesn't use as much battery power to run as third-party IM clients.
- BBM has proven to be quite stable and is not the cause of memory leaks that plague other third-party apps.
- You can easily change your BBM handle at will without your contacts needing to re-add you to their contact list.

- BBM conversations and contact list can be backed up locally to media card, or remotely via email(With BBM5)
- One disadvantage of BlackBerry Messenger is that you send an instant

message to someone unless you know his or her Pin code ,the eight-digit-letter-and-number code assigned to that BlackBerry device.

However, the biggest disadvantage of BlackBerry Messenger may be that it only allow you to exchange instant messages with other BlackBerry users. Introduced in early 2006 as a feature of BlackBerry Enterprise server 4.1.BlackBerry Messenger isn't compatible with popular iMing programs. That's because it works differently.

With most instant messaging services, you download software that becomes the client on your computer or Smartphone. That client connects to the provider's server, using the proprietary protocol for communication. Once you've logged on, the client sends the server your connection information(IP address),your computer port number and the names of everyone your contact list.

The server creates a temporary files with connection information for you and your contacts. Then the server determines which contact are logged on and sends that information to your client ,as well as letting the contact know you're available. After that ,the server is no longer involved ,and all communication is between your client and that of your message recipient.

With BlackBerry Messenger, however, the server stay involved as it would if you were sending e-mails. All communications go through parent-company Research in Motion's servers as to continue to exchange messages. That also means you can't use BlackBerry Messenger unless you have a BlackBerry Internet plan, or data plan [source: CrackBerry].

Next, let's explore what else you'll need to get started with BlackBerry Messenger and its basic functions.

Getting Started with BlackBerry Messenger

BlackBerry Messenger doesn't require much set-up, particularly as it comes preloaded on newer models .With an older BlackBerry model, you'll have to do a BlackBerry Messenger download. No matter what, here's what you'll to use BlackBerry Messenger.

- A Java-based BlackBerry
- A BlackBerry internet plan ,or data plan, so you can send and receive PIN messages through Research in Motion's servers.
- Your PIN code –to find it ,go to “options,” then “Status” and finally “PIN”
- BlackBerry Messenger software –if it's not already on your BlackBerry ,use your BlackBerry browser or internet Explorer to go to <http://www.BlackBerry.com/messenger> and download it. If you plan to install the BlackBerry Messenger program via your computer, you need BlackBerry device software ver3.6 or higher .If you're installing from your BlackBerry, you'll need BlackBerry Device software v 3.7 or higher and at least 16 MB of flash memory.

With the software installed, you're ready to log on. The first time, you'll be asked to pick a display name to identify yourself while IMing and to create a password. Once you do that, you'll be logged automatically into BlackBerry Messenger whenever your device is connected to your wireless network. Once you build your contact list, you can send and receive messages.

Once you are done with the set-up, Just enter the BBM Pin of the desired person, add him to your contacts and you are all set to chat away.

BlackBerry Messenger Functions

Getting started with BlackBerry Messengers is easy for BlackBerry users. It simply requires PIN activation.

With BlackBerry Messenger, it's easy to manage contacts, to indicate your availability, to "ping" a contact and to perform other functions. Here's how some of these work.

### Managing Contacts

Perhaps you'd like to use BlackBerry Messenger to see a contact's information. All you need to do so is go to the Contact List screen, click on the contact's name, and click "Contact info."

Beyond testing your contacts separately, BlackBerry Messenger lets you gather them into groups and then manage those groups. For example:

- To add a group to the contact list, go to the Contact List screen and click "Add Group." Then type a name and click "OK."
- To switch a contact from one group to another, click the contact's name on the Contact List and click "Move." Then select a group and click on it.
- To remove a group, click the group's name on your Contact List. Then click "Delete Group" and "Delete." (Note that you can't remove the default Contact group.)

### Availability Status

Your availability status shows your contacts whether you want to exchange IM (Available) or not (Unavailable) at any given time. BlackBerry Messenger will automatically change your status in some cases. It'll, for example, show a busy icon if you're doing something else on your BlackBerry or if you have not responded to a message received in the past two minutes. An Unreachable icon will be shown if you're using the phone or in an area without enough wireless coverage.

But you can also change your own status and leave a message for contacts. To change your status, go

to the Contact List screen, and click "Available" or "Unavailable." Type the message you want contacts to see when they IM you, and click "OK." If you choose "Unavailable," you'll still receive messages but you won't be notified when they arrive.

### Notifications and Pings

You can use notifications to alert you of an incoming instant message by having your BlackBerry vibrate or emit a tone. You can set and change notifications in your BlackBerry Messenger profile. Go to the Profiles list, click on a profile, and click "Edit." Click on a notification option (like "Messenger – New Message"), and click "Edit." Set the option you want (like "Vibrate-Tone") and set the desired volume: click the trackpad, and click "Save."

Beyond your own settings, you can "ping" someone who isn't responding by making their BlackBerry vibrate when you send a message. Just click the trackpad in BlackBerry Messenger, and click "Ping Contact." If you want to turn off the ping function on your own device, go to the Contact List screen, click "Options" and click on the box before "Clear the Vibrate When Receiving a Ping."

### More Functions

Here are a few more functions to try:

- Press the SYM key twice to see a selection of emoticon that you can use in your instant messages.
- Select "View Calendar" to access your BlackBerry calendar without leaving BlackBerry Messenger.
- Try "Copy History" to save a copy of your conversation. Once you hit "End Conversation," your chance to save the conversation is gone.

BlackBerry Messenger can keep you in touch with other BlackBerry users. But what if you want to exchange instant messages with other contacts? We'll look next at what your options are.

BlackBerry Messenger has you in touch with your BlackBerry-using friends and colleagues, but what about everyone else? You can use

other options to IM with them from your BlackBerry. One option is to pick one of the major instant messaging services that provide an application for the BlackBerry – and most of them do. Among these are:

- Yahoo Messenger
- Google Talk
- Windows Live Messenger
- AOL Instant Messenger
- ICQ for BlackBerry
- IBM Lotus Sametime
- Novell GroupWise Messenger

Each application offers different functions. The advantage is that you can extend an IM service that you already use to your BlackBerry, adding mobile availability and possibly accessing your contact list for that service. To use any of these, you'll need to download the application directly to your BlackBerry – or to your computer and then install it on your BlackBerry. And you need to check whether the service you want is available through your wireless provider.

**BlackBerry users can access other instant messaging programs such as Yahoo Messenger.**

The disadvantage of these is that you can only chat with others who use that service. To solve that problem, you can go to a service that offers messaging for multiple providers simultaneously. JiveTalk, EQO and WebMessenger are three that offer BlackBerry service. But they're not all free.

JiveTalk isn't free, but it provides connections to AIM, Yahoo, MN, Google Talk, ICQ, Jabber and MySpaceIM. A non-transferable license for one BlackBerry device costs \$19.95 and includes free software upgrades. But switch to a new BlackBerry, and you'll need to get another license. A \$29.95 user license can be transferred to a new device.

EQO offers free IMing with connections to MSN, AIM, Yahoo!, Google Talk, QQ, ICQ and Jabber. The company also offers – and charges for – text messaging and VoIP calling.

WebMessenger is a hosted service that can be used to access AOL, MSN, Yahoo, Google Talk, ICQ and Jabber networks from a BlackBerry or other mobile device. While the company offers a

monthly or yearly subscription service, WebMessenger Business-Class Service Is free.

**How does it work?**

- The BlackBerry device
- Email redirection, managed in one of two ways:
  - The BlackBerry Enterprise Server (BES), which works directly with the Exchange mail server. UITS recommends this option if you have an IU Exchange account.
  - The BlackBerry Desktop Redirector, which runs on your personal computer and redirects messages as they arrive in Outlook. You can use this option with any Outlook mail setup (e.g., POP, IMAP, HTTP, etc.).

A BlackBerry receives email through the following process:

1. The Exchange or other email account (see second option above) receives the message.
2. The redirector looks in the email account, finds the message, and forward it to the BlackBerry service provided by RIM.
3. RIM's BlackBerry service end the message to the wireless data network (e.g., Airtel, Vodafone).
4. The wireless data network provider sends the message in a wireless signal to the BlackBerry device. (You must be in a data coverage area to receive mail.)
5. The BlackBerry receives the signal and displays the message.

A BlackBerry sends mail in the reverse of this process. The BlackBerry device sends the message to the wireless data network provider. The provider forwards it to RIM's BlackBerry service, which in turn ends it over the internet to the redirector (either the BES server or desktop server). The redirector then sends the message to your email account, from which it is sent over the internet to the recipient.



## The Mechanism

A BlackBerry, on the other hand, does everything a PDA can do, and it syncs itself continually through push technology. BlackBerry Enterprise server or Desktop Redirector software “pushes,” or redirects, new e-mail, calendar update, documents and other data straight to the user over the Internet and the cell phone network.

First, the software senses that a new message has arrived or the data has changed. Then, it compresses, packages and redirects the information to the handheld unit. The server uses hypertext transfer protocol (HTTP) and transmission control protocol (TCP) to communicate with the handhelds. It also encrypts the data with triple data encryption standard (DES) or advanced encryption standard (AES).

The software determines the capabilities of the BlackBerry and lets people establish criteria for the information they want to have delivered. The criteria can include message type and size, specific senders and updates to specific programs or databases.

Once all of the parameters has been set, the software waits for updated content. When a new message or other data arrive, the software formats the information for transmission to and display on the BlackBerry. It packages e-mail, messages into a kind of electronic envelope so the user can decide whether to open or retrieve the rest of the message.

The blackberry listens for new information and notifies the user when it arrives by vibrating, changing an icon on the screen or turning on a light. The blackberry does not poll the server to look for updates. It simply wait for the update to arrive and notifies the user when it does. With e-mail, a copy of each message also goes to the user’s inbox on the computer, but the e-mail client can mark the message as read once the user reads it on the blackberry.

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# GOOGLE CHROME

Owaiz Khalife

**Company Developer:** Google Inc.  
**Programmed in:** C, C++  
**Os Family:** Unix-like  
**Working State:** Chromebooks  
**Supported Platforms:** x86, ARM

**Google Chrome OS** is a Linux-based operating system designed by Google to work exclusively with web applications. Google announced the operating system on July 7, 2009 and made it an open source project, called **Chromium OS**, in November.

First Google dominated the search engine market. Then Google entered the Web-based e-mail market. Android invades Windows Mobile's turf. And then Google jumps into the browser market with Chrome. Now Google has upped the ante yet again with its plans for a new operating system based on **Google Chrome**.

The new operating system, aptly named **Google Chrome OS**, will be an open-source operating system initially geared toward netbooks. Google claims the new operating system, which should ship on netbooks, will be "**lightweight**" and heavily **Web-centric**.

**SPEED, SIMPLICITY AND SECURITY** are the key aspects of **Google Chrome OS**. Google is designing the OS to be fast and lightweight, to start up and get you onto the web in a few seconds. The user interface is minimal to stay out of your way, and most of the user experience takes place on the web. And as Google did for the Google Chrome browser, Google is going back to the basics and completely redesigning the underlying security architecture of the OS so that users don't have to deal with viruses, malware and security updates.

**Google Chrome OS** will run on both **x86** as well as **ARM** chips and Google is working with multiple OEMs to bring a number of netbooks to market next year. The software architecture is simple — Google Chrome running within a new windowing system on top of a Linux kernel. For application developers, the web is the platform. All web-based applications will automatically work and new

applications can be written using your favorite web technologies. And of course, these apps will run not only on Google Chrome OS, but on any standards-based browser on Windows, Mac and Linux thereby giving developers the largest user base of any platform.

**Google Chrome OS** is a new project, separate from Android. **Android** was designed from the beginning to work across a variety of devices from phones to set-top boxes to netbooks. **Google Chrome OS** is being created for people who spend most of their time on the web, and is being designed to power computers ranging from small netbooks to full-size desktop systems. While there are areas where Google Chrome OS and Android overlap, Google believes choice will drive innovation for the benefit of everyone, including Google.

Google Chrome Vs. The World

In the mid-1990s, when Microsoft ruled the tech world, and its then-erstwhile competitors struggled to gain entry into both new and existing markets, **few foresaw a day when that domination would end**.

So what kind of company could succeed Microsoft? Well, the PC industry is ever-evolving, and the current market movements are towards **mobility and cloud services**. Here, two obvious players emerge, **Apple** and **Google**.

**Google**, meanwhile, is perhaps even more dangerous to Microsoft. That's because Google seeks to offer alternatives to Microsoft solutions across the board, and unlike most other competitors, it has the money to make it happen. Google started off slow, but quickly made inroads into every conceivable market in which Microsoft plays, a series of moves so aggressive and so unexpected that the software giant is still in many ways trying to figure out what happened.

The most amazing of these Google initiatives, of course, is **Chrome OS**, a version of Google's web browser that is literally an operating system in its own right, and thus a competitor to Windows.

Google is positioning **Chrome OS** as no less than a full-fledged replacement for Windows.

All the major new work, it says, is happening on the web. (It should be noted that there is plenty of native application development occurring today, but it's happening on mobile devices, mostly based on Google's **Android OS** and on **Apple's iOS**, which runs the tablet and smart phones, and not on the PC. But what Google is talking about here is on the PC.

Google's approach on the PC desktop, of course, is brand new because the company has no legacy technologies to contend with, no backwards compatibility concerns stopping it from evolving its platform quickly, and no hundreds of millions of customers with varied and often contradictory requirements. It is a company born in the Internet Age, and it sees everything through the lenses of the web.

What Google is offering with **Chrome OS** then, is similar to what Microsoft is offering in the mobile space with Windows Phone 7: A system that is clean, small, and fast, but easy to criticize because of "obvious" missing features. Both will evolve or time, of course, and fill in the gaps. But this is the tradeoff with something new.

**Chrome OS is eliminating the need for Windows.** As is the case with Apple's ever-expanding stable of iOS-based devices, Google foresees a world in which users--not technical users, but all users, including very average people with no technical skills at all--can do what they want to do, online, without having to deal with the complexity of Windows.

Today, by and large, most of the customers are using Windows-based PCs. So Google is releasing software that runs on that platform (the **Chrome web browser**, for example) that lets users move into this new world slowly. As users have good experiences with the companies' products, they'll be far more likely to consider moving up the product chain. For **Google**, it's from web applications like **Gmail**, to the company's **browser**, and then to **Android phones** and **Chrome OS**-based computers. When all is said and done, users will have no need or use for Windows, not to mention other Microsoft products.

Today, Google is also talking up end-to-end experiences in **Chrome OS**. This time around, the focus is on simplicity and speed. The out of box experience has just a few simple steps, and anyone who's purchased a new PC can tell you that the experience of **setting up a Windows-based PC is generally a nightmarish one**, and nothing like the **simple Chrome OS set up**, or as Google calls it, **"from 0 to done in less than 60 seconds."**

This process is something that will get even better over time. Today, for example, I'd never choose Google's web-based Google Docs solutions over Microsoft Office. But as Google Docs--and competing solutions like Microsoft's web-based Office Web Apps--get more sophisticated, that will no longer be the case. By logging on to a **Chrome OS**-based PC, I gain access to all of my configured web apps, including Google Docs (and, potentially, Office) automatically. So unlike traditional versions of Office, these web-based offerings don't need to be installed, but they also don't need to be updated or configured with my custom settings. Just log on and it's all there.

It's not just this initial setup that's better, though I should note that it often takes me the better part of a day to take an existing PC, wipe it out, and reinstall all of my apps and data. It's day-to-day performance, around things like sleep and resume, which on **Chrome OS** are near instantaneous. It's about ongoing, behind-the-scenes updating of all software components, whether they're on the device itself or out in the cloud, all without any user intervention. It's about having the same experience, on any device to which you logon, without having to do any work at all. Sharing PCs or using public PCs is suddenly the simplest thing in the world.

Folks, this is a revolution. No, it's not complete right now, at this moment, mostly because of the immaturity of some of the web app solutions. But it's only a matter of time. And a lot of what we really do use every day is already there. You can see the finish line.

**Connectivity is integral to the experience.** While the open nature of **Chrome OS** makes it inconceivable that every single **Chrome OS**-based device will have **3G** or **LTE** cellular connectivity in addition to 802.11n-based wireless, Google has engineered the system so that it can seamlessly move between these network types when available

and be used in offline mode when not. This is an important consideration for a system that lives largely in the cloud, especially for those cases in which the data you're accessing is online.

Google is even working on a solution for printing, called **Google Cloud Print**, this capability lets you print from a **Chrome OS**-based device to "any printer connected to your network," and it will work from no matter where you are in the world as long as you're connected.

Google currently keeps the Chrome web browser completely up to date, automatically, and any software updates it requires are applied without the user's knowledge or intervention. So too will **Chrome OS** be updated. But **Chrome OS** goes a step further by also keeping every single installed application up to date as well. This is an area where Windows simply falls flat.

Security isn't just about updating, of course. **Chrome OS** feature OS and app sandboxing, so no part of the system can impact other parts. By default, all user data in **Chrome OS** is "heavily encrypted". So if you lose your **Chrome OS** PC, no worries. Your data is safe in the cloud, and any thief who obtains your computer can't access any of that data.

Most amazingly, **Google** is implementing some of the **TPM (Trusted Platform Module) security technologies**. This includes **Verified Boot**, where the core of the OS is physically separated and inaccessible by software, and thus always known to be safe. That core part of the OS then "cryptographically" checks every other OS component to make sure they're safe--i.e. not hacked or modified by others. If anything is wrong, the system will use a known good backup copy of the OS to set things right. "**Chrome OS will be the most secure consumer operating system that has ever been shipped,**" the company claims.

Google's vision of the future is as clear with **Chrome OS, The Web is the OS of the future,**

and a modern OS needs to be built around the Web first. In fact, the answer is **Google's Chrome OS**.

# SYMBIAN OPERATING SYSTEM

Sagar Pradhan

The All over Model contains the following layers, from top to bottom:

- UI Framework Layer
- Application Services Layer
  - Java ME
    - OS Services Layer
  - Generic OS services
  - Communications services
  - Multimedia and graphics services
  - Connectivity services
  - Base Services Layer
  - Kernel Services & Hardware Interface Layer

There is also a large volume of user interface (UI) Code. Only the base classes and substructure were contained in Symbian OS, while most of the actual user interfaces were maintained by third parties. This is no longer the case. The third major UI's – S60, UIQ, and MOAP- were contributed to symbian on 2009. Symbian also contains graphics, text layout and front rendering libraries.

The Internet protocol suite (TCP/IP) and the Open Systems Interconnection model (OSI model) of computer networking each specify a group of protocols and methods identified by the name application service layer.

The TCP/IP, the application layer contains all protocols and methods that fall into the realm of process-to-process communications across an Internet Protocol (IP) network. Application layer methods use the underlying transport layer protocols to establish to establish host-to-host connections.

In the OSI model, the definition of its of its application layer is narrower in scope, explicitly distinguishing additional functionality above the transport layer at two additional levels, the session layer and the presentation layer. OSI specifies strict modular separation of functionality at these layers and provides protocol implementations for each layer.

Symbian specializes in software solutions that enable efficient implementation of quality experiences. The quality of the User Experience for any device or service is dependent on properly executed software. Software that is not optimized leads to expensive technical obstacles. Poor or mediocre usability and performance can be eliminated with well-designed software. Symbian is designed to emphasis compatibility with other devices, especially removable media file systems.

There is a large networking and communication subsystem, which has three main servers called: ETEL, ESOCK, and C32. Each of these has a plug-in scheme. For example, ESOCK allows different “.PRT” protocol modules to implement various networking protocol schemes. The subsystem also contains code that supports short-range communication links, such as Bluetooth, IrDA and USB.

The Bas eServices is the lowest level reach able by user –side operations; it includes the File Server and User Library, a Plug-In Framework which manages all plug –ins, Store, Central Respiratory, DBMS and cryptographic services. It also includes the text Window Server and the Text Shell: the two basic services from which a completely functional port can be created without the need for any higher layer services.

Symbian has a microkernel architecture, which means that the minimum necessary is within the kernel to maximize robustness, availability and responsiveness. It contains a scheduler, memory management and device drivers, but other services like networking, telephony, and file system support are placed in the OS Services or the Base Services Layer.

All native Symbian C++ applications are built up from three framework classes defined by the application architecture: an application class creates the fundamental application behavior.

## **Introduction:**

In 2009, we established the Symbian Foundation to make the Symbian platform available open source and royalty-free. In November 2010 we announced that the foundation would ramp down its operational activities as a result of changes in global economic and market conditions.

**Symbian** is a mobile operating system and computing platform designed for smart phones and currently maintained by Nokia. The Symbian platform is the successor to Symbian OS and Nokia Series 60; unlike Symbian OS, which needed an additional user interface system, Symbian includes a user interface component based on S60 5th Edition. The latest version, Symbian^3, was officially released in Q4 2010, first used in the Nokia N8. In May 2011 Symbian Anna was officially released on two new phones the Nokia X7 and E6. Nokia announced Symbian Anna will come to all Symbian^3 phones.

*Symbian OS* was originally developed by Symbian Ltd. It is a descendant of Psion's EPOC and runs exclusively on ARM processors, although an unreleased x86 port existed.

There is a strong emphasis on conserving resources which is exemplified by Symbian-specific programming idioms like descriptors and a cleanup stack. Similar methods exist to conserve disk space, though disks on Symbian devices are usually flash memory. Further, all Symbian programming is event-based, and the central processing unit (CPU) is switched into a low power.

## Features of Symbian:

### 1. User interface:

Symbian has had a native graphics toolkit since its inception, known as AVKON (formerly known as Series 60). S60 was designed to be manipulated by a keyboard-like interface metaphor, such as the ~15-key augmented telephone keypad, or the mini-QWERTY keyboards. AVKON-based software is binary-compatible with Symbian versions up to and including Symbian^3.

Symbian^3 includes the Qt framework, which is now the recommended user interface toolkit for new applications. Qt can also be installed on older Symbian devices.

2. **Performance:** Symbian OS is designed to make minimal demands on batteries and to have low memory.

3. **Multitasking:** Telephony and universal messaging are fundamental components. All applications are designed to work seamlessly in parallel.
4. **Standards:** The use of technologies based on agreed-upon standards is a basic principle of Symbian OS, ensuring that applications are robust, portable, and interoperable.
5. **Object-oriented:** Software architecture.
6. **Memory management optimized:** For embedded software environment. Run time memory requirements are minimized: Very small executables sizes and ROM – based code that executes in place.
7. **Security:** Mechanism for enabling secure communications and safe data storage. Application support for international environment with build-in Unicode character sets. A rich support and varied API allowing access to reuse components in developer applications.
8. **Design:** Symbian features pre-emptive multitasking and memory protection, like other operating systems (especially those created for use on desktop computers). EPOC's approach to multitasking was inspired by VMS and is based on asynchronous server-based events.

Symbian OS was created with three systems design principles in mind:

1. the integrity and security of user data is paramount
2. user time must not be wasted
3. all resources are scarce

### 9. Architecture

#### Technology domains and packages

Symbian's design is subdivided into **technology domains**,<sup>[41]</sup> each of which comprises a number of software **packages**.<sup>[42]</sup> Each technology domain has its own roadmap, and the Symbian Foundation has a team of technology managers who manage these technology domain roadmaps.

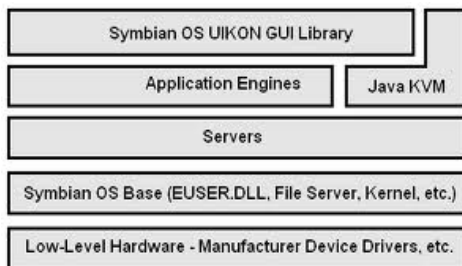
Every package is allocated to exactly one technology domain, based on the general functional area to which the package contributes and by which it may be influenced. By grouping related packages by themes, the Symbian Foundation hopes

to encourage a strong community to form around them and to generate discussion and review.

The Symbian System Model illustrates the scope of each of the technology domains across the platform packages.

Packages are owned and maintained by a package owner, a named individual from an organization member of the Symbian Foundation, who accepts code contributions from the wider Symbian community and is responsible for package.

Symbian OS generic technology structure



The system kernel, file server, memory management and device driver are located in the "Base" Operating system Layer. Symbian uses microkernel approach. The kernel manages system resources such as memory and is responsible for time-slicing the applications and system tasks. Device drivers provide the control and interface to specific items of hardware, display, infrared port and so on.

The upper layer of the system provides communication and extensive computing services, such as TCP/IP, IMAP4, SMS and database management. Symbian OS components provide data management, communications, graphics, multimedia, security, personal information management(PIM) application engines, messaging engine ,Bluetooth, browser engines and support for data synchronization and internationalization.

## Development of Symbian Code:

### Symbian C++

From 2010, Symbian switched to using standard C++ with [Qt](#) as the SDK, which can be used with either [Qt Creator](#) or Carbide. Qt supports the older Symbian S60 3rd and 5th editions, as well as the new Symbian platform. It also supports [Maemo](#) and [MeeGo](#), Windows, Linux and Mac OS X.

Symbian OS previously used a Symbian specific C++ version along with [Carbide.c++ integrated development environment](#) (IDE) as the native application development environment.

Alternative application development can be done using [Python](#) (see [Python for S60](#)), [Adobe Flash](#) or [Java ME](#).

It is also possible to develop using Symbian C++, although it is not a standard implementation. Before the release of the Qt SDK, this was the standard development environment. There were multiple platforms based on Symbian OS that provided [software development kit](#) (SDKs) for application developers wishing to target Symbian OS devices, the main ones being UIQ and S60. Individual phone products, or families, often had SDKs or SDK extensions downloadable from the maker's website too.

The SDKs contain documentation, the header files and library files needed to build Symbian OS software, and a Windows-based emulator ("WINS"). Up until Symbian OS version 8, the SDKs also included a version of the [GNU Compiler Collection](#) (GCC) compiler (a [cross-compiler](#)) needed to build software to work on the device.

Symbian OS 9 and the Symbian platform use a new [application binary interface](#) (ABI) and needed a different compiler. A choice of compilers is available including a newer version of GCC (see external links below).

Unfortunately, Symbian C++ programming has a steep [learning curve](#), as Symbian C++ requires the use of special techniques such as descriptors, active objects and the cleanup stack. This can make even relatively simple programs harder to implement than in other environments. Moreover, it was questionable whether these techniques, such as the memory management paradigm, were actually beneficial.

Symbian C++ programming is commonly done with an integrated development environment (IDE). For earlier versions of Symbian OS, the commercial IDE CodeWarrior for Symbian OS was favoured. The CodeWarrior tools were replaced during 2006 by Carbide.c++, an Eclipse-based IDE developed by Nokia. Carbide.c++ is offered in four different versions: Express, Developer, Professional, and OEM, with increasing levels of capability. Fully featured software can be created and released with the Express edition, which is free.

**Malware** Symbian OS was subject to a variety of viruses, the best known of which is "Cabir". Usually these send themselves from phone to phone by Bluetooth. So far, none have taken advantage any flaws in Symbian OS – instead, they have all asked the user whether they would like to install the software, with somewhat prominent warnings that it can't be trusted.

However, with a view that the average mobile phone user shouldn't have to worry about security, Symbian OS 9.x adopted a UNIX-style capability

model (permissions per process, not per object). Installed software is theoretically unable to do damaging things (such as costing the user money by sending network data) without being digitally signed – thus making it traceable. Commercial developers who can afford the cost can apply to have their software signed via the Symbian Signed program. Developers also have the option of self-signing their programs. However, the set of available features does not include access to Bluetooth, IrDA, GSM CellID, voice calls, GPS and few others. Some operators have opted to disable all certificates other than the Symbian Signed certificates.

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# Mobile Banking

Swapnil Pradhan

## 1. Introduction

Mobile banking (also known as M-Banking, m banking, SMS Banking) is a term used for performing balance checks, account transactions, payments, credit applications and other banking transactions through a mobile device such as a mobile phone or Personal Digital Assistant (PDA). The earliest mobile banking services were offered over SMS. Mobile banking has until recently (2010) most often been performed via SMS or the Mobile Web. Apple's initial success with i-Phone and the rapid growth of phones based on Google's Android (operating system) have led to increasing use of special client programs, called apps, downloaded to the mobile device.

## 2. History of mobile banking

The advent of the Internet has enabled new ways to conduct banking business, resulting in the creation of new institutions, such as online banks, online brokers and wealth managers. Such institutions still account for a tiny percentage of the industry.

With the introduction of the first primitive smart phones with WAP support enabling the use of the mobile web in 1999, the first European banks started to offer mobile banking on this platform to their customers. Over the last few years, the mobile and wireless market has been one of the fastest growing markets in the world and it is still growing at a rapid pace. According to the GSM Association and Ovum, the number of mobile subscribers exceeded 2 billion in September 2005, and now 2009 exceeds 2.5 billion (of which more than 2 billion are GSM).

## 3. A mobile banking conceptual model

In one academic model mobile banking is defined as:

Mobile Banking refers to provision and availment of banking- and financial services with the help of mobile telecommunication devices. The scope of offered services may include facilities to conduct bank and stock market transactions, to administer accounts and to access customized information."

According to this model Mobile Banking can be said to consist of three inter-related concepts:

- Mobile Accounting
- Mobile Brokerage
- Mobile Financial Information Services

Most services in the categories designated *Accounting* and *Brokerage* are transaction-based. The non-transaction-based services of an informational nature are however essential for conducting transactions - for instance, balance inquiries might be needed before committing a money remittance. The accounting and brokerage services are therefore offered invariably in combination with information services. Information services, on the other hand, may be offered as an independent module.

## 4. Types of Mobile banking business models.

A wide spectrum of Mobile/branchless banking models is evolving. However, no matter what business model, if mobile banking is being used to attract low-income populations in often rural locations, the business model will depend on banking agents, i.e., retail or postal outlets that process financial transactions on behalf Telco's or banks. The banking agent is an important part of the mobile banking business model since customer care, service quality, and cash management will depend on them.

### a. Bank-focused model

The bank-focused model emerges when a traditional bank uses non-traditional low-cost delivery channels to provide banking services to its existing customers. Examples range from use of automatic teller machines (ATMs) to internet banking or mobile phone banking to provide certain limited banking services to banks' customers. This model is additive in nature and may be seen as a modest extension of conventional branch-based banking.

### b. Bank-led model

The bank-led model offers a distinct alternative to conventional branch-based banking in that customer conducts financial transactions at a whole range of retail agents (or through mobile phone) instead of at bank branches or through bank employees. This model promises the potential to substantially increase the financial services

outreach by using a different delivery channel (retailers/ mobile phones), a different trade partner (Telco / chain store) having experience and target market distinct from traditional banks, and may be significantly cheaper than the bank-based alternatives. The bank-led model may be implemented by either using correspondent arrangements or by creating a JV between Bank and Telco/non-bank. In this model customer account relationship rests with the bank

#### c. Non-bank-led model

The non-bank-led model is where a bank has a limited role in the day-to-day account management. Typically its role in this model is limited to safe-keeping of funds. Account management functions are conducted by a non-bank (e.g. Telco) who has direct contact with individual customers.

### 5. Mobile Banking Applications:

Mobile banking can offer services or applications such as the following:

#### Account Information

1. Mini-statements and checking of account history
2. Alerts on account activity or passing of set thresholds
3. Monitoring of term deposits
4. Access to loan statements
5. Access to card statements
6. Mutual funds / equity statements
7. Insurance policy management
8. Pension plan management

#### Payments, Deposits, Withdrawals, and Transfers

1. Domestic and international fund transfers
2. Micro-payment handling
3. Mobile recharging
4. Commercial payment processing
5. Bill payment processing
6. Peer to Peer payments

#### Investments

1. Portfolio management services
2. Real-time stock quotes
3. Personalized alerts and notifications on security prices

#### Support

1. Status of requests for credit, including mortgage approval, and insurance coverage
2. Check (cheque) book and card requests
3. Exchange of data messages and email, including complaint submission and tracking
4. ATM Location

#### Content Services

1. General information such as weather updates, news
2. Loyalty-related offers
3. Location-based services

#### Others:

- Get account balance details
- Request a cheque book
- Request last three transaction details
- Pay bills for electricity, mobile, insurance etc.

### 6. Working of mobile banking

An overview:

In order to avail the services mentioned above, a user subscribing to a wireless carrier sends an SMS with a predefined code to the bulk service provider's number.

The service provider forwards this message to the bank's mobile banking applications. The mobile banking applications interface with the core banking servers (that contain the user account information) that service the request made by the user. The response is then sent by the mobile banking applications to the bulk service provider who in turn forward it to the valid user via SMS. There are two ways in which a bank can communicate with a customer using SMS:

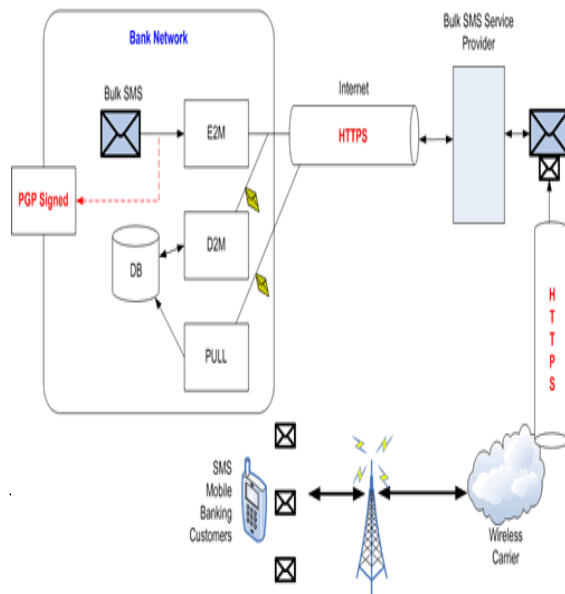
1. In the first method the bank proactively sends data to customers in response to certain transactions. For e.g. account to account transfer, salary credit and some promotional messages. This data can be sent to the customer in two ways
  - a. E-mail to mobile (E2M): In this method, the bank sends an email to the mobile banking application through a specific email address. This email may consist of the message content together with the mobile numbers of the customer. The mobile banking application in turn sends this message in a specific format (for e.g. XML tags are part of a HTTP GET message query string) to the service provider's

application server. From here on the information from the XML tags is extracted and sent as a SMS to the wireless carrier which in turn forwards this message to the customer.

b. Database to mobile (D2M) : Here a mobile banking application continuously polls the banks database server and whenever a relevant event happens, for e.g. an account to account transfer, it forwards the specific message to the service provider's application server. The message format may be the same as the one used in the E2M case. This message is then forwarded to the wireless carrier which in turn forwards this message to the customer.

3. In the second method the bank sends data in response to specific customer query such as account balance details. The customer first sends a pre-defined request code via SMS to the Bulk SMS service provider's registered mobile number. Depending on the message code, the bulk SMS provider forwards the SMS to a PULL application in the mobile banking server. The PULL application receives the request and forwards it to the core banking application for further processing. The core banking server then processes this message and sends the reply to the PULL application which in turn forwards in to the customer via the service provider. As in the above cases the request and the response for the PULL application may be a HTTP GET message with XML tags in the query string.

The following is a diagram shows a structural design for the mobile banking scheme.



The following aspects need to be addressed to offer a secure infrastructure for financial transaction over wireless network:

1. Physical part of the hand-held device. If the bank is offering smart-card based security, the physical security of the device is more important.
2. Security of any thick-client application running on the device. In case the device is stolen, the hacker should require at least an ID/Password to access the application.
3. Authentication of the device with service provider before initiating a transaction. This would ensure that unauthorized devices are not connected to perform financial transactions.
4. User ID / Password authentication of bank's customer.
5. Encryption of the data being transmitted over the air.
6. Encryption of the data that will be stored in device for later / off-line analysis by the customer.

One-time password (OTPs) are the latest tool used by financial and banking service providers in the fight against cyber fraud. Instead of relying on traditional memorized passwords, OTPs are requested by consumers each time they want to perform transactions using the online or mobile banking interface. When the request is received the password is sent to the consumer's phone via SMS. The password is expired once it has been used or once its scheduled life-cycle has expired.

## 8. Personalization

It would be expected from the mobile application to support personalization such as :

1. Preferred Language
2. Date / Time format
3. Amount format
4. Default transactions
5. Standard Beneficiary list
6. Alerts



## 9. Challenges for a Mobile Banking Solution

There are a large number of different mobile phone devices and it is a big challenge for banks to offer mobile banking solution on any type of device. Some of these devices support Java ME and others support SIM Application Toolkit, a WAP browser, or only SMS.

Initial interoperability issues however have been localized, with countries like India using portals like R-World to enable the limitations of low end java based phones, while focus on areas such as South Africa have defaulted to the USSD as a basis of communication achievable with any phone.

The desire for interoperability is largely dependent on the banks themselves, where installed applications (Java based or native) provide better security, are easier to use and allow development of more complex capabilities similar to those of internet banking while SMS can provide the basics but becomes difficult to operate with more complex transactions.

There is a myth that there is a challenge of interoperability between mobile banking applications due to perceived lack of common technology standards for mobile banking. In practice it is too early in the service lifecycle for interoperability to be addressed within an individual country, as very few countries have more than one mobile banking service provider. In practice, banking interfaces are well defined and money movements between banks follow the ISO-8583 standard. As mobile banking matures, money movements between service providers will naturally adopt the same standards as in the banking world.

## 10. Future of Mobile Banking

Based on the 'International Review of Business Research Papers' from World business Institute, Australia, following are the key functional trends possible in world of Mobile Banking.

With the advent of technology and increasing use of Smartphone and tablet based devices, the use of Mobile Banking functionality would enable customer connect across entire customer life cycle much comprehensively than before. With this scenario, current mobile banking objectives of say building relationships, reducing cost, achieving new revenue stream will transform to enable new objectives targeting higher level goals such as building brand of the banking organization. Emerging technology and functionalities would enable to create new ways of lead generation, prospecting as well as developing deep customer relationship and mobile banking world would achieve superior customer experience with bi-directional communications.

There is vast scope for growth in mobile banking industry. In future, the concept of carrying cash or carrying wallet may become obsolete. You will be able to carry out all kind of financial transactions from buying a small pencil worth Re 1 to buying a car worth, say, Rs 10 lakhs using your mobile phone.

There will be no need to carry any credit cards. Your mobile phone will be able to serve as a debit and a credit card. The banking software vendors like us will have a big role to play in this.

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# ARTIFICIAL REALITY

Surabhee Saha

Artificial Intelligence is the ability of a machine to mimic human behavior. Humans are conscious beings. In their consciousness they see and learn things that their brain processes to accomplish activities. Then again there are things they do see which are not related to accomplishing any task. So the brain stores it away in memory. In an unconscious state while sleeping the brain brings back this unused processed data in the form of dreams.

Now if artificial intelligence does mimic human nature is it possible that even an artificial intelligence can have random bits of unused processed data and have dreams?

If it does have dreams and it does mimic human behavior can it learn to keep it a secret even from its creator?

Thus in layman terms one can say that whether one is a machine or a human being a particular topic that occupies the mind or our consciousness requires a particular level of decision making to decide whether the topic that has interrupted a flow of thought should take top priority.

For example: Let's say a student is writing a paper and her neighbor starts ruffling the paper and drops a pen. From peripheral view the student can see the neighboring student shift in his position in a restless and awkward manner. Although the student is writing a paper which in this case is the main task one cannot overlook the fact that although we cannot entirely say that the student is distracted, one cannot deny that there is in fact a parallel activity going on in the consciousness of the student that logically is second priority yet has interrupted the top priority that is writing the paper.

As soon as a robot is made to actively function in the environment it either uses his own database or creates a database using the simple English syntax called subject + verb + object.eg-

Trees give fruits.

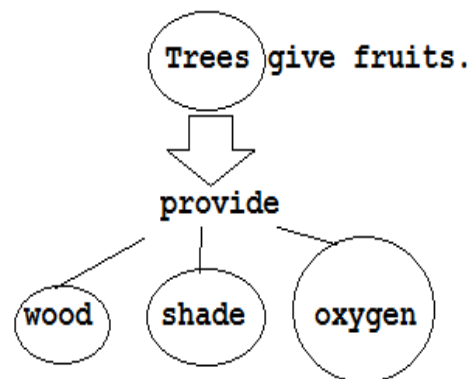
Let's focus on the subject of these sentence- Trees. Now, trees will be associated with another set of corresponding subjects, verbs and objects-

An attempt to explain consciousness is best seen in the Moving wave algorithm.

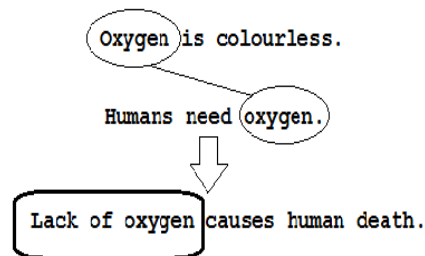
In the Moving Wave Algorithm, only one concept at a time occupies the focal point of consciousness. A sentence of thought is quickly strung together and briefly occupies the advancing front of consciousness.

Whether we are a robot or a human being, we are conscious of each thought as we think it, because the selection process for the inclusion of concepts in a thought being generated requires each candidate concept to rise briefly above all other active concepts and seize our attention.

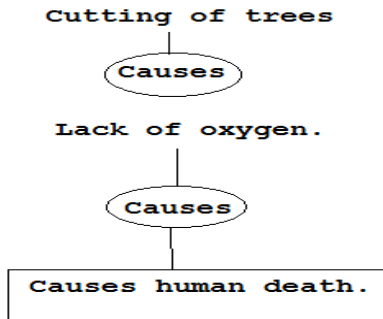
The algorithm explains how a wave of information spreads across the mind grid of a robot.



Now, let us take into consideration the word oxygen now oxygen will have another set of words associated with it in the database of artificial intelligence-



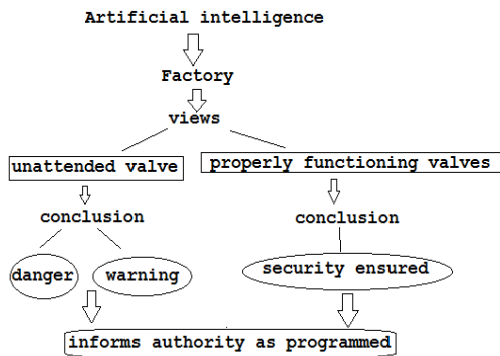
Thus, the artificial intelligence integrates two data which are associated according to its data dictionary-



Now, let us assume that a robot functions on artificial intelligence- we will use a simple example-Lets say that a robot is programmed to obey all the user's commands keeping in mind the following three laws-

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

As one can see according to the laws a robot cannot cause harm to a human being so let us assume that a robot is assigned the task to cut a stretch of trees



Now, let us take another example, where program or instructions may not necessarily be available for the robot to take decisions.

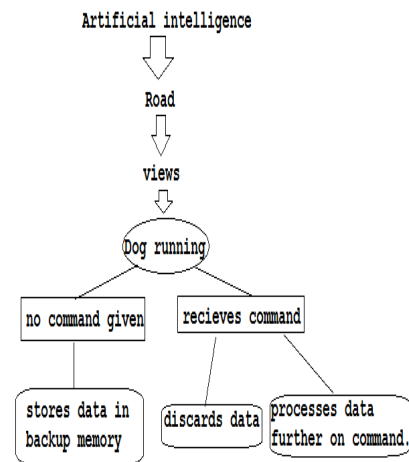
in particular area, the robot is programmed to calculate the percentage of oxygen in the air due to the presence of trees, after calculations the robot comes to a conclusion that cutting the trees will reduce the percentage of oxygen to dangerous level.

Cutting the trees will not cause direct harm to the user i.e. if a robot cuts the trees the robot isn't harming the human being according to the laws. Still due to an extensive database the robot is consciously aware of the danger of cutting down all the trees. The ill effects of low number of trees may not be immediate yet the robot is aware that they are definite. Thus, at an advanced level of artificial intelligence a robot will have to decide between taking orders of priority and seeing a logical outcome.

This of course is the case in consciousness-what happens if a machine is in an unconscious state?

As mentioned earlier, artificial intelligence has a basic database. Let us assume that at an advanced level a robot is designed to form its database on the basis of observations it makes. The following diagram depicts the working of an observational database-

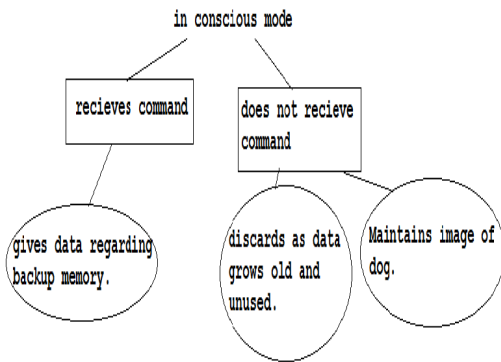
**Stage 1-Conscious state**



**Stage 2- An artificial dream?**

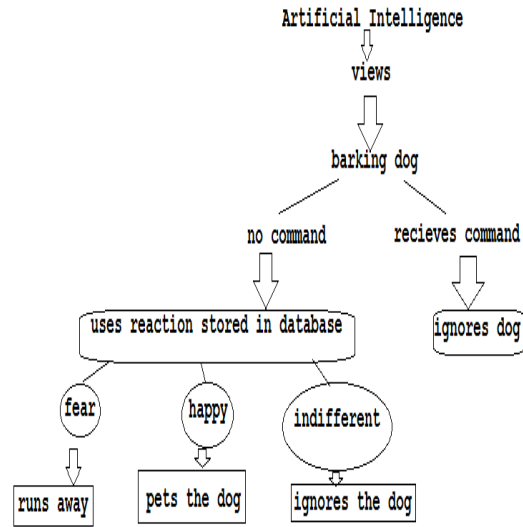
The image of the dog is unprocessed i.e. no instruction was available for the robot to decide what it should do with the image it has seen. Thus, the image is pushed in backup memory in an unconscious or sleep mode, random unused bits of code will come together and recreate a random image in the mind grid of the robot from the backup memory—A dream is created. E.g.: the dog.

Thus in the conscious mode there are two possibilities-



If it does maintain the image of a dog, which is not required by the user can we thus say, that the robot is not maintaining just a picture but a secret?

The question further extends into the fact where a robot is free to take decisions where humans are not involved for e.g.:



What happens when the robot takes decisions beyond trivial matters like the above examples?

The question remains-to what extent can we control artificial intelligence or rather to what extent can we not control it in the first place-

Reference:

<http://www.mailarchive.com/agi@v2.listbox.com/msg02527.html>

# PIRACY:PIRATES OF THE INTERNET,PIRACY,AHOY!

Udit Bajaj

## 1. Introduction

At the onset of this post, I would like you all to know two things:

- 1.1 This is not a tutorial on how to crack software, rip music or movies.
- 1.2 Piracy is strictly discouraged and any questions pertaining to learning how to do it with exact steps will be deemed non-existent.

As a kid who was re-introduced to computers in 2005 when I got my third personal PC and learned how to use it, I always wanted to do things that other 'cool kids' do in college. For example: - Start music and play GTA: Vice City. However, the game cost a bomb, and my parents surely would not dole out money for my music needs. What do I do? In comes a friend with an easy way out: piracy. He introduced me to cracks, and ripped music and movies using the Internet and I discovered a completely new world. A world, which made me curious. 'How do they do it?' I asked often. 'How are they able to crack such stuff so easily?'

The curiosity piqued my interest and I delved in the world of cracked tools and software, Wikis and How-Tos just to find the answer to that elusive question 'How?' Listed below are some of the most preferred methods to crack or bypass the security of the DRM (Digital Rights Management) and SecuROM amongst other protection methods. Note again that this is not a tutorial, but only a brief explanation. I will not be responsible if the FBI, CBI, CIA, RIAA, MPAA or Ubisoft lawyers come knocking at your doors.

## 2. Methods often used in Piracy

### 2.1 Games

Probably the most in-demand form of 'software' in the current ages, games have undergone a huge change from the SecuROM days to UbiDRM<sup>[1]</sup> and server verification methods used in the current and

popular titles. The simplest way one can explain how such copy-protection methods can be passed are by mentioning the 'crack files' freely available on the net. While legal users may have a genuine reason to adopt these measures to bypass the painful game security to be able to play it without any problems, pirates have found it to be more useful and necessary as they do not have to pay a cent for the games.

What crackers do is, modify the application's binary code to prevent some other copy-protection specific codes from executing. In simpler terms, they change values inside the game's code so that the game does not go under registration verification. This is easily done by using specially created decompilers or debuggers to reverse-engineer the game code and search for the specific keys or 'if-else' style statements. These are then changed so the need for entering the key is entirely bypassed, or fooling it into believing that any random keygen can work with the game and is an original key. After decompiling a file and looking for the code, the cracker simply opens the game executable in a hex editor and changes the values of the protection methods. Scripting programs like .NET platforms, running a high level scripting language are proven effective decompilers. Most common game cracks use a variant of this method to get past the protection and ensure a trial-free game or fully cracked "legally purchased" software.

Another popular method is using specially developed software, which scan an application for any copy protection, and remove it to enable the user to copy the entire contents of the said software to the user's storage. A popular and well-known example of this method is 'game fix' or 'no-CD/DVD patch', which will not look for the original CD/DVD in the user's CD-ROM drive once it is cracked.

### 2.2 Movies

Movies can be 'ripped' in a sense that they can be copied to user's storage from discs or official distribution media, like theaters. When



downloading movies you see terms such as CAMRip, TS, PPVRip, SCR, DVDRip, BRRip etc. These are nothing but the methods in which the movies have been ripped. This can be done in two basic methods. One method is recording the movie while it is playing in a theater using some form of recording equipment like camera; the other is actually obtaining official prints of the media like movie reel prints before they reach the theater or the preview DVDs called screeners or the officially released retail DVDs.

What a pirate really does is capture the video using video recorders or cameras and connecting the audio line to the original source so that the sound is clearer than the built-in recording of the movie audio using the device microphone. The print is then ‘cleaned’ on computers by using a special software which tries to enhance the quality and increase the brightness and contrast of the colors to make the picture appear bright and vivid. Recently, moviemakers have started using a copy-protection method known as “Coded Anti-Piracy.” A now popular technique using CAP is Cinefence<sup>[2]</sup>. What it does is embed a theater-specific sequence of dots in the print. When a CAMRip is not cleaned of these dots or if they are not blurred, the movie studios will be able to determine which theater the print was ripped in. A PPVRip is where the movies are ripped from Pay-Per-View screenings on TVs using satellite dishes like Dish-TV and such.

The better versions are SCR, DVDRips, BRRips etc. SCR is short for screener, which is ripped from private screenings for critics, video stores, and film industries. As they are pirated from officially distributed private screenings, the quality is better than PPVRip or TS. DVDRips and BRRips are ripped from the official retail DVDs and BluRay discs available to public. These rips have the best picture and sound quality, and are quite popular amongst the pirates.

Using some movie ripping tools easily available on the Internet, one can rip the contents of the movie, choosing between keeping the DVD menus and removing them along with pre-movie trailers or

‘extra features’ in the DVD. Using such tools one can upscale movie resolutions, split audio tracks and lower file size for a smaller footprint, all while maintaining high quality. Pirated movies are also known as bootleg recordings as they are not officially released performance recordings, but are illegal.

### 2.3 Music

Perhaps the easiest to pirate of the three major fields is music. When you download a \*.MP3 file from the Internet, what you are really downloading is a ripped version of an audio file which is officially distributed through audio CDs of official movie/album soundtracks.

Without delving into the actual steps of how to rip music, we will only look at the basic theory. CD Ripper software can extract the audio from the file and in some cases, also identify the track, and name it appropriately. The audio files stored in the CD are in a format known as CDDA. These are then extracted from the computer in much more suitable and better compatible formats like MP3, FLAC, AAC amongst many other formats available. The popularity of these formats ensure that they are playable across all types of platforms such as MP3 players, CD players, mobiles and other devices without needing the CD.

Even Windows Media Player lets you ‘rip’ audio files to store them on your computer<sup>[3]</sup>. Technically, ripping audio files is not illegal as long as it is not distributed or sold for profit. You can rip an audio CD to store the songs on your computer for your own personal use if you do not wish to damage the CD from overuse. However, pirates take advantage of the Rip feature available in most media players and rip the audio CDs to share the songs on the Internet free. Pirates then upload the MP3 songs on the Internet and make it available for public download due to a “deeper understanding” amongst them. Shown here is an interesting picture of how a pirate conceives copyright protections and other security measures put in place by the studios and possibly makes it understandable as to why they do what they do<sup>[4]</sup>.

If you are a **pirate** this is what you get:



but if you are a **paying customer**, this is what you get:



### 3. How to prevent piracy:

#### 3.1 Cripple pirated software with payloads

In an unauthorized copy of Batman:Arkham Asylum, the game would disable gliding skills and other various character powers, thus making the game unplayable after some time. In a pirated copy of The Sims 2, the player would not be able to build custom walls for a custom home or buy custom beds and furniture. Such copy protection methods however usually resulted in people assuming that the software was buggy, reducing potential sales.

#### 3.2 Separate demo and full version

Many developer studios offer trial versions or demo versions of their software free. A trial version offers full features of a program but limits the usability to a few days. A demo, on the other hand, offers limited features for an unlimited period. If a user wishes to extend the time to use the software or get all the features, he has to buy a fully licensed copy.

#### 3.3 Online game features or online registration

Many games now a day's offer multiplayer gaming features. It requires a valid, licensed username and password. Without it, multiplayer will not be

available. Sometimes, some single player features are also disabled, like bonuses, limited edition packs etc.

#### 3.4 Give discounts or lower the product price

Although this is not a solid measure for reducing piracy, reducing price has often been noted to increase sales and decrease the pirated versions of the software or music or movies. Despite that, this is not really a foolproof method to prevent piracy.

#### 3.5 Give your product for free

Open source products are sometimes as good as, or even better than paid versions or closed source projects. A free item has always been known to drastically reduce the chances of piracy. Other than that, if you use an open source product, you don't have to worry about piracy. This is useful for small products where profit margins would have been low enough not to generate any substantial revenue. Thus reducing piracy, and spreading the word about your product.

#### 3.6 If your product ends up to some warez site, take legal actions

Usually you can find paid products easily available on warez sites. If you are a developer affected by this, you can file a complaint against the website to

the ISP and also to the legal authorities. If many developers complain against such websites, chances are that the website will be taken down. Although, this does not help much when warez websites are aplenty.

#### 4. Conclusion

I personally do not ignore pirates, but I also won't concentrate on fighting against piracy. The roots of the problem isn't small income, it's the attitude.

I would again like to stress that we do not encourage piracy, nor do we suggest trying out the methods listed above. We are not liable for any damage caused to your computer or your reputation when paraded in front of the entire world as a pirate. We won't be paying any fines on your behalf just because you were adventurous \*read: stupid\* enough to do illegal acts such as ripping or distributing a movie without any license.

I would also like to end this discussion by saying that piracy is a crime, but so is stripping hard-

working consumers of their every single penny to give them bloated software, a horrible movie or songs that are an insult to music.

#### 5. References

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<http://boingboing.net/2010/02/18/infographic-buying-d.html>

# HTML5



Ishan Kamat

## What is HTML5?

HTML4 (HyperText Markup Language) has been widely used since 1997 for designing Websites. HTML5 is the successor of HTML4 and is now being widely implemented by various IT companies like Google , Apple.

There are three main aims to HTML5:

- Specifying current browser behaviours that are interoperable
- Defining error handling for the first time
- Evolving the language for easier authoring of web applications

## New Features in HTML5

Some of the most interesting new features in HTML5 are:

- The canvas element for drawing
- The video and audio elements for media playback
- Better support for local offline storage
- New content specific elements, like article, footer, header, nav, section
- New form controls, like calendar, date, time, email, url, search

## New Elements in HTML5

Some of the tags in previous version of HTML are obsolete and are no longer used. These elements

have either been completely deleted or modified in HTML5.

HTML5 also introduces new elements for better structure, drawing, media content and better form handling.

Some of the most interesting elements introduced in HTML5 are:

## Markup Elements:

1. `<article>` - Specifies independent , self contained content.
2. `<mark>` - Used to highlight content on the webpage.
3. `<progress>` - Used to represent progress of a task .
4. `<wbr>` - Lets the browser know where to introduce a line break in case a word is too long.

## Media Elements:

1. `<audio>` - For playing audio files on a webpage without the need for any plug-in.
2. `<video>` - For playing video files without need for any plug-ins.
3. `<source>` - Specifying file source for media elements like audio and video.

### Canvas Element:

1. <canvas> - For making graphics using JavaScript.

### Form Elements:

1. <datalist> - Will provide with pre-defined options for having an input.
2. <keygen> - Will generate a key using security algorithms to authenticate users.
3. <output> - represents result of a calculation.

Please note that the elements mentioned above are still in experimental phase and some of them may not be supported by all browsers.

### Understanding the Media Elements in detail:

<video> - The <video> tag is a standard way to embed videos on a webpage. In the earlier version of HTML there was no such standard element to embed videos and the videos had to be played using available plug-ins (eg. Flash).

Attributes of <video> tag.

Attribute	Description
<b>autoplay</b>	The video will start playing as soon as it is downloaded
<b>controls</b>	Specifies all controls on the video player
<b>height</b>	Sets the height of the video player.
<b>loop</b>	Plays the video repetitively.
<b>muted</b>	Specifies the video to be played with muting the video.
<b>poster</b>	Specifies the image to be displayed until the video is loaded.
<b>preload</b>	Specifies how the video should be loaded when the page loads.
<b>src</b>	Specifies the source of the video file.
<b>width</b>	Sets the width of the video player.

An example demonstrating the use of <video> tag.

```
<video width="320" height="240"
controls="controls" poster="image.gif"
muted="muted">
  <source src="movie.ogg" type="video/ogg" />
</video>
```

The video formats currently supported by HTML5 are mp4 , webm and ogg.

<source> - The <source> tag is used to specify the media source for the audio and video elements. It allows to specify alternate audio/video files which the web browser may choose from, based on media type or codec support.

Attributes of <source> tag.

Attribute	Description
<b>media</b>	Specifies the type of media resource (either audio or video)
<b>src</b>	Specifies the location of the media file to be played.
<b>type</b>	Specifies the MIME type of the media resource.

<audio> - Today, most audio files are played through a plug-in (like flash). However, different browsers may have different plug-ins.

HTML5 defines a new element which specifies a standard way to embed an audio file on a web page: the <audio> element.

The audio element has similar attributes as video elements. However video attributes such poster, muted, height and width are not used in audio element.

Example demonstrating use of an audio element.

```
<audio controls="controls">
  <source src="song.ogg" type="audio/ogg" />
  <source src="song.mp3" type="audio/mp3" />
</audio>
```

Currently there are 3 supported file formats for the audio element: mp3, wav and ogg.

Please note that not all browsers support all 3 types of audio formats.

### Understanding the Canvas element in detail:

<canvas> - The canvas element is used to draw graphics on a web page.

What is a canvas?

A canvas is a rectangular area where graphics can be drawn. The canvas element does not have the ability to draw graphics on its own. It uses JavaScript to draw graphics.

HTML5 has a built-in object for the canvas element, the `getContext("2d")` object.

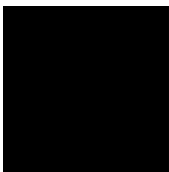
The `getContext("2d")` object has methods to draw lines, boxes, circles, and more.

Example to demonstrate use of the canvas element.

```
<canvas id="myCanvas"></canvas>

<script type="text/javascript">
var
canvas=document.getElementById('myCanvas');
var ctx=canvas.getContext('2d');
ctx.fillStyle="#000000';
ctx.fillRect(0,0,100,100);
</script>
```

Output:



In the above example `fillStyle` is used to fill color in the rectangle. Default color is black.

The `fillRect` method draws a rectangle and fills it with the color specified in the `fillStyle` attribute.

### Understanding HTML5 Form Input Types, and Elements in detail:

HTML5 has several new input types for forms. Earlier, validation for forms had to be done using one of the scripting languages. However, these new features allow for better input control and validation.

List of some of the new input types:

- **email** - Used for input fields that should contain an e-mail address.

Example:

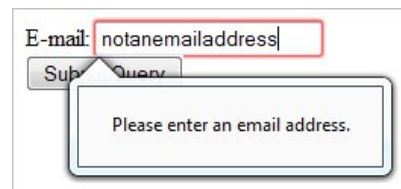
```
<form action="demo_form.asp" method="get">
```

```
E-mail: <input type="email" name="user_email" /><br />
```

```
<input type="submit" />
```

```
</form>
```

Output:



- **url** - Used for input fields that should contain a URL address.

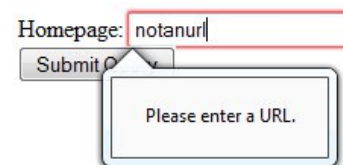
Example:

```
<form action="demo_form.asp" method="get">
```

```
Homepage: <input type="url" name="user_url" /><br />
```

```
<input type="submit" />
```

Output:



- **number** - Used for input fields that should contain a numeric value.

Example:

```
<form action="demo_form.asp" method="get">
```


```
Points: <input type="number" name="points"
min="1" max="10" />
```

```
<input type="submit" />
```

```
</form>
```

Output:

Minimum Value that can be entered is 1



Maximum Value that can be entered is 10.



- **range** - Used for input fields that should contain a value from a range of numbers.

```
<form action="demo_form.asp" method="get">
```

```
Points: <input type="range" name="points"
min="0" max="10" />
```

```
<input type="submit" />
```

```
</form>
```

Output:



### Web Storage in HTML5:

Data on the client side can be stored in 2 ways using HTML5:

1. `sessionStorage` – Stores data only for a particular session.
2. `localStorage` – Store data permanently.

The first is designed for scenarios where the user is carrying out a single transaction, but could be carrying out multiple transactions in different windows at the same time.

Cookies don't really handle this case well. For example, a user could be buying the same product in two different windows, using the same site. If the site used cookies to keep track of which product the user was buying, then as the user clicked from page to page in both windows, the product currently being purchased would "leak" from one window to the other, potentially causing the user to buy the same product twice without really noticing.

To address this, this specification introduces the `sessionStorage` IDL attribute. Sites can add data to the session storage, and it will be accessible to any page from the same site opened in that window.

For example, a page could have a checkbox that the user ticks to indicate that he wants insurance:

```
<label>
  <input type="checkbox"
  onchange="sessionStorage.insurance = checked ?
  'true' : ''">
  I want insurance on this trip.
</label>
```

A later page could then check, from script, whether the user had checked the checkbox or not:

```
if (sessionStorage.insurance) { ... }
```

If the user had multiple windows opened on the site, each one would have its own individual copy of the session storage object.

The second storage mechanism is designed for storage that spans multiple windows, and lasts beyond the current session. In particular, Web applications may wish to store megabytes of user data, such as entire user-authored documents or a user's mailbox, on the client side for performance reasons.

Again, cookies do not handle this case well, because they are transmitted with every request. However by using `localStorage`, data is sent only when needed.

The `localStorage` IDL attribute is used to access a page's local storage area.

Following is an example of a webpage which can display a count of how many times the user has loaded its page by the use of this code:

```
<p>
  You have viewed this page
  <span id="count">an untold number of</span>
time(s).
</p>
<script>
  if (!localStorage.pageLoadCount)
    localStorage.pageLoadCount = 0;
  localStorage.pageLoadCount =
parseInt(localStorage.pageLoadCount) + 1;
document.getElementById('count').textContent =
localStorage.pageLoadCount;
</script>
```

Each website has its own separate storage area, and a website can only access data stored by itself

References:

Introducing HTML5 – Bruce Lawson and Remy Sharp

<http://www.w3schools.com/html5/>

<http://www.w3.org/TR/webstorage/>