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Ishare

Editorial

We would like to wholeheartedly thank our honorable Chairman, Secretary, Executive Director and Principal for their continuous encouragement and constant support for bringing out the magazine. We profoundly thank our Head of the Department for encouraging and motivating us to lead the magazine a s uccessful one right from the beginning. Ishare serves as a platform for updating and enhancing upcoming technologies in Information and Communication. We are grateful to all the contributors to this magazine so far. The magazine has been sent to almost 60 institutions in and around Tamilnadu. So far we have received feedbacks and appreciations from various institutions.

We would be very pleased to receive your feedbacks. Please send your feed backs to ksrcas.ishare@gmail.com

By,

Editorial Board

Content

1. Computer Invention

Ms. R. SWARNALAKSHMI

Asst. Professor, Dept of Computer Applications

Introduction

This digital pen is a computer invention that transmits writing into digital media.

Although touch screen de vices represent a movement away fro m paper, approximately eighty-percent of businesses still use paper based forms.

Many professionals hand-write their notes, tables, diagrams and drawings instead of using tablets or other devices.

The computer pen is comparable to a regular ink pen (even uses refillable ink) that writes on regular paper, except it has an opti cal reader that records m otion, images and coordinates. The recorded data is then tra nsmitted to a computer via a wireles s transmitter. You can browse and edit your written notes, diagrams, tables, or drawings.

Another useful feature of this computer invention is that hand-written digital files can be easily con verted into text fonts for use in word docu ments or e mails. Digital pen technology was fir st developed by the Swedish Inventor and Entrepreneur Christer Fåhraues.

Fåhraues is a Physician and has an honorary Doctorate degree in Technology from Lund University in Sweden, and a M.Sc. degree in Bioengineering from the University of California San Diego. Fåhraues served as the Chief Executive Officer and Chair man of

Anoto Group AB, a company he originally founded in 1996 as C Technologies to license his digital pen technology.

This computer invention has been licensed to companies around the world for various commercial products. Applications include data/signature capture, completing forms, mapping, surveying, document management, paper replay, whiteboards, toys and education. There are great expectations for digital pen technology over the next few years.

Computer Invention

Cloud computing is the term used to describe technology that will replace how we currently use our computers and software applications. The concept of cloud computing is that any device (computer invention) connected to the internet can utilize a network of computing resources. This would include infrastructure, applications and storage for far less than what it would cost to use your own hardware, software and resources.

Additionally, it allows users to have access to applications that they would not have otherwise. Access is as simple as using an interface application or just a web browser from any location.

The cloud can allow access to millions of computers in an intelligent, scalable and redundant system with expert support. Similar to outsourcing, the difference and advantages of cloud computing are speed, efficiency, capability and cost, particularly with the increasing popularity of smart phones and tablets. It allows users to work from anywhere, to perform any task with any application, and to pay for only what you use.

Cloud computing is comparable to using email or online banking where you log into your account to access and manage your information. The software, applications and storage do not exist on your computer. But unlike your email or online banking services, clouds can perform complicated engineering tasks, schematics, modeling or mathematical

computations, and it can do this in a cost effe ctive and efficient manner. Another major advantage to cloud computing is the reliability of service.

Servers can crash, temporarily denying you online access to services and data. But cloud computing has multiple servers so you always have access. Some concerns about cloud computing are security and the effect it will hav e on the co mputer industry. The security concerns are similar to those regarding email and online banking.

These have proven to ha ve reliable security p rotocols therefore si milar advanced technology has been ad opted for cloud computing. It's anticipated that co mputer repair and maintenance, as well as IT employment /contracts will stea dily decline as cloud computing rises in popularity. There has been a proliferation of free public clouds appearing on the internet.

These services, often referre d to as SaaS (software as a ser vice) are easy t o use, fast, reliable and very good. You can increase your use of cloud computing to meet a high demand on your resources and you can reduce your usa ge during low demand. This allows you to adapt to chang ing conditions without m aking significant long term investments in personnel, computers, software and operati onal costs. Hopefully, cloud computing will assist independent inventors and small businesses to be more efficient and cost effective. At the very least, it's a leveling of the playing field.

LaCie Safe

This computer invention provides peace of mind for securing your information. Storing your files on this mobile hard drive gives you multiple levels of protectio n because it uses adv anced encryption and biometric authentication technology.

The Safe uses 128-bit AES encryption (Advanced Encryption Standard) which is the same standard used by governments to protect top secret information. Encryption

converts information that is readable into a mixture of unreadable characters. Decryption processes the encrypted unreadable characters back into a readable format.

The algorithm that encrypts and decrypts the information is known as a cipher. The cipher allows access to the readable information when you enter a password. Most ciphers will use passwords that are four to eight characters in length, but a 128-bit AES cipher uses a 16 character password which is extremely difficult to hack.

The AES cipher or "Rijndael" (pronounced Rein Dahl) is named after the Belgian inventors Joan Daemen and Vincent Rijmen. Biometric authentication is a technology that recognizes physical or behavioral characteristics such as fingerprints, palm geometry, retina patterns, voice and signature. Fingerprint recognition is the most popular because it's easier to use. Your finger is scanned for minutia, which are the points on a fingerprint where a ridge ends or splits into two. An algorithm extracts the minutia points and creates a template image that is used for authentication.

2. Z-WAVE

Ms. V. MENAKA

Asst. Professor, Dept. of CS

Z-Wave is a wireless communications protocol designed for home automation, specifically to remotely control applications in residential and light commercial environments. The technology uses a low-power RF radio embedded or retrofitted into home electronics devices and systems, such as lighting, residential access control, entertainment systems and household appliances.

Z-Wave communicates using a low-power wireless technology designed specifically for remote control applications. The Z-Wave wireless protocol is optimized for reliable, low-latency communication of small data packets with data rates up to 100kbit/s,[1] unlike Wi-Fi and other IEEE 802.11-based wireless LAN systems that are designed primarily for high-bandwidth data flow. Z-Wave operates in the sub-gigahertz frequency range, around 900 MHz. This band competes with some cordless telephones and other consumer electronics devices, but avoids interference with Wi-Fi, Bluetooth and other systems that operate on the crowded 2.4 GHz band. Z-Wave is designed to be easily embedded in consumer electronics products, including battery operated devices such as remote controls, smoke alarms and security sensors. Z-Wave was developed by a Danish startup called Zen-Sys that was acquired by Sigma Designs in 2008.

As of 2013[update], Z-Wave is supported by over 160 manufacturers worldwide and appears in a broad range of consumer and commercial products in the US, Europe and Asia. The lower layers, MAC and PHY, are fully backwards compatible. The Z-Wave transceiver chips are supplied by Sigma Designs and Mitsumi.

Some Z-Wave product vendors have open source options for the hobbyist communities. They require users to start with a complete Z-Wave transceiver from a Z-Wave OEM such as an Intermatic USB stick. Since 2010, there is a project called Open-zwave that seeks to offer development support without expensive software development kits. Another project has created a Z-Wave daughter board for the Raspberry Pi, a credit-card-sized single-board computer.

Z-Wave is a protocol oriented to the residential control and automation market. Conceptually, Z-Wave is intended to provide a simple yet reliable method to wirelessly control lights and appliances in a house. To meet these design parameters, the Zensys or Sigma Designs Z-Wave package includes a chip with a low data rate that offers reliable data delivery along with simplicity and flexibility.

Z-Wave works in the industrial, scientific, and medical (ISM) band on a single frequency using frequency-shift keying (FSK) radio. The throughput is up to 100 kbit/s (9600 bit/s using older series chips) and suitable for control and sensor applications.

Each Z-Wave network may include up to 232 nodes, and consists of two sets of nodes: controllers and slave devices. Nodes may be configured to retransmit the message in order to guarantee connectivity in the multipath environment of a residential house. Average communication range between two nodes is 30.5 m (100 ft), and with message ability to hop up to four times between nodes, this gives enough coverage for most residential houses.

Z-Wave Alliance

The Z-Wave Alliance is a consortium of over 250 independent manufacturers as of 2013[update], who have agreed to build wireless home control products based on the Z-Wave standard. Principal members include GE/Jasco, Evolve, Ingersoll-Rand, Linear, FAKRO and Sigma Designs.

As of 2013[update], there are more than 900 different products certified by the Z-Wave Alliance. Products and applications from the Z-Wave Alliance span all major market sectors for residential and light commercial control applications. These include lighting, HVAC and security control, as well as home theaters, automated window treatments, pool and spa controls, garage and access controls and more.

Radio specifications

- **Bandwidth**: 9.6 or 40 kbit/s, speeds are fully interoperable
- **Modulation**: GFSK Manchester channel encoding[8]
- **Range**: Approximately 100 ft (30 m) assuming "open air" conditions, with reduced range indoors depending on building materials

- **Frequency band**: The Z-Wave Radio uses the 868.42 MHz SRD Band (Europe); the 900 MHz ISM band: 908.42 MHz (United States); 916 MHz (Israel); 919.82 MHz (Hong Kong); 921.42 MHz (Australian/New Zealand).

Z-Wave units can operate in power-save mode and only be active 0.1% of the time, thus reducing power consumption substantially.

Z-Wave network setup

Z-Wave utilizes mesh network architecture, and can begin with a single controllable device and a controller. Additional devices can be added at any time, as can multiple controllers, including traditional hand-held controllers, key-fob controllers, wall-switch controllers and PC applications designed for management and control of a Z-Wave network.

A device must be "included" to the Z-Wave network before it can be controlled via Z-Wave. This process (also known as "pairing" and "adding") is usually achieved by pressing a sequence of buttons on the controller and on the device being added to the network. This sequence only needs to be performed once, after which the device is always recognized by the controller. Devices can be removed from the Z-Wave network by a similar process of button strokes.

This inclusion process is repeated for each device in the system. The controller learns the signal strength between the devices during the inclusion process, thus the architecture expects the devices to be in their intended final location before they are added to the system. Typically, the controller has a small internal battery backup, allowing it to be unplugged temporarily and taken to the location of a new device for pairing. The controller is then returned to its normal location and reconnected.

Topology and Routing

Each Z-Wave network is identified by a Network ID, and each device is further identified by a Node ID. The Network ID (also called Home ID) is the common identification of all nodes belonging to one logical Z-Wave network. The Network ID has a length of 4 bytes (32 bits) and is assigned to each device, by the primary controller, when the device is "included" into the Network. Nodes with different Network ID's cannot communicate with each other.

The Node ID is the address of a single node in the network. The Node ID has a length of 1 byte (8 bits). It is not allowed to have two nodes with identical Node ID on a Network.

Z-Wave uses a source-routed mesh network topology, and has one Primary Controller and zero or more Secondary Controllers that control routing and security. Devices can communicate to one another by using intermediate nodes to actively route around and circumvent household obstacles or radio dead spots that might occur. A message from node A to node C can be successfully delivered even if the two nodes are not within range, providing that a third node B can communicate with nodes A and C. If the preferred route is unavailable, the message originator will attempt other routes until a path is found to the C node. Therefore, a Z-Wave network can span much farther than the radio range of a single unit; however, with several of these hops a slight delay may be introduced between the control command and the desired result.

In order for Z-Wave units to be able to route unsolicited messages, they cannot be in sleep mode. Therefore, battery-operated devices are not designed as repeater units. A Z-Wave network can consist of up to 232 devices, with the option of bridging networks if more devices are required. As a source-routed static network, Z-Wave assumes that all devices in the network remain in their original detected position. Mobile devices, such as remote controls, are therefore excluded from routing.

In later versions of Z-Wave, new network discovery mechanisms were introduced. So-called "explorer frames" can be u sed to heal broken routes cau sed by de vices that have been moved or re moved. Explorer fr ames are broadcast with a prunin g algorithm and are therefore supposed to reach t he target device, even without further topolo gy knowledge by the transmitter. Explorer frames are used as a last option by the sendin g device when all other routing attempts have failed.]

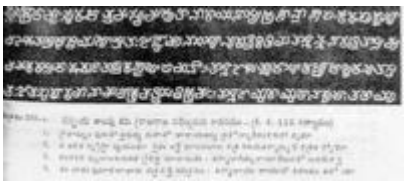
3. Do Computers Need Grammar Books Too?

Ms. C. SURIYA

Asst. Professor, Dept of CS

Introduction

The world's first known grammar "book" was conceived by Pānini in fourth century B.C. India, when only a tiny minority of people could read or write, and when their greatest challenge was bare sur vival. His g rammar contained 3,959 rules of th e Sanskrit language, which describe how words are co mposed, how they combine into sentences, and what they mean.



Extract from Pānini's grammar, the Aṣṭādhyāyī

This grammar probably didn't influence the everyday life of the population as its primary goal was to teach the proper use of Sanskrit for the writers of sacred books, who could have foreseen at the ti me that this knowledge of the co mposition of words, their combination into sentences and the description of their m eaning would one day become so critical in today's world of information overload.

Today, one of the g reatest challenges of the " information society " and "knowledge economy " is making sense of and getting the most benefit out of "big data ", 80 per cent of which is textual . Company analysts trying to follow wh ich company bought which co mpany, for exa mple, might be faced with reviewing hundreds of thousands of documents. Doctors require lists of patients eligible for a clinical tri al based on hundreds of thousands of patient reports. Companies need to learn about proble ms with their products which might be reported in hundreds of thousands of forums.

Understanding all the subtleties and complexities of human languages is, and probably will always be, the priv ilege of the hum an mind, but g iven the enor mous quantities of texts, man must rely on the help of automated processing. The better automated processes manage to decode the meaning of the texts, the more they can help by extracting useful information from them, and thus mining knowledge.

Integrating grammar in the design of automated language processing tools can be of real help since texts are com posed of words in different form s and roles, and those words make up sentences and the sentences convey complex meanings – which are described by grammar rules.

How does grammar help access information and knowledge?

Today, the most widely- used tools that help us access information and knowledge in texts are search engines based on keyword search. When you write a wor d in the keyword box of a search engine you will get a list of documents that contain that word. But could a business analyst ask a standard keyword-based search engine to pro vide a 'list of the co mpany transactions'? Could a doctor ask for the 'list of patients wh o are eligible for a clinical trial'? Could a com pany manager obtain a 'list of com plaints'? The answer is clearly "no".

To illustrate the lim itations of k eyword-based search for com plex queries, let's take the example of a b usiness analyst who would like to submit the query 'b uyers and

companies bought'. Why, after submitting such a query would the title of this news article '*Microsoft Acquires Sun Microsystems' not be returned?*

In order to be able to return this answer, the search-engine would have to be aware of how words are composed, how they combine into sentences and what they mean i.e., it would have to "know" some grammar. It would need to master at least the following concepts:

- The concept of a company – to be able to match '*Microsoft* ' and ' *Sun Microsystems* 'as company names
- The concept of a transaction – to match '*acquires* with a transaction
- The concepts of "buyer" and "thing bought" and their expression in sentences – so that it can match '*Microsoft'* as a buyer and '*Sun Microsystems'* as a company bought.

But keyword-based search engines are not aware of these concepts. More sophisticated search engines are required.

Beyond keyword search

Since the foundation of Xerox Research Centre Europe in the early nineties, one of our main research topics has been natural language processing. Over the past 10 years, the focus has been on information extraction so that automated tools can return answers to more in-depth queries. We have developed what we call 'Fact Spotter', a sophisticated information extraction tool that takes into account the complexity of language structure, and can navigate the three concepts described in the example above.

Based on linguistic rules, Fact Spotter can detect the names of people, companies or locations, dates and various other so-called "named entities[i]" in texts (and it can do this is several different languages).1 In the example above, Fact Spotter would identify '*Microsoft'* and '*Sun Microsystems'* as company names. It would analyze word forms,

and provide a formalism, which allows users to constitute lists of words and expressions that convey the same concept. This ability makes it possible, for example, to associate the word '*acquires'* with the concept of transaction.

Fact Spotter also can conduct syntactic and semantic analysis. Syntactic analysis identifies '*Microsoft'* as the subject of ' *acquires'* and '*Sun Microsystems'* as the direct object of '*acquires'* . The semantic analysis maps these syntactic functions into semantic roles . Thus ' *Microsoft'* can be recognized as a buyer and ' *Sun Microsystems'* as a company bought.

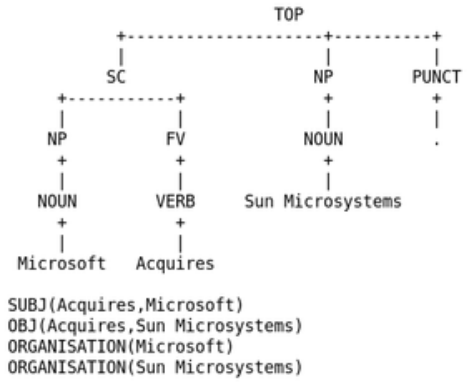


Fig.: Fact Spotter's grammatical analysis of *'Microsoft acquires Sun Microsystems'*

Context is another aspect of human language that Fact Spotter can handle. It can differentiate among several meanings of the same word (disambiguation), e.g., it knows that in the sentence '*I can see, and I see a can'*, the first *can* is a verb, and the second is a noun. It also can recognize particular linguistic structures that carry the same meaning, e.g., '*buy* ', '*acquire'* and '*become the new owner of* ', and it has the capability of recognizing different expressions that refer to the same entity, e.g., *'Microsoft Corporation'* and *'it'* in the sentence *'Microsoft Corporation announced after the close today that it will buy Sun Microsystems'* . As you can see, these skills are necessary to understand linguistic meaning _ something keyword-based search engines simply can't do.

Fact Spotter has been used in numerous information extraction tasks in different domains and languages: clinical decision making, event extraction and the establishment of chronological order in news articles, the detection of political risk, mining clients' complaints for customer relationship management, the extraction of biological knowledge from research articles, etc. We are currently engaged in new research that will make it very easy for Fact Spotter to adapt to new tasks. Grammatical rules were created some 2500 years ago and have been taught ever since schools exist - to the regret of many a pupil! From guidelines in writing sacred texts, to regulating national languages, to learning and translating foreign languages, the practical uses of grammar rules have increased over the centuries. Today even computers are more effective if they have been through grammar school!

4. Client Computing

Ms.R.SANGEETHA

Assistant Professor, Dept of CS

In a computer network, the client computers communicate with a server computer via the Internet.

Client

A **client** is a piece of computer hardware or software that accesses a service made available by a server. The server is often (but not always) on another computer system, in which case the client accesses the service by way of a network. The term applies to programs or devices that are part of a client–server model.

Overview

A client is a computer program that, as part of its operation, relies on sending a request to another computer program (which may or may not be located on another computer). For example, web browsers are clients that connect to web servers and retrieve web pages for display. Email clients retrieve email from mail servers. Online chat uses a variety of clients, which vary depending on the chat protocol being used. Multiplayer video games or online video games may run as a client on each computer. The term "client" may also be applied to computers or devices that run the client software or users that use the client software.

A client is part of a client–server model, which is still used today. Clients and servers may be computer programs run on the same machine and connect via inter-process communication techniques. Combined with Internet sockets, programs may connect to a service operating on a possibly remote system through the Internet protocol suite. Servers wait for potential clients to initiate connections that they may accept.

The term was first applied to devices that were not capable of running their own stand-alone programs, but could interact with remote computers via a network. These dumb terminals were clients of the time-sharing mainframe computer.

Types

Client types and their features

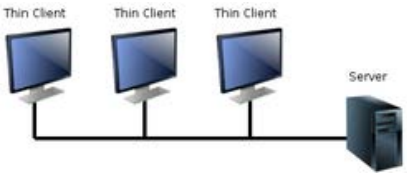
	Relies on local storage	Relies on local CPU
Fat client	Yes	Yes
Hybrid client	No	Yes
Thin client	No	No

In one classification, client computers and devices are either fat clients, thin clients, or hybrid clients.

Fat

A *fat client*, also known as a *rich client* or *thick client*, is a client that performs the bulk of any data processing operations itself, and does not necessarily rely on the server. The personal computer is a common example of a fat client, because of its relatively large set of features and capabilities and its light reliance upon a server. For example, a computer running a CAD program (such as AutoCAD or CATIA) that ultimately shares the result of its work on a network is a fat client. Common development tools for rich clients include Delphi, NetBeans and Visual Studio.

Thin



A *thin client* is a minimal sort of client. Thin *clients* use the resources of the host computer. A thin client generally only presents processed data provided by an application server, which performs the bulk of any required data processing. A device using web application (such as Office Web Apps) is a thin client.

Programming environments for thin clients include JavaScript, ASP.NET, JSP, Ruby on Rails, Django, PHP and others.

Hybrid

A *hybrid client* is a mixture of the above two client models. Similar to a fat client, it processes locally, but relies on the server for storing persistent data. This approach offers features from both the fat client (multimedia support, high performance) and the thin client (high manageability, flexibility). A device running the video game Diablo III is an example of hybrid client.

5. Make Undeletable Folders in Windows

A.GOKULRAJ

II B.C.A 'A'

How to Make Undeletable/ UnrenamableFolders?

Have you ever wondered how you can make a folder which neither can be deleted nor b e renamed? Well, if you have, then you have come to the right place. With this trick, you will be able to create folders in Windows which cannot be renamed or deleted**.**

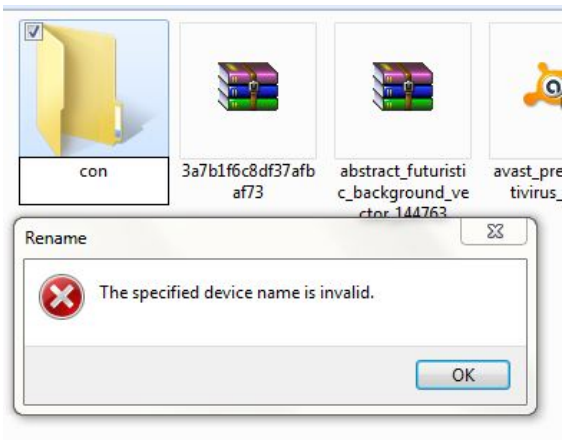
Basic Concept:

The basic concept behind this trick is the use of Keywords. Keywords are reserved words in any programming language that cannot be used as names of variables. Windows also uses certain keywords in its pro gramming. Some of them are con, aux, lpt1, lpt2, lpt3, lpt4, lpt5, lpt6, lpt7, lpt8, lpt9.

Take a Test:

To test this concept, make a new folder in your Windows desktop and try to give it a name same as any keyword mentioned above.

Final Output:(An error message)



Windows will not rename your folder to any of the keyword given above.

Trick:

So the question arises, how can we make a folder with a keyword as its name? The solution to this problem is included in Windows itself. As we know that. Windows has evolved from D.O.S.(Disk Operating System), its commands can be used in Windows. You can use D. O.S. Programming in Windows to create a folder with a keyword as its name using the steps given below:-

Simple steps to make it:

1) Press "Winkey+R"/Start-->Run

2) Click on Run. Type in "cmd" without quotes.

3) In the Command Prompt Window that opens, type the name of the drive you wish to create your folder and press Enter.(i.e: type D: and hit enter)

4) Note that the folder cannot be created in the root of C : / drive (if C: is your system drive).

5) Type this command- "md con\" or "md lpt1\" without the quotes and press Enter. You can choose any of the keywords given above as the name of your folder.

7) Now Windows will create an undeletable, unrenamable folder in the drive you have entered

Then how to Delete the Folder?

Although it is not possible to m anually delete the folder, you can delete the folder by typing "rd con\" or "rd lpt1\" in Step 4 instead of "mdcon\" or "md lpt1\".

Windows Compatibility:

This tricks works on Windows XP, Windows Vista, Windows 7 and Windows 8.

6. Five Cooling Solutions to Prevent Your PC From Overheating

M. KIRAN KISHORE

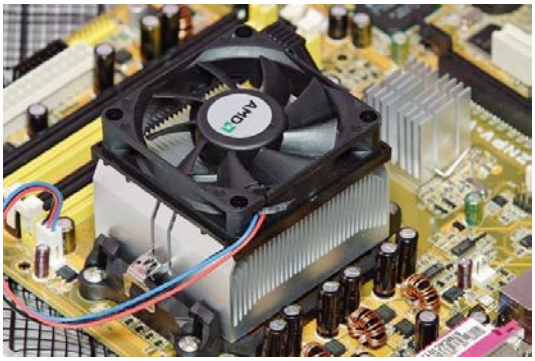
II B.Sc CS 'B'

Introduction

Computers need cooling to remove the heat their components generate during use. If you are building your own PC — especially if you're overclocking it — you'll need to think about how you'll cool it. Heat build-up can actually da mage your computer's hardware or cause it to be come unstable. Modern PCs may shut do wn and refuse to operate if they reach a potentially unsafe level of heat.

Heat Sinks

Cooling system cools a com ponent by dissip ating heat. For example, your CPU probably has a heat sink on top of it — that's the large, metal object. CPUs don't just have heat sinks — if you have a dedicated graphics card, your GPU probably has a heat sink as well. Other components on your motherboard may have their own heat sinks, too. Heat moves from the heat-generating component to the heat sink pressed against it. The heat sink is designed with a large surface area, exposing a large amount of its surface to the air to dissipate heat more efficiently.



Thermal Compound

CPUs and GPUs generally have a thermal compound between them and the heat sink. This may be called thermal grease, thermal gel, thermal paste, heat sink paste, or many other things. This material is smeared on top of the CPU, and then the heat sink is pressed down on top. The thermal compound fills any air gaps between the heat -

producing component and the heat sink allowing more efficient transfer of heat. Be careful when applying this stuff, as you don't want to use too much — you just want enough to fill in the air gaps between the CPU and heat sink, not so much that it will ooze out the sides and make a mess.

Some heat sinks ship with thermal pads on their undersides. This makes them easier to install, but the pads are less effective at conducting heat than typical paste. An included thermal pad may be good enough for running a CPU at its stock speeds, but isn't ideal for overclocking. Thermal compound can deteriorate over time. If your CPU is generating more heat than normal and you've dusted out your heat sinks and fans, you may sometimes need to reapply fresh thermal compound.

Fans

Fans force air to move, so the hot air is blown away from heat-generating components and expelled from the desktop or laptop PC's case. Fans typically blow hot air outward, but you could set up a system of fans to suck cool air inward on the front and blow out air out the back. Fans are an active cooling solution — they require power to run.

A typical desktop PC may contain multiple fans. The CPU itself often has a fan on top - so the CPU is inserted into the socket on the motherboard, thermal paste is applied to the top of the CPU, and the heat sink is attached to the CPU. The fan is placed on top of the heat sink, ensuring the hot air is blown away from the heat sink and CPU. Dedicated NVIDIA and AMD GPUs often have a similar setup, with heat sink compound, a heat sink, and a fan of their own.

Fans are also integrated into desktop power supplies. On laptops, they're placed so they can blow hot air out of a strategically placed air vent. On desktops, they may be placed to blow air out of the desktop's air vents. When building your own PC, you'll

want to think about how air will travel so the PC will stay cool. This isn't necessary if you're building a power-efficient PC that generates little heat, but it is a concern if you're building a gaming PC with a powerful CPU and GPU — especially if you're be overclocking them.

Dust build-up can clog heat sinks, fans, air vents, and your computer's case, blocking air flow. This is why it's a good idea to regularly dust out your computer's case. You should also ensure your PC's air vents aren't blocked or the air will have nowhere to go and the computer will overheat.

Water Cooling

The above methods are the typical types of cooling solutions you'll find in most PCs, although some power-efficient PCs are designed to work without fans. Still, enthusiasts sometimes opt for more extreme cooling solutions. Water cooling, or liquid cooling, was originally for mainframes. Enthusiasts who want to overclock their hardware and push it as far as possible like water cooling because it's more effective at cooling than fans, so a water-cooled PC can be overclocked further.

Water cooling involves a pump that pumps water through tubes that travel throughout your PC's case. The cool water in the tubes absorb heat as it moves through your case and then leaves your case, where a radiator radiates the heat outward. This is only necessary if you need to deal with an extreme amount of heat — for example, if you're overclocking more than typical cooling solutions can handle.

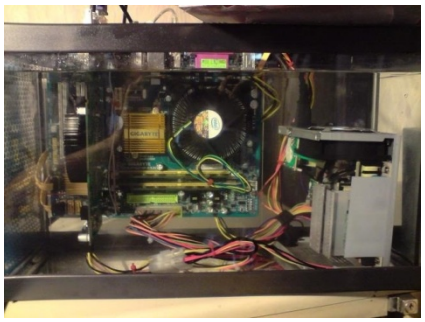
You can buy water cooling kits, so this isn't as hard to set up as you might think, but these kits do cost hundreds of dollars. They also consume more power and are more complex. If a tube springs a leak and starts spraying water inside your running computer, you'd likely have a disaster on your hands.

Immersion Cooling

Immersion cooling is less common, but even more extreme. With immersion cooling, a computer's components are submerged in a thermally conductive, but not electrically conductive, liquid. In other words, don't use water for this! An appropriate type of oil will typically be used for this.

The computer's components generate heat, which is absorbed by the liquid surrounding them. The fluid is more efficient at absorbing heat than air. The surface of the fluid is exposed to the air, and the heat dissipates from the surface of the fluid to the air. In other words, imagine filling your entire computer's case with oil and leaving your components submerged to cool it. You'd obviously want the appropriate type of oil and a case that won't leak!

Some enthusiasts do go this route, but it's much rarer than water cooling systems. This technique is used to cool some supercomputers.



There are other, more exotic ways to cool a PC, too. For example, you could use "phase change" cooling — this is basically like a refrigerator for your PC. It's obviously more expensive and draws more power. When building your own PC, get the usual heat sink, thermal compound,

and fans — that will probably be enough. If you want to go crazy with overclocking, gets water cooling solution. You probably shouldn't go beyond water cooling!

7. How (and Why) to Change Your MAC Address on Windows, Linux, and Mac?

VENUGOPALCHETTY P.V.S
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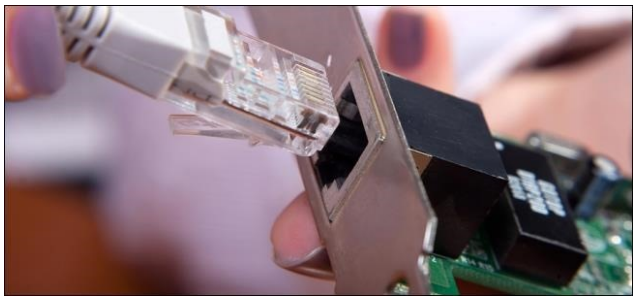
Introduction

Each network interface on your computer or any other networked device has a unique MAC address. These MAC addresses are assigned in the factory, but you can change, or "spoof," MAC addresses in software.MAC stands for "media access control." MAC addresses are also commonly referred to as physical addresses or hardware addresses, because they correspond to a hardware adapter.



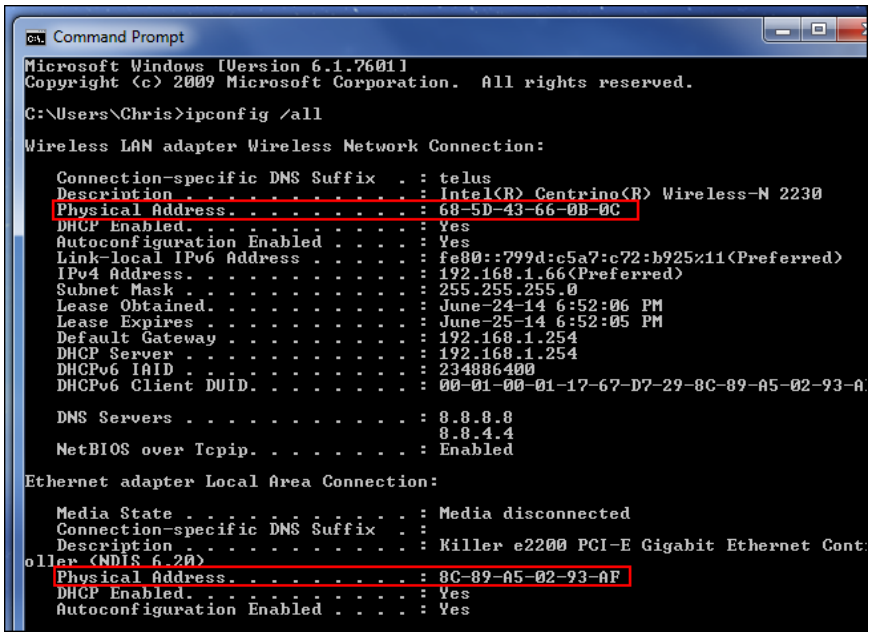
What MAC Addresses Are Used For?

- **Static IP Assignment:** Routers allow you to assign static IP addresses to your computers. When a device connects, it always receives a specific IP address if it has a matching MAC address.
- **MAC Address Filtering:** Networks can use MAC address filtering, only allowing devices with specific MAC addresses to connect to a network. This isn't a great security tool because people can spoof their MAC addresses.
- **MAC Authentication:** Some Internet service providers may require authentication with a MAC address and only allow a device with that MAC

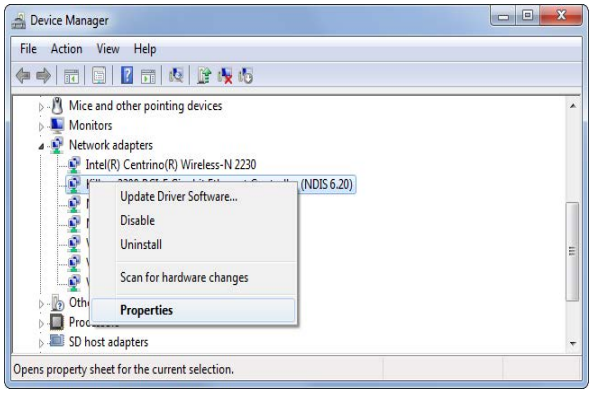
address to connect to the Internet. You may need to change your router or computer's MAC address to connect.

- **Device Identification:** Many airport Wi-Fi networks and other public Wi-Fi networks use a device's MAC address to identify it. For example, an airport Wi-Fi network might offer a free 30 minutes and then ban your MAC address from receiving more Wi-Fi. Change your MAC address and you could get more Wi-Fi. (Free, limited Wi-Fi may also be tracked using browser cookies or an account system.)
- **Device Tracking:** Because they're unique, MAC addresses can be used to track you. When you walk around, your smartphone scans for nearby Wi-Fi networks and broadcasts its MAC address. A company named Renew London used trash bins in the city of London to track people's movements around the city based on their MAC addresses. Apple's iOS 8 will use a random MAC address each time it scans for nearby Wi-Fi networks to prevent this sort of tracking.

Bear in mind that each network interface has its own MAC address. So, on a typical laptop with both a Wi-Fi radio and a wired Ethernet port, the wireless and wired network interface each have unique, separate MAC addresses.

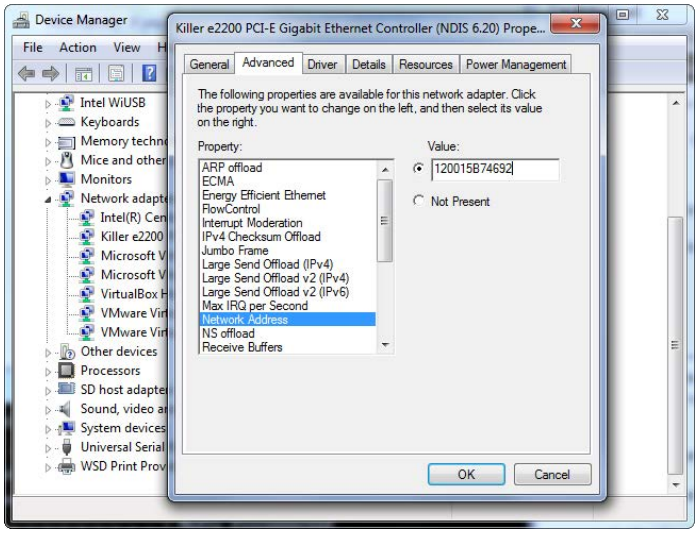


Windows



Most network cards will allow you to set a custom MAC address from their configuration panes in the Device Manager, although some network drivers may not support this feature. First, open the Device Manager. On Windows 8.1, press Windows Key + X and click Device Manager. On Windows 7, press the Windows key, type "Device Manager" to search for it, and click Device Manager. Locate the network interface you want to modify under Network Adapters, right-click it, and select Properties.

Click the Advanced tab and select Network Address in the list. Your network driver doesn't support this feature if the option isn't here.

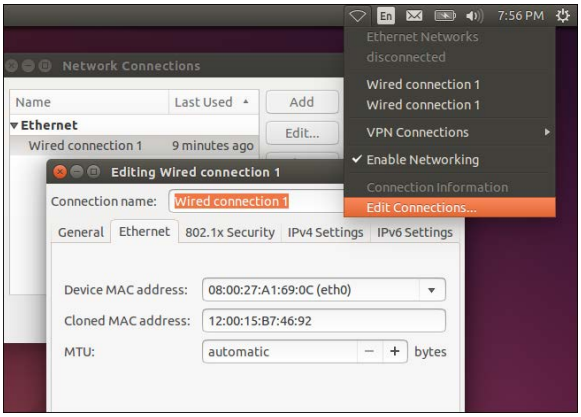


Enable the Value option and enter your desired MAC address without any separating characters — don't use dashes or colons. Click OK afterward.

Linux

Modern Linux distributions like Ubuntu typically use Network Manager, which provides a graphical way to spoof a MAC address. For example, on Ubuntu you'd click the network icon on the top panel, click Edit Connections, select the network connection you want to modify, and click Edit. On

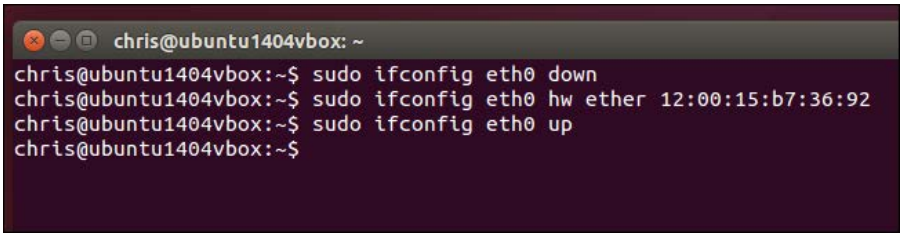
the Ethernet tab, you'd enter a new MAC address under "Cloned MAC address" and save your changes.



You can also do this the old-fashioned way. This involves taking the network interface down, running a command to change its MAC address, and then bringing it back up. Be sure to replace "eth0″ with the name of the network interface you want to modify and enter the MAC address of your choice:

```
sudo ifconfig eth0 down
sudo ifconfig eth0 hw ether xx:xx:xx:xx:xx:xx
sudo ifconfig eth0 up
```

You'll have to modify the appropriate configuration file under /etc/network/interfaces.d/ or the /etc/network/interfaces file itself if you want this change to always take effect at boot time. If you don't, your MAC address will be reset when you restart.

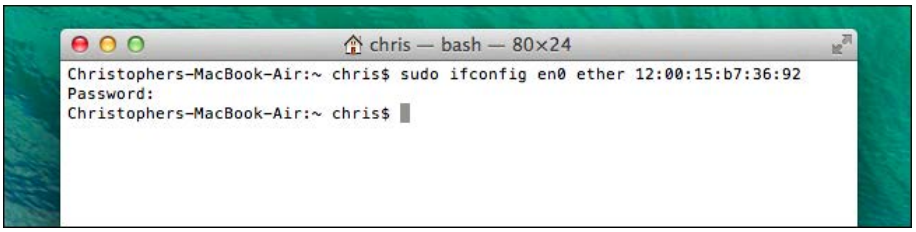


Mac OS X

Mac OS X's System Preferences pane displays each network interface's MAC address, but doesn't allow you to change it. You can do so with a single command. Open a Terminal window (press Command + Space, type Terminal, and press Enter.) Run the following command, replacing en0 with the network interface's name and filling in your own MAC address:

sudo ifconfig en0 xx:xx:xx:xx:xx:xx

The network interface will generally be either en0 or en1, depending on whether you want to configure a Mac's Wi-Fi or Ethernet interface. Run the ifconfig command to see a list of interfaces if you're not sure of the appropriate network interface's name.



As on Linux, this change is temporary and will be reset when you next reboot. You'll need to use a script that automatically runs this command on boot if you'd like to permanently change your Mac address. You can verify your change took effect by running a command that shows your network connection details and checking what MAC address your network interface reports afterwards. On Windows, run the ipconfig /all command in a Command Prompt window. On Linux or Mac OS X, run the ifconfig command. If you need to change the MAC address on your router, you'll find this option in your router's web interface.

8. What You Need to Know About Creating System Image Backups?

M. DHANUSH
II B.Sc CS-'B'

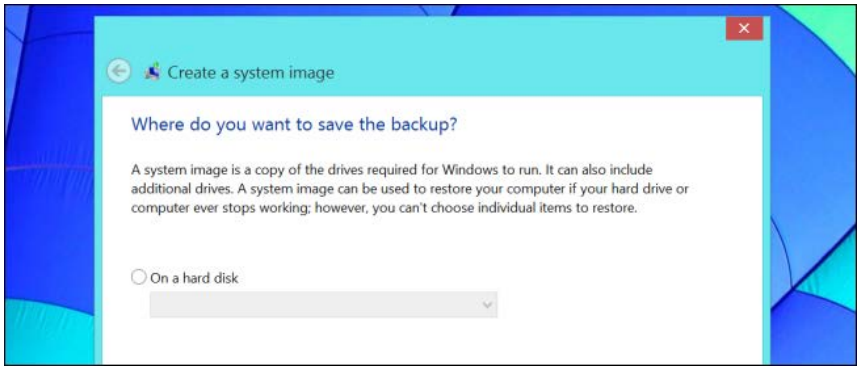
Introduction:

System images are complete backups of everything on your PC's hard drive or a single partition. They allow you to take a snapshot of your entire drive, system files and all. Windows, Linux, and Mac OS X all have integrated ways to create system image backups. There are sometimes good reasons to do this, but they shouldn't be your regular backup strategy.

What is a System Image?

A system image is a file — or set of files — that contains everything on a PC's hard drive, or just from one single partition. A system imaging program looks at the hard drive, copying everything bit by bit. You then have a complete system image you can copy back onto a drive to restore the system state. The system image contains a complete snapshot of everything on the computer's hard drive at any given time. So, if you have 500 GB of space used on a 1 TB drive, the system image will be about 500 GB. Some system image programs use compression to shrink the system image's size by as much as possible, but don't count on saving much space in this way.

Different system image programs use different types of system images. For maximum compatibility, you should use the same tool you used to create the system image to restore it. Windows itself creates system images that contain multiple files with the .xml and .vhd file extensions. System images are just one of the many back up tools included in Windows.



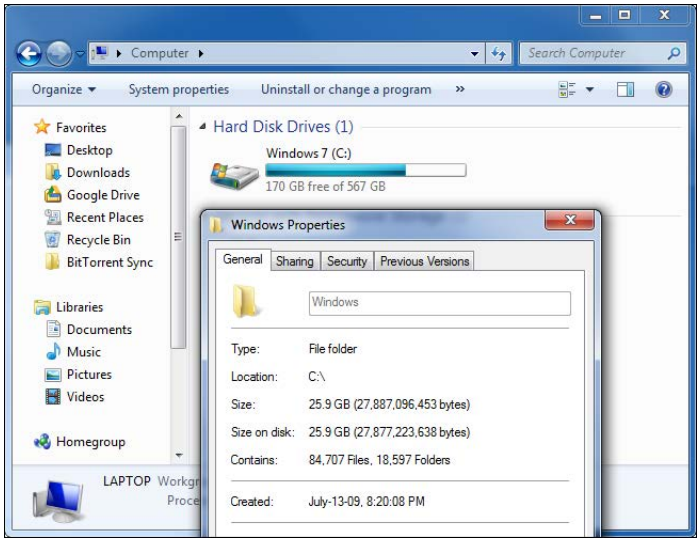
System Images Aren't Ideal for Normal Backups

System images aren't the ideal way to create normal backups of your computer and its files. System images are very large, and they contain files you really don't need. On Windows, they'll probably include tens of gigabytes of Windows system files. If your hard drive crashes, you can always just reinstall Windows — you don't need backup copies of all these files. The same goes for program files. If your hard drive crashes, you don't need an image of your installed Microsoft Office and Photoshop program files — you can just reinstall these programs on a new Windows system.

System image backups will capture files you can easily redownload and reinstall as well as files you don't care about. You can't control what is and isn't backed up — you end up with an image containing everything on your hard drive. Because so much data has to be backed up, a system image will take a much longer time to create than a smaller, more focused backup. It will also be harder to import on another computer. If your entire computer dies, you won't be able to just restore a system image that was

created on another computer — your Windows installation won't run properly on different hardware. You'd need to reinstall Windows anyway.

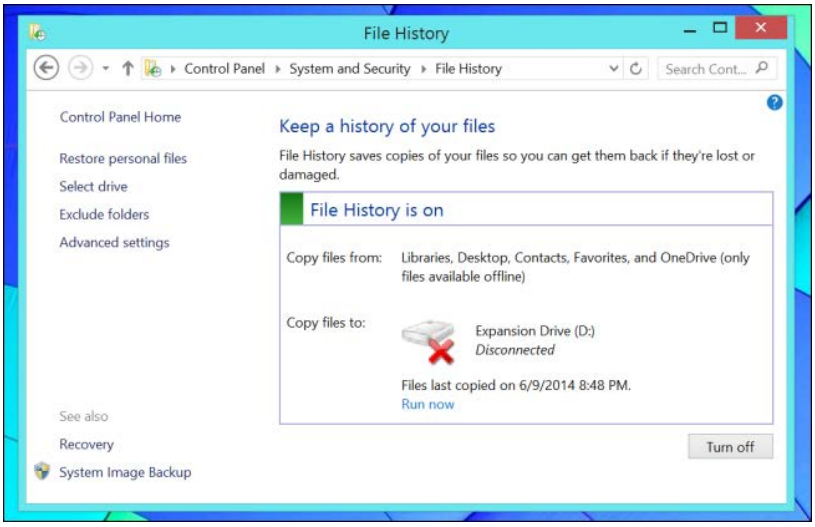
This doesn't just apply to Windows. Macs include an integrated way to create system images, and Apple advises you only restore system files on the same Mac the backup was created on. For typical backups, you should just back up the files that are actually important to you. If your system ever goes down, you can then reinstall Windows and your programs and restore your personal files from the backup. Use File History to do this on Windows 8 or Windows Backup to do this on Windows 7.



When You Should Create a System Image?

System images can still be useful. For example, let's say you want to upgrade your computer's hard drive — maybe you're upgrading from a slower mechanical hard drive to a speedy solid-state drive. You can create a system image of your computer's hard drive, swap the drive out for an SSD, and then restore that image to the SSD. This can migrate your entire operating system to the SSD. Of course, if both drives can fit in your computer at once, you may be better off using a system imaging program to copy the contents of your hard drive directly to the SSD rather than creating a system image backup and then restoring from that, which will take twice as long.

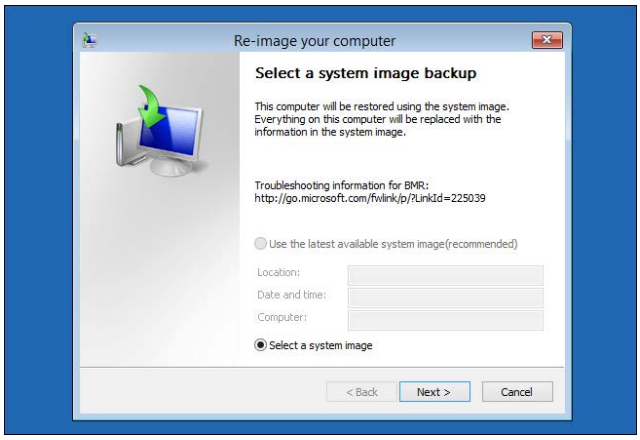
These types of images can also be used by system administrators, who could roll out a standard system image on different PCs across their network. A server or other mission-critical computer could be configured and a system image created to restore the software to that specific state. If you're a typical home user looking to back up your files, you probably don't need to create a system image.



How to Create and Restore System Images?

To create a system image on Windows 8.1, open the Control Panel, navigate to System and Security > File History, and click the System Image Backup link at the bottom-left corner of the window. On Windows 7, open the Control Panel, navigate to System and Security > Backup and Restore, and click the Create a system image option.

You can then restore these backup images using the Advanced Startup Options on Windows 8 or the System Recovery option on Windows 7. These can be accessed from a Windows installation disc or recovery drive.



On a Mac, you can use Time Machine create and restore system image backups. Time Machine backs up system files as well as your own files, and you can restore a Mac from a Time Machine backup from Recovery Mode. On a Linux PC, you can use the low-level dd utility to make an exact copy of a drive and restore it later.

Acronis True Image and Norton Ghost is popular third-party disk imaging tools you can use for this, too. While developing Windows 8.1, Microsoft removed the "System Image Backup" option from the user interface and forced people to access it from a PowerShell window. After widespread complaints, Microsoft restored this option to the graphical interface. Microsoft's motive was pretty clear here — average PC users shouldn't be distracted by system image backups and should just use a simple backup solution like File History. Microsoft eventually restored the graphical option to make people happy, which is fine — but they were right that most Windows users shouldn't use it.

9. Battery that gets charged in 10 minutes

K. MEENAMBIGAI
Asst. Professor, Dept of CS

What if the battery in your Smartphone or electric car ca n be charged fully in 10 minutes flat?

Researchers have developed new architect ure for lithium -ion battery anodes that far out perform the current standard. The three-dimensional, silicon-decorated, cone-shaped carbon-Nano tube cluster architecture for lithium-ion battery anodes could enable charging of portable electronic equipment in barely 10 minutes instead of hours.

"Lithium-ion batteries based on this novel architecture de monstrate a hi gh reversible capacity and excellent cycling stability," said lead study author Wei W ang from Bourns Colle ge of En gineering at the Univ ersity of California, Riverside. The architecture demonstrates excellent electrochemical stability and irre versibility even at high charge and discharge rates -- nearly 16 ti mes faster than conventionally used graphite-based anodes.

The ultrafast rate of char ge and discharge can be attributed to two r easons. Firstly, the seamless connection between grapheme-covered copper foil and carbon Nano tubes enhances the a ctive material-current collector contact integrity which facilitates charge and thermal transfer in the electrode system. And secondly, the cone-shaped architecture offers s mall interpenetrating channels for faster electrolyte access into the electrode which may enhance the rate performance, Wang explained.

Silicon is a type of anode material that is rec eiving a lot of at tention because it s total charge capacity i s 10 ti mes higher than commercial graphite-based lithium-ion battery anodes.

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Google was founded by Larry Page and Sergey Brin

Google

They incorporated Google as a privately held company on September 4, 1998. An initial public offering followed on August 19, 2004