CTC(T&IT),CRPF

Monthly

e-Newsletter

OCT - 2021

PURSUIT OF EXCELLENCE

"You must be the change you wish to see in the world."

> **"Don't take rest after your first victory because if you fail in the second, more lips are waiting to say that your first victory was just luck."**
>
> Dr. A. P. J. Abdul Kalam

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Patron

Sh. Harjinder Singh, DIGP
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Editor & Publisher

Sh.Saket Kumar, DC

Editorial Assistance

Insp/T Birendra Bonkar
HC/RO P.Albin
HC/RO. Sandeep Malvi

Published By
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READER'S CENTER

IMPORTANT CONSTITUNAL AMENDMENTS

SL NNO.	AMENDMENT NO.	YEAR	DETAILS
1.	104TH	2020	Removed the reserved seats for Anglo-Indian community in lok Sabha and state assemblies
2	103rd	2019	10% reservation for economically weaker sections of citizens of government services.
3.	101st	2016	Good and service tax introduced
4.	86th	2002	a) free and compulsory education to children between 6 to 14 years of age was made fundamental right. b) a new fundamental duty under article 51 was added-that it is duty of every parent to provide opportunities for education to his child between 6-14 years.
5	69th	1991	Union territory of Delhi was given special status of NCR.
6	61ST	1989	Voting age was decreased from 21 to 18 for both lok sabha and legislative assemblies election
7	44th	1978	Changes in basic structure of constitution can only be made if approved by people of India through referendum. This amendment reversed the provision made by 42nd amendment act that allowed the govt. to amend the same on its wish.
8	42nd	1976	a) Word "socialist', secular and integrity was added in preamble of constitution. B) 10 fundamental duties added for the citizen through article 51(a). c)this amendment act is also known as "Mini-Constitution "

SI/Crypto S.K.Mourya

SWEAT POWERED BATTERY FOR WEARABLE TECHNOLOGIES

Scientist from Nanyang Technological University have developed a soft and stretchable battery that is powered by human perspiration. The prototype battery consists of printed silver flake electrodes that generate electricity in the presence of sweat. Measuring 2cmx2cm, and as flat as a small paper bandage, the battery is affixed to a flexible and sweat absorbent textile that is stretchable and attachable to wearable devices like watches, wristbands, or arm straps. An individual wearing the battery around their wrist can generate a voltage of 4.2 v and output power of 3.9m W, sufficient to power a commercial temperature sensor device and send the data continuously to a Smartphone via Bluetooth. The battery could help reduce harmful electronic waste, it does not contain heavy metals or toxic chemicals.

SI/Crypto S.K.Mourya

EDGE COMPUTING

Edge computing is transforming the way data is being handled, processed, and delivered from millions of devices around the world. The explosive growth of internet-connected devices—the IOT along with new applications that require real-time computing power, continues to drive edge-computing systems.

Faster networking technologies, such as 5G wireless, are allowing for edge computing systems to accelerate the creation or support of real-time applications, such as video processing and analytics, self-driving cars, artificial intelligence and robotics, to name a few.

WHAT IS EDGE COMPUTING ?

Gartner defines edge computing as "a part of a distributed computing topology in which information processing is located close to the edge—where things and people produce or consume that information."

At its basic level, edge computing brings computation and data storage closer to the devices where it's being gathered, rather than relying on a central location that can be thousands of miles away. This is done so that data, especially real-time data, does not suffer latency issues that can affect an application's performance. In addition, companies can save money by having the processing done locally, reducing the amount of data that needs to be processed in a centralized or cloud-based location.

Edge computing was developed due to the exponential growth of IoT devices, which connect to the internet for either receiving information from the cloud or delivering data back to the cloud. And many IoT devices generate enormous amounts of data during the course of their operations.

Think about devices that monitor manufacturing equipment _Factor or an internet-connected video camera that sends live footage from a remote office. While a single device producing data can transmit it across a network quite easily, problems arise when the number of devices transmitting data at the same time grows. Instead of one video camera transmitting live footage, multiply that by hundreds or thousands of devices. Not only will quality suffer due to latency, but the costs in bandwidth can be tremendous.

EDGE EQUIPMENT

The physical architecture of the edge can be complicated, but the basic idea is that client devices connect to a nearby edge module for more responsive processing and smoother operations. Terminology varies, so you'll hear the modules called edge servers and "edge gateways," among others.

BENEFITS

For many companies, cost savings alone can be a driver to deploy edge-computing. Companies that initially embraced the cloud for many of their applications may have discovered that the costs in bandwidth were higher than expected and are looking to find a less expensive alternative. Edge computing might be a fit.

Increasingly, though, the biggest benefit of edge computing is the ability to process and store data faster, enabling for more efficient real-time applications that are critical to companies. Before edge computing, a smartphone scanning a person's face for facial recognition would need to run the facial recognition algorithm through a cloud-based service, which would take a lot of time to process. With an edge computing model, the algorithm could run locally on an edge server or gateway, or even on the smartphone itself, given the increasing power of smartphones. Applications such as virtual and augmented reality, self-driving cars, smart cities and even building-automation systems require fast processing and response.

HC/RO   CHANDAN KUMAR

FFC, CTC (T &IT)

NANO-DIAMOND SELF-CHARGING BATTERIES
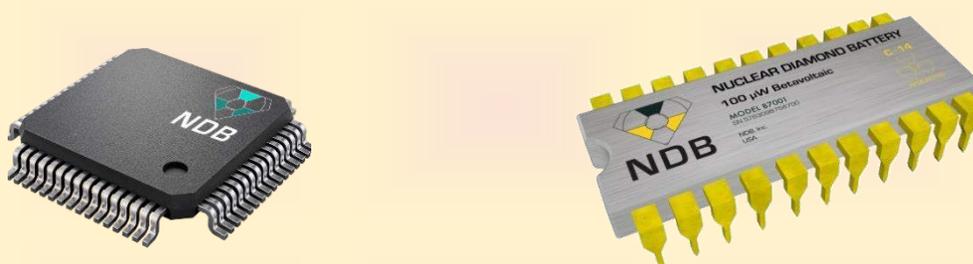
California company NDB says its nano-diamond batteries will absolutely upend the energy equation, acting like tiny nuclear generators. They will blow any energy density comparison out of the water, lasting anywhere from a decade to 28,000 years without ever needing a charge. They will offer higher power density than lithium-ion. They will be nigh-on indestructible and totally safe in an electric car crash. And in some applications, like electric cars, they stand to be considerably cheaper than current lithium-ion packs despite their huge advantages.

The heart of each cell is a small piece of recycled nuclear waste. NDB uses graphite nuclear reactor parts that have absorbed radiation from nuclear fuel rods and have themselves become radioactive.   Untreated, it's high-grade nuclear waste: dangerous, difficult and expensive to store, with a very long half-life.

This graphite is rich in the carbon-14 radioisotope, which undergoes beta decay into nitrogen,   releasing an anti-neutrino and a beta decay electron in the process. NDB takes this graphite, purifies it and uses it to create tiny carbon-14 diamonds. The diamond structure acts as a semiconductor and heat sink, collecting the charge and transporting it out. Completely encasing the radioactive carbon-14 diamond is a layer of cheap, non-radioactive, lab-created carbon-12 diamond, which contains the energetic particles,   prevents radiation leaks and acts as a super-hard protective and tamper-proof layer.

To create a battery cell, several layers of this nano-diamond material are stacked up and stored with a tiny integrated circuit board and a small supercapacitor

to collect, store and instantly distribute the charge. NDB says it'll conform to any shape or standard, including AA, AAA, 18650, 2170 or all manner of custom sizes.

And so what you get is a tiny miniature power generator in the shape of a battery that never needs charging – and that NDB says will be cost-competitive with, and sometimes significantly less expensive than – current lithium batteries. That equation is helped along by the fact that some of the suppliers of the   original nuclear waste will pay NDB to take it off their hands.

Radiation levels from a cell, NDB tells us, will be less than the radiation levels produced by the   human body itself, making it totally safe for use in a variety of applications. At the small scale, these could include things like pacemaker batteries and other electronic implants, where their long lifespan will save the wearer from replacement surgeries. They could also be placed directly onto circuit boards, delivering power for the lifespan of a device.

In a consumer electronics application, NDB's Neel Naicker gives us an example of just how   different these devices would be: "Think of it in an iPhone. With the same size battery, it would charge your battery from zero to full, five times an hour. Imagine that. Imagine a world where you wouldn't have to charge your battery at all for the day. Now imagine for the week, for the month... How about for decades? That's what we're able to do with this technology."

And it can scale up to electric vehicle sizes and beyond, offering superb power density in a battery pack that is projected to last as long as 90 years in that application – something that could be pulled out of your old car and put into a new one. If part of a cell fails, the active nano diamond part can be recycled into another cell, and once they reach the end of their lifespan – which could be up to 28,000 years for a low-powered sensor that might, for example, be used on a satellite – they leave nothing but "harmless by   products."

In the words of Dr. John Shawe-Taylor, UNESCO Chair and University College London Professor: "NDB has the potential to solve the major global issue of carbon emissions in one stroke without the   expensive infrastructure projects, energy trans-

portation costs, or negative environmental impacts associated with alternate solutions such as carbon capture at fossil fuel power stations, hydroelectric plants, turbines, or nuclear power stations. Their technology's ability to deliver energy over very long periods of time without the need for recharging, refuelling, or servicing puts them in an ideal position to tackle the world's energy requirements through a distributed solution with close to zero environmental impact and energy   transportation costs."

Indeed, the NDB battery offers an outstanding 24-hour energy proposition for off-grid living, and the NDB team is adamant that it wishes to devote a percentage of its time to providing it to needy remote communities as a charity service with the support of some of the company's business customers.

Should the company chew right through the world's full supply of carbon-14 nuclear waste – a   prospect that would take some extremely serious volume – NDB says it can create its own carbon-14 raw   material simply and cost-effectively.

The company claims to have completed a proof of concept, and is ready to begin building its   commercial prototype once its labs reopen after COVID shutdown. A low-powered commercial version is expected to hit the market in less than two years, and the high-powered version is projected for five years' time. NDB says it's well ahead of its competition with patents pending on its technology and manufacturing processes.

Should this pan out as promised, it's hard to see how this won't be a revolutionary power source. Such a long-life battery would fundamentally challenge the disposable ethos of many modern technologies, or lead to battery packs that consumers carry with them from phone to phone, car to car, laptop to laptop across decades. NDB-equipped homes can be grid-connected or not. Each battery is its own near-inexhaustible green energy source, quietly turning nuclear waste into useful energy.

Sounds like remarkable news to us!

HC/RO Balachandar.N

OVERCLOCKING OF COMPUTERS

INTRODUCTION:- When "fast is not enough" gamers, hobbyists find and devise new ways of intriguing ways of taking their hardware to max. Overclocking has become common with all of newest hard ware devices having the ability to reach over-clocked speed of over 50%.The purpose of overclocking is to increase the operating speed of a given component. Normally, on modern systems, the target of overclocking is increasing the performance of a major chip or subsystem, such as the main processor or graphics controller, but other components, such as system memory (RAM) or system buses (generally on the motherboard), are commonly involved. The trade-offs are an increase in power consumption (heat) and fan noise (cooling) for the targeted components. Most components are designed with a margin of safety to deal with operating conditions outside of a manufacturer's control; examples are ambient temperature and fluctuations in operating voltage. Overclocking techniques in general aim to trade this safety margin by setting the device to run in the higher end of the margin, with the understanding that temperature and voltage must be more strictly monitored and controlled by the user. Examples are that operating temperature would need to be more strictly controlled with increased cooling, as the part will be less tolerant of increased temperatures at the higher speeds. Also base operating voltage may be increased to compensate for unexpected voltage drops and to strengthen signalling and timing signals, as low-voltage excursions are more likely to cause malfunctions at higher operating speeds.
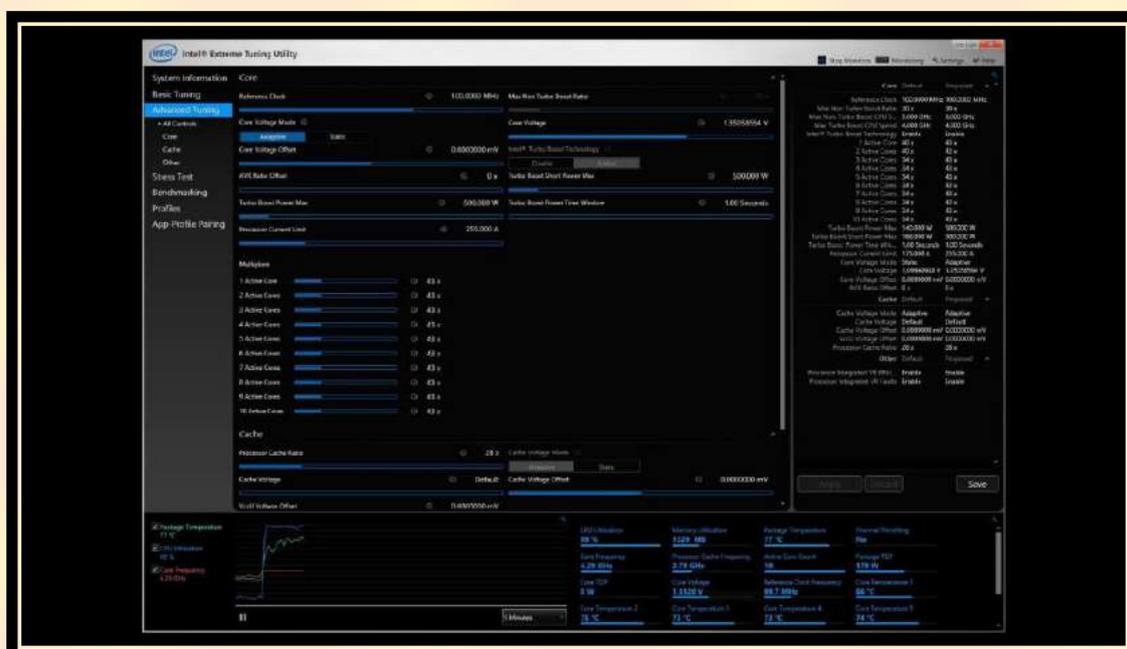
<u>What is overcloking</u>:- ? □This is the process of running the device faster than it is specified to do. With a successful overclock, the system will run stable and exactly the same as it did at the default factory set frequency, just faster. Overclocking generally refers

to running your CPU, and these days your video card too, at higher internal CPU clock and bus speeds than the manufacturer's specs for achieving better system performance at little or no cost. The clock speed of a processor is the main factor that determines the computing power of a computer, measured in MHz or GHz. To better understand the concept, imagine your car drives at fixed speed of 1 to 60 mph, although the optimal speed is 50, nothing prevents it from going faster or slower. You want to run at higher speeds only at favorable conditions

Issues in Overclocking –

 Increasing the operation frequency of a component will usually increase its thermal output in a linear fashion, while an increase in voltage usually causes heat to increase quadratic ally. Excessive voltages or improper cooling may cause chip temperatures to rise almost instantaneously, causing the chip to be damaged or destroyed.

Exotic cooling methods used to facilitate overclocking such as water cooling are more likely to cause damage if they malfunction. Sub-ambient cooling methods such as [phase-change cooling](#) or [liquid nitrogen](#) will cause water [condensation](#), which will cause damage unless controlled.

 How to Overclock How :-

STEP-1   :- Create a handy chart of your PC's current configuration. This chart also works as a guideline n report in further steps

STEP -2   :- Using you handy chart write on the next available block the number of the next frequency level. So if the first frequency level is 133, if you using a Pentium 4 it is, then the next frequency level would be 134, then 135, and so on. For every upgrade to the frequency setting restart the computer noting if the startup was successful. If yes, then follow the same instruction to raise the level again.

Benefits of Overclocking:-

The increased performance with minimum cost . Satisfaction from achieving it, then later tweaking it.

Higher performance in games, en-/decoding, video editing and system tasks at no additional direct monetary expense, but with increased electrical consumption and thermal output.

Risks of Overclocking

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as [phase-change cooling](#) or [liquid nitrogen](#) will cause water [condensation](#), which will cause damage unless controlled.

Overclocking may void your system warranty. ☐Overclocking may reduce the life-time of your system. ☐Overclocking may cause system less stable. If you find your system unstable at higher speeds, proper testing is the key to a successful overclock

Final Thoughts:-

☐Important factors for successful overclocking: Monitoring S/Ws CPU Cooling , Case Cooling, Quality Components Motherboard Monitor, Nowadays overclocking is almost a science, there is so .

HC/RO S.K.Malvi

Technical Quiz

R&D Team

1. _____ monitors user activity on internet and transmit that information in the background to someone else

    a) Malware

    b) Spyware

    c) Adware

    d) None of these

2. All of the following are examples of real security and privacy risks EXCEPT:

    a) hackers

    b) spam

    c). viruses

    d). identity theft

3. Which of the following is the least secure method of authentication?

    a) Key card

    b) fingerprint

    c) retina pattern

    d) Password

4. unsolicited commercial email is known as?

    a) Spam

    b) Virus

    c) Crackers

    d) Proxy

5. When IT Act 2000 came into effect?

    a)17 October,2000

    b) 11 November,2000

    c) 17 October,2001

    d) 11 November,2001

6. Which section of IT Act deals with Hacking of computer systems and its penalties?

      a) Section 64

      b) Section 65

      c) Section 66

      d) section 63

7. In which HASH algorithm, process Y is denoted as a random number.

      a) Direct hashing

      b) Mid-square hashing

      c) Fold Shift Hashing

      d) Pseudo random hashing

8. H-mac hashing are used in

      a) SSL,IP

      b) digital Signature

      c) VPN

      d) Proxy Server

9 Keylogger is type of

      a) Worm

      b) Trojan Horse

      c) Virus

      d) Spyware

10 Firewall is used to protect an intranet from

      a) Unauthorized access

      b) Virus

      c) Malware

      d) Trojan

Technical Terms

R&D Team

APT	Advanced Persistent Threat	A cyber attack that continuously uses advanced techniques to conduct cyber espionage or crime
APWG	Anti-Phishing Working Group	An international consortium that brings together businesses affected by phishing attacks with security companies, law enforcement, government, trade associations, and others.
AV	Antivirus	A computer program used to prevent, detect, and remove malware.
AVIEN	Anti-Virus Information Exchange Network	A group of Antivirus and security specialists who share information regarding AV companies, products, malware and other threats.
CAPTCHA	Completely Automated Public Turing Test to Tell Computers and Humans Apart	A response test used in computing, especially on websites, to confirm that a user is human instead of a bot.
CARO	Computer Antivirus Research Organization	An organization established in 1990 to study malware.
CAVP	Cryptographic Algorithm Validation Program	This program provides validation testing of FIPS-approved and NIST-recommended cryptographic algorithms and individual components. Cryptographic algorithm validation is necessary precursor to cryptographic module validation.
CBC	Cipher Block Chaining	Operation for a block cipher using an initialization vector and a chaining mechanism. This will cause the decryption of a block of cipher text to depend on preceding cipher text blocks.
CBC-MAC	Cipher Block Chaining Message Authentication Code	This constructs a message authentication code from a block cipher. The message is encrypted with some block cipher algorithm in CBC mode. This creates a chain of blocks with each block depending on the correct encryption of the previous block.
CERIAS	Center for Education and Research in Information Assurance and Security	A part of Purdue University dedicated to research and education in information security.

Acknowledgement

We are highly thankful for reading out this compilation and hope it will be useful for you in our day to day professional and personal life. We would like to hear your interest areas, suggestions from you to make this newsletter more informative and interesting. Your views will definitely help us to create this newsletter as an effective medium to reach you with latest development in the fields of communication and technology.

R&D Team

CTC T&IT CRPF, Ranchi, Jharkhand

✉ ctcit@crpf.gov.in

Answers to the Quiz

1	2	3	4	5	6	7	8	9	10
B	B	D	A	A	C	D	A	D	A