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Sunil Rajguru
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Tomorrow's Smartphone Ecosystem

Once the desktop took over the world. Then the corporate world replaced it with the laptop. The tab gave stiff competition to both. But if there's one thing that seems to be having an unlimited march over everyone's life, then it's still the mobile.

While at first it was used to make selected calls and receive messages, it soon rendered the landline, pager, pocket diary and wristwatch obsolete.

Personal Buddy: In the social media era you simply had to pick your poison: Twitter, Facebook, LinkedIn, Instagram, YouTube etc. Very soon you had no time to see all of this on your desktop or laptop, but the smartphone was the first (and sometimes only) choice. Then came apps that were mobile only like WhatsApp and TikTok.

Buying companion: Ecommerce took off big time and is also graduating on to the smartphone, so much so that many shopping sites now have mobile only apps or were born on the mobile. Cheap broadband, GPS and better functioning smartphones means that the mobile is enough for all your buying needs.

Government proxy: If that wasn't bad enough then the government got onto the bandwagon. Now Aadhaar and all your identification can be done on the phone. Aarogya Setu and CoWIN came in short time. Paytm gave way to UPI. Social life. Shopping life. Government life. It's all smartphone life now.

Boarding passes on the mobile seem ancient by now as both the government and tech giants can keep track of you along with all your key habits thanks to the mobile. The consumer couldn't care less. The benefits of giving up your privacy are simply too monumental.

Smartphone ecosystem: Going into the future, the smartphone is here to stay, and everything is being built around it. Wireless earbuds are catching on and the smartwatch which can do everything a watch could do and even check your heartbeat and oxygen saturation level: It is being built solely around the smartphone.

While Google Glass went away due to privacy issues, a whole range of AR glasses are being developed which too will be connected to your smartphone. While the Metaverse has failed to take off on your desktop/laptop, chances are that it will succeed with the AR glass connected smartphone.

This is the first stage of singularity where we merge with the machine. The smartphone may not be physically connected to you yet, but it is already spiritually and emotionally one with you. Will a day come when the SIM card will be embedded in your body and every gadget around be connected? One card to rule them all? Possible!

Sunil Rajguru

> *It could include the Metaverse*

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The second option is upgrading your CPU, RAM and SSD, etc. Replacing the hard disk with a new SSD will likely be the best upgrade to speed up your computer.

Ashok Pandey
✉ ashokpa@cybermedia.co.in

🐦 https://twitter.com/PandeyAshokk

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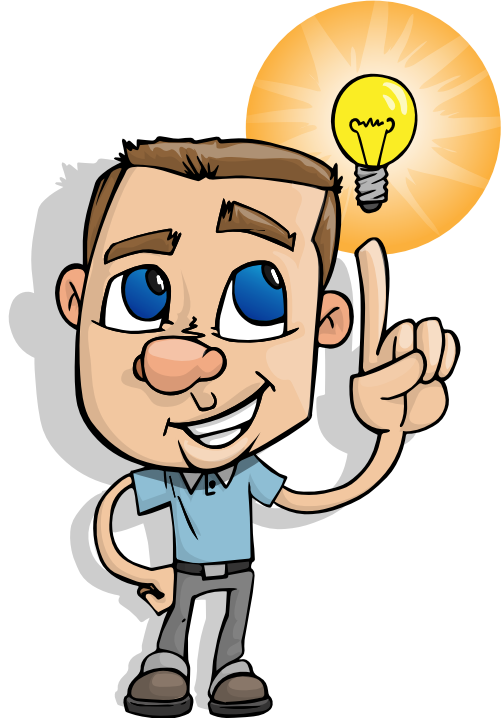
What upgrades can make my laptop good for games?

■ *Shritam Bhowmick*

There are several ways to do that. You could add more RAM and replace the HDD with an SSD (in case the laptop didn't come with the latter). You could buy a monitor to get a bigger screen to play games. However, the biggest difference you get in gaming performance is from the GPU. If the laptop doesn't have a dedicated GPU, then you can't upgrade to one. Onboard GPUs are not powerful enough to play the heavy duty AAA gaming titles. If you want to enjoy those, then you'll have to guy a new laptop.

What are the ways to speed up my computer?

■ *Keshav Pandey*

There are two ways – first, identify the bottlenecks that are slowing down your PC. Old unnecessary files, data and temporary files, etc. clear them to boost the performance. Use the Task Manager and Resource Monitor to identify which components are just waiting and which components are overloaded. You can manage them by reducing their load.

Is it safe to play games in laptop while charging?

■ *Faraz*

If you have an old gen gaming laptop, then it will hurt the battery and other components. However, in modern laptops, you can surely play games while it's plugged in and charging, because it can smartly manage the power distribution without putting any burden on the battery life. Plus your laptop runs most efficiently while it's plugged in. Also when you run on power, your GPU delivers the peak performance.

I am a medical student; can you please suggest the best laptop?

■ *Shreyas Prabhu*

You can check out the HP Spectre x360 13-aw2003TU Convertible. This laptop is a mobile powerhouse that's safer, smarter, and more secure for healthcare. It is a stylish machine with precision-crafted Aluminum design and a narrow-border IPS display.

HP has added many features that will be very useful for healthcare professionals like the Trusted Platform Module (TPM) support and Webcam kill switch. Since this laptop also offers a touch screen, you can also use it as a tablet if you need to. You will be able to Interact easily and accurately with the touchscreen. The laptop is priced at INR 99,999 and is powered by 11th Gen Intel Core i5 processor, 8 GB RAM, 512 GB SSD, and Intel Iris Xe Graphics.

You kidnapped my Cat?! Keep it!

Pratima H
✉ pratimah@cybermedia.co.in

Ransomware is a tricky enemy to fight. You feed the beast when you pay for it to go away. But what if it's not your cat but your dog that gets trapped by it? Can you still afford to say no? How to avoid those see-saw headaches and that endless dilemma?

"Don't call the cops, or else". Remember these lines, said in a baritone note, and always accompanied with a cigarette smoke ring?

No matter which language you are watching it in, if it's a movie-scene showing a kidnapper's call – these lines haunt the victim for at least five more scenes. More so, when the cops say exactly the same thing – "Don't pay the ransom, or else."

Caught between Syclla and Charybdis, the victims swing on an uneasy pendulum between 'should they, and 'should they not'.A question that has started giving migraines to many businesses too. Specially, since the arrival of a new breed of pirates. Ransomware.

▼ Stay near the phone

Put simply, Ransomware is a special genre of cyberattack where a company is threatened with complete halt of operations or bad reputation just because the thieves have taken possession of its most crucial and sensitive data. To get the data back, and get the wheels of business moving again, the victim has to pay some ransom—as demanded by these data burglars.

We just saw it happen as recently as a few weeks back—with the Australian health insurer Medibank when data belonging to 9.7 million of its current and former customers was being held at ransom, as per some reports. At the time of writing, the company had decided not to pay ransom and there were rumours of some data being released on the dark web.

Just a few months back, in 2021, we saw how Colonial Pipeline suffered a $4.4 million ransom demand for restoring their oil operations. A recent example—in April 2021 – is that of a DarkSide attack for theft of 150GB of data from chemical distribution company Brenntag, where the German firm paid $4.4 million in settlement to restore the data and prevent it from being leaked. In December 2019, U.K. foreign currency agency Travelex was hit by REvil and was asked for a $6 million settlement, but it ended up paying $2.3 million to decrypt the stolen data (which included its customers' credit card numbers, dates of birth, and national insurance numbers).

We also know about a large ransomware payment example – that of CAN Financial, a big US insurance firm. In March 2021, it

VISHAK RAMAN,
Vice President of Sales, India, SAARC and Southeast Asia, Fortinet

"Just like a child, when kids steal a school bag and demand lunch money to give it back, cybercriminals are doing the same to organizations after successfully deploying ransomware and taking sensitive data hostage by encrypting it."

paid a settlement fee of $40 million, after hackers initially demanded $60 million. In fact, US banks reported about $1 billion in 2021 ransomware payments (as per the Financial Crimes Enforcement Network).

And these are not small pennies falling out of a hole in the pocket. These are big dents.

Per Palo Alto Networks' Ransomware Threat Report 2022, the average ransom demanded in 2021 was $2.2 million, up 144 per cent from 2020. Additional findings by Unit 42, the threat intelligence team at Palo Alto Networks, indicated that in the first five months of 2022, the average ransom paid climbed to $925,162, up 71 per cent from last year.

You would think that most companies would tighten their reflexes, put on a brave face, then a thick skin, and say that rare word to data kidnappers – No!

Ransomware Hurts

- 66% enterprises have suffered significant revenue loss
- 53% shared that their brand suffered
- 32% lost leadership through dismissal or resignation
- 29% were forced to eliminate jobs after the incident
- 25% succumbed to the organisation's closure

Source: Cyberreason 'Ransomware: The True Cost to Business'

Well, as it turns out, both cybersecurity experts and government security agencies keep dissuading companies from attempting to pay ransoms, and yet as many as 76 per cent of organizations admit to paying ransomware criminals. And one-third were seen still unable to recover data, as per the Veeam 2022 Ransomware Trends Report.

According to the report by Institute for Security + Technology, global IT professionals when we look at some organizations reporting a ransomware attack, 27 per cent of victims chose to pay the ransom requested. The average amounts paid were like this: $1.18 million in APAC, $1.06 million at EMEA, and $0.99 million in the United States. From 2020, when the average ransom paid was just over $300,000, we have seen the numbers hitting the roof – rising to $541,000 in 2021.

Interestingly, when the attackers initially demanded over $3 million, the average amount paid was 43 per cent of the ransom demand – but some cyber criminals managed to blackmail victims into paying almost the full amount they first asked for.

VENKAT KRISHNAPUR,
Vice President of Engineering and Managing Director, Trellix India

"Before you go any further, it's important to discover which variant of ransomware you're dealing with. One way is to visit 'No More Ransom', a worldwide initiative Trellix is a part of. The site has a suite of tools to help you free your data, including the Crypto Sheriff tool. These are custom built decrypting tools that can help recover your data."

According to Securonix research, the average ransomware payment in Q2 2021 was $136,576.00, with 32 per cent of ransomware victims paying the ransom in 2021. Already by April 2021, at least $18 billion had been paid out for ransoms, creating strong incentives for cybercriminals and fueling further growth in the volume of attacks.

A look at The Ransom Atlas

- In the US, ransomware activity increased 100% quarter over quarter in transportation and shipping.

- Germany generated the most threat detections related to APT actors in Q3 (29% of observed activity), and also had the most ransomware detections.

- The China-linked threat actor, Mustang Panda, had the most detected threat indicators in Q3, followed by Russian-linked APT29 and Pakistan-linked APT36

- Phobos, a ransomware sold as a complete kit in the cybercriminal underground, has avoided public reports until now. It accounted for 10% of global detected activity and was the second most used ransomware detected in the US. LockBit continued to be the most detected ransomware globally, generating 22% of detections

- But Years'-old vulnerabilities continue to be successful exploitation vectors. Trellix observed Microsoft Equation Editor vulnerabilities comprised by CVE-2017-11882, CVE-2018-0798, and CVE-2018-0802 to be the most exploited among malicious emails received by customers during Q3

- Trellix saw Cobalt Strike used in 33% of observed global ransomware activity and in 18% of APT detections in Q3

Source: Trellix, The Threat Report: Fall 2022 from Advanced Research Center

Cybersecurity Ventures estimated that the global cost of ransomware through 2021 was $20 billion and it is expected to go as huge as $265 billion by 2031. About 80 per cent of global organizations that have paid a ransom demand experienced another attack, and interestingly, this was often at the hands of the same threat actors – as unravelled in a study by Cyberreason 'Ransomware: The True Cost to Business'.

But paying the kidnapper gets you the cat – when it's out of the bag. Often, it is another headache to take care of.

Yes, in nearly half (46 per cent) of cases, the victim organization regained access to data following payment, but some or all of it was corrupted. A recent Hiscox Cyber Readiness Report also found that 36 per cent of companies that made the ransom payment were hit again, while 41 per cent who paid failed to recover all of their data.

The dominoes fall far and wide. As a consequence of ransomware payments, cyber insurance premiums have increased by 32 per cent, with losses mounting for insurance providers, as noted by Securonix research. Enterprises that have been compromised with ransomware have experienced an average of 23 days downtime after an attack, and even when paying the ransom, they were only able to fully restore their data in eight per cent of cases, with 80 per cent falling victim to another attack afterward.

Payment does not guarantee files will be recovered, reasons Vishak Raman, Vice President of Sales, India, SAARC and Southeast Asia at Fortinet. "It may also embolden adversaries to target additional organizations, encourage other criminal actors to engage in the distribution of ransomware, and/or fund illicit activities that could potentially be illegal. And while, often, someone may feel desperate and want to pay the ransom or a ransomware settlement to regain access to critical data, it is a decision that should be considered very carefully.

That's why most security experts, vendors and authorities keep telling victims to 'never pay. In 2020, The U.S. Department of the Treasury's Office of Foreign Assets Control (OFAC) also made an announcement that paying ransom to cybercriminals is now illegal. Also, while speaking at the National Cyber Security Centre's (NCSC) CYBERUK 2021 virtual conference, home secretary Priti Patel had warned ransomware victims that the government doesn't support victims of ransomware attacks paying the ransom. "Government has a strong position against paying ransoms to criminals, including when targeted by ransomware," she had said.

In the opinion of Maheswaran S, Country

Did they pay? Did it work?

- 73% of organizations suffered two or more ransomware attacks in the last 12 months
- 47% of data was encrypted in a ransomware attack
- 32% of organizations who paid the ransom still could not recover their data

Source: Veeam survey of 1,000 IT Leaders that suffered a ransomware attack in 2021

India and Ransomware

- India is 10th in the world by ransomware attacks
- Small businesses (up to 500 employees) are at the highest risk, accounting for more than half of all attacks (54.7%)
- In India, Tech/IT is the top industry hit by ransomware (23.40% of all attacks), followed by the Manufacturing industry (10.90%)
- 17% of ransomware attacks in India attack businesses that have over 80 billion ₹ in annual revenue. However, most often, ransomware in India targets companies with annual revenue between 8₹ to 40₹ billion (41.5%)
- 11.3% of ransomware attacks in India target companies that employ more than 10,000 employees

Source: Data from NordLocker

Manager, India, Varonis, the decision to pay ransomware to restore data is difficult and must be made carefully at the board level, rather than by security professionals alone. "One of the primary reasons why businesses do not pay ransom is that there is no guarantee that all data will be restored. Furthermore, encrypted files are frequently unrecoverable, and one may need to create a new decryption tool by extracting keys from the tool provided by the attacker. It's also worth noting that recovering data can take several weeks, especially if it's heavily encrypted, and there's no guarantee that the hackers will delete the stolen data. They may later sell or disclose the information if it is valuable, which negates the entire purpose of paying the ransom."

So are enterprises really helpless when put at the gun-point of ransomware? How to say 'No'? And how to call cops or fighters without being too obvious or too late?

▼ After the Call comes

The question of whether you should pay the ransom comes with the fear that you won't get your school bag back or the encryption key after paying, Raman gives a logical but empathetic picture here. "It is hard to put any faith in the goodwill of bullies or cybercriminals. Instead of returning your data, they could simply empty your 'school bag' and all of its contents, including sensitive data, on the internet for all to access and use. In

HARSHIL DOSHI,
Country Director - India, Securonix

"Lately, we have been observing that ransomware has also become a national security concern, with governments feeling the need to step in since the Colonial Pipeline breach (one of the biggest ransomware attacks on a major US-based oil refinery). The Australian government is also now considering outlawing ransomware payments in an attempt to work towards identifying the adversaries/attacker groups and ensuring that organizations are better prepared to react to these threats in the future."

other words, paying the ransom could mean your organization has no 'school bag' and no 'money for lunch'. And perhaps, worst of all an organization doesn't want to have a reputation as a payer in the cybercriminal underworld, because that could be the equivalent of painting a target on their back. While we appreciate that some organizations may have no option but to pay ransomware attackers, we at Fortinet recommend not doing so unless you absolutely must take the risk because if

Weak Spots Worth Noting

- Out of 18 industries identified, the manufacturing industry (10.2% of all attacks) is most likely to be hit by ransomware worldwide. Manufacturing is closely followed by the construction (9.6%), transportation (8.3%), healthcare (7.8%), and tech/IT (7.6%) industries.

- Companies whose annual revenue is between 10-25M USD are targeted by ransomware the most (18.1%). Interestingly, companies with more than 1B USD in annual revenue are the targets behind 10.1% of attacks. Even though less than 1% of companies worldwide are publicly traded, they make up 16.6% of targeted companies.

- LockBit group is the most active ransomware gang worldwide, responsible for 16.4% of attacks. LockBit is closely followed by Conti (15.3%), Pysa (6%), REvil (5.4%), and Maze (5.1%).

Source: Trellix, The Threat Report: Fall 2022 from Advanced Research Center

you don't your business is guaranteed to fail. In addition to becoming a repeat victim, paying the ransom emboldens the bad guys and funds more of their future attacks on others."

But it's not that easy to go to sleep wishing it's all a bad dream that will just go away. Or is it?

Over the past few years, cybercriminals have used quadruple extortion via dark web leak sites and threatened victim shaming to heighten the cost and immediacy of the threat, reminds Sean Duca, Vice President, Regional Chief Security Officer - Asia Pacific and Japan

"For example, we've seen gangs make threatening phone calls to employees and customers and launch Denial of Service (DoS) attacks to shut down a victim's website to incentivise payments. Ransomware-as-a-service (RaaS) operators have also grown, optimising their businesses to lower the technical bar for fellow adversaries, which has fuelled the spread of ransomware." Such developments have made it harder for organisations to defend against ransomware which has led to a steep rise in both demands and payments of ransomware.

While organisations are generally advised not to pay the ransom, the prolonged effects of a shutdown can force organisations to consider other options to restore operations. The long-term effects of a ransomware attack can pose a substantial challenge. It is not practical to ban ransom payments overnight.

▼ Saying No To The Caller

Despite all these threats and landmines, there are a lot of enterprises who heed to the advice and gut-instinct of not turning weak. And when they say 'no' – they have a lot 'yes' areas that they have ticked beforehand.

Bad Idea to Pay Because

- No guarantee of getting the data back
- No assurance the stolen data won't be used elsewhere
- Even if you get it back, decryption and re-starting will take time
- It's a sign that you can pay – again!

MAHESWARAN S,
Country Manager, India, Varonis

"Our research reveals that infrastructure ransomware attacks like the Colonial pipeline data breach or the attack on Britain's National Health Service (NHS) are on a rise. Hackers are honing in on organizations and services that are critical to the ongoing functions of society, knowing full well that the cost of these systems being down on a prolonged basis far exceeds the ransom they'll ask for."

As Harshil Doshi, Country Director - India, Securonix observes, "Enterprises who are cyber insured, typically have ransomware coverage, provided if they follow certain best practices. Secondly, if enterprises have deployed an efficient data backup solution for their endpoints, then that helps them not to be held at ransom."

The question gets even more tricky for small companies. As Oliver Noble, a cybersecurity expert at NordLocker argues, smaller companies tend to pay a ransom more often compared to big businesses, but at the core of this tendency is not their size but rather the lack of budget allocated to deal with cyber threats. "Big corporations usually have the funds and expertise to secure their systems from ransomware attacks, such as cloud backups that can be used to restore the data that was stolen during a ransomware attack. Bigger companies also usually separate access to resources based on departments. Because of this, bigger companies tend to weather the storm instead of paying up."

We are also increasingly seeing the role of negotiators who are involved in ransomware payments and settlements, Raman notes. "They play a key role in negotiating and arriving at a final settlement amount and recovering the data. Victims of ransomware attacks who feel compelled to pay cybercriminals often wonder if it is illegal to do so. There is no law against

paying ransom when an organization's data and/ or systems are taken hostage. However, it is strongly discouraged by authorities and those of us in the cybersecurity industry to pay cyber ransoms or succumb to extortion demands."

When faced with such a wide number of potential attackers, with the prospect of weeks to months of recovery time, it's often tempting to give in to a ransom demand - Venkat Krishnapur, Vice-President of Engineering and Managing Director, Trellix India paints a realistic picture. "Depending on the sort of data or infrastructure put at risk by the ransomware assault, an enterprise's response would vary, but ideally, enterprises shouldn't give in to the ransom demands. The biggest challenge of succumbing to this blackmail is the risk of not even receiving the decryption key, or getting a partially functional one. Additionally, giving in to such demands would just put a target mark on your organisation since it would show a history of paying off the attackers. This just puts them at a higher risk of recurring attacks and ransom demands."

Also, the ransom money could be used to further fuel criminal activity – either in the form of newer, more evolved attacks, or a larger and stronger network of attackers wreaking havoc on unsuspecting businesses.

Just like a child, when kids steal a school bag and demand lunch money to give it back, cybercriminals are doing the same to organizations after successfully deploying ransomware and taking sensitive data hostage by encrypting it. Obviously, the stakes are higher for an organization that's attacked. An organization's survival may depend on getting the encryption key from the cybercriminals to decrypt and get back their stolen data. But the dilemmas seem surprisingly similar for both sets of victims, Raman explains.

By far, one can say that choosing not to pay ransomware is a good response to threats, echoes Maheswaran S. "However, it's a much more complicated issue than it seems. Is there cyber insurance in place for ransomware attacks? Can bitcoins be purchased to pay the ransom in time? Do backups exist for the attacked systems? Is the data even mission-critical? These are a few questions organizations might have to ask and answer when they consider whether to pay the ransom or not."

VAIBHAV TARE, Chief Information Security Officer (CISO) & Global Head, Fulcrum Digital

"Due to the fact that paying ransom is considered unlawful, many businesses are skeptical about doing so and tend to avoid getting into this predicament. Some enterprises follow the right course by alerting the authorities and handling the attack responsibly."

Paying – not paying – is a tough decision. Neelesh Kripalani, Chief Technology Officer, Clover Infotech reflects that there is no one-size-fits-all answer to this. "It has to be carefully evaluated on the case-to-case basis by the management of the organization. Moreover, it's always advisable to plan ahead in this digital day and age, where we all are vulnerable to cyber-crimes."

That's where we should pull up our socks and get shoes that help us run fast.

▼ Rewind to- Before The Call Comes

Heard of the 'Broken Window' Theory? It tells that a small but visible sign of damage or disorder can actually encourage bad actors to do more damage because they see that the environment is conducive and neglectful enough to proceed.

A small breach, followed with a ransom paid, may look inconsequential during a busy week. But it can cascade into something huge. So watch every window.

Doshi recommends that an enterprise should first classify mission-critical data that has maximum impact on the organization and identify a mechanism to have backups stored in a multi cloud capacity as well as on a secure on-prem offsite location. Such a strategy would ensure that a single compromise against these datasets would not impact day-to-day operations.

Basically be preemptive and preventive. Enterprises should assume that they can be hit at some point in the future and should have

Attackers AIMing for AIIMS

In a recent dent, Indian is reeling under a cyber-attack with servers of the All India Institute of Medical Sciences (AIIMS) reportedly hacked and down. According to some media speculations, the team could be confronting an alleged ransomware demand of Rs. 200 crore.

This attack also, supposedly, entails a data breach with data of about 3-4 crore patients, including that of VIPs, political leaders and top bureaucrats, compromised. At the time of writing this article, services like emergency, outpatient, inpatient and laboratory wings were being handled in the manual mode while restoration work through physical servers for e-hospital servers was also underway. More resources have been marshalled for diagnostics, labs and OPD services. Scanning and sanitisation of networks were also initiated even as intelligence teams were working to investigate the attack.

a playbook ready to ensure minimal damage, Doshi minces no words here. "They should ideally test restores and backups and invest in AI/ML backed detection and response tools to make their systems more resilient. They can also look at cyber insurance as part of their overall risk strategy. Building on the required telemetry for proactive use would help preempt the need to pay a ransom."

In case an organisation is already under a ransomware attack, it is critical to act fast and minimise damage, even before evaluating the demands of a cybercriminal, Krishnapur shares

Fight Back

- Be mentally-ready and not in denial
- Harden your IT Infra and perimeter – specially unpatched devices, unpatched software, and open RDP ports
- Be proactive in threat detection and finding security loopholes
- When hit- Isolate the damage area
- Disconnect so that the fire does not spread
- Use back-up and resilience tools
- Share info with peers
- Dilute the threat, minimise disruption, accelerate recovery
- Assess the costs associated with any downtime or disruptions to the business
- Find out the impact of the breach on a company's brand reputation
- Calculate the time spent by IT staff dealing with, and recovering from, the incident; and also the legal expenses incurred addressing regulatory and compliance considerations
- Take into account Life-or-death situations such as a hospital that has its systems locked, and patient lives may be at risk

some Ninja moves. "Some steps organisations could take include: isolating the affected device to ensure network and other device's safety and then limiting the ransomware's scope by disconnecting all suspicious devices, including those operating off-premises from the network."

It's also important to look for recently encrypted files with unusual file extension names, reports of strange file names, of users having difficulty opening files, proactively tracking the source of information, and inspect the alerts generated by an antivirus antimalware software, EDR, or any active monitoring platform.

And back-up, back-up, back-up – as almost every security expert out there has said umpteen times. If an organisation finds itself without a viable backup, there is still a chance that the data can be recovered using a growing number of free decryption keys. In case an organisation has no viable backup, and is also unable to locate a decryption key, it may have to cut losses and start from scratch.

"Backing up all of your data to an external server is one of the most important actions to take. You will have a copy of your files ready to go if the original ones get stolen, so your business operations won't come to a complete halt." Noble also advises.

Third-party service providers and outsourcing organizations will also likely be increased targets of ransomware in 2023 and beyond, warns Maheswaran S. "As companies become more distributed in terms of both business operations and IT infrastructure, malicious actors will look for vulnerabilities wherever they can find them. So although a company may be headquartered in the U.S. and have adequate cyber defenses, ransomware attacks may still try and find a backdoor via a contractor or data center in India or Brazil."

In short, be very alert and be very ready for attacks – but do bolt all your windows well. One can afford to let go of cats. But the situation flips when it's your dear dog or baby. Watch your assets well. Maybe you cannot do much about the 'kidnapping' but if you can weaken the part where they say 'or else', that's enough. And use some smoke – to smoke them out.

Baby's Day Out or Old Boy – which movie you are in, it's up to you. ■

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Write to:
Rajiv Pathak I Sr. Manager, Marketing I rajivp@cybermedia.co.in I +91 8010757100

Strengthening Cybersecurity The Right Way

Manoj Shashtrula
✉ pcquest@cybermedia.co.in

Cybercrime doesn't mean just data loss or server failure. Security breaches considerably influence the firm's reputation, profitability, and prospects. Data leakage caused by malware attacks results in millions of dollars in losses, and hence potential bankruptcy

Technology has advanced dramatically in recent years, but the number of businesses falling victim to cyberattacks has not decreased. Unsurprisingly, cyberattacks escalated by 42% in the first half of 2022 compared to 2021. The ongoing year is regarded as one of the worst years in cybersecurity history. Although the advanced malicious attacks can be attributed to the negative impact of technological advancement, when experts delved more profoundly, they discovered that the negligence on the defence side was the cause of many data breaches.

Considering that even prestigious companies like MailChimp, Microsoft, and Uber, renowned for emphasising security, were not impervious to malicious attempts, the above studies prove that complacency is actually to blame for the rise in harmful attacks. Using proper and prominent cybersecurity software can be a solution to revert any possible attacks, but with a sound strategy, it can be effective.

MANOJ SHASHTRULA,
Founder & CEO, Socly.io

Why is cyber security strategy important?

The consequences of cybercrime are more than just data loss or server failure. Security breaches considerably influence the firm's reputation, profitability, and prospects. Data leakage caused by malware attacks results in millions of dollars in losses, potentially driving a corporation into bankruptcy in extreme situations. Evidently, within six months of experiencing a data breach, 60% of small firms declare bankruptcy.

However, a comprehensive cybersecurity policy may save a company from any unfortunate scenario, even if it is subjected to unforeseen minor attacks. Developing a pragmatic cybersecurity system will:

• Assist businesses in eliminating operational disruptions and minimising any associated revenue losses.

• Strengthen and safeguard your brand's reputation with current customers, prospective partners, and other stakeholders.

Given these advantages, it is impossible to refute the notion of an efficient cybercrime strategy. However, formulating a plan can be an intricate process. So, here are some excellent strategies to strengthen and enhance the potential of a security strategy:

Encrypt networks

Attackers can exploit even the slightest vulnerability in wireless networks to penetrate the company's solid defence. According to a survey, 72% of firms that experienced a data breach identified that the network infiltration was caused by an unsecured wireless device linked to their Wi-Fi network.

Security teams can thus work to protect their internet connection by encrypting information and deploying a firewall to eliminate any security flaws from emerging. Furthermore, ensure that your Wi-Fi network's Service Set Identifier (SSID) is not visible to outsiders and consider using a Virtual Private Network (VPN).

Enable Multi-Factor Authentication

Poor or reused credentials are responsible for 80% of all data breaches, and over 300 billion passwords are susceptible to cybercrime. As a result, unique and robust passwords must be used to access the company's networks and applications.

Moreover, cybercrime experts suggest the adoption of Multi-Factor Authentication (MFA), a technique used to validate an individual's

Comply with data protection norms

- Cybersecurity compliance aligns your organisational risk management framework with standardized data protection protocols like SOC2, ISO 27001, PCI-DSS, HIPAA, NYDFS, GDPR, etc., to implement a systematic governance approach and rule out potential vulnerabilities.

- Integrated platforms that automatically collect thousands of data points of processes, policies, people, assets, and vendors in one interface provide complete control over your security program and increase the visibility of your compliance status. Monitoring your systems and managing your resources help identify, interpret, and combat cyber threats and protect your intellectual property against malicious attacks.

identification more than twice. An MFA requires the user to provide passwords, phone numbers, and unique personal attributes such as fingerprint or facial recognition. The user will only be granted access if all the procedures above have been verified.

Preserve and backup crucial data

In some unprecedented circumstances, a firm's defence may not be sufficient to safeguard data from unauthorised access. Corporate operations would be forced to halt and go offline in such events. In the worst-case scenario, essential records and data would also be erased in chaos.

As a result, 40% of organisations that experience a data breach have lost 20% of their revenues. To avoid such mishaps, ensure that all critical organisational information, applications, and collaboration tools are promptly stored and backed up in cloud server repositories. Cloud servers come equipped with analytics, processing, and security tools to safeguard and enhance security and critical

corporate operations, allowing businesses to be spared of concerns about data breaches and performance issues.

Employ antivirus software

Finally, ensuring that devices in the company are equipped with the most recent version of antivirus software is essential. Antivirus programs guarantee reliable protection for equipment and are frequently updated with advanced functionality that can effectively shield systems against any ransomware attempts.

Updating antivirus software, operating system software, web browsers, and other programs are essential for maintaining the integrity of infrastructure. Therefore, it is advised that all programs be set to install updates automatically.

The bottom line

Lastly, educating the staff with adequate training on cybersecurity issues and the ideal ways to avoid data breaches and thefts is necessary. Remind them about the various attack types and offer regular updates on the most recent cyberattack.

Businesses lost an average of $4.35 million in 2022 due to data breaches. In light of the increasing number of malicious cyberattacks, it is essential to take action. Companies must develop an articulate cybersecurity approach that safeguards pertinent data while gaining confidence among stakeholders and clients. ∎

The author is Founder & CEO, Socly.io

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ravik@cybermedia.co.in

Let's check out the winners of business solutions this year...

Satya Sundar Mohanty, CyberMedia Research
Ashok Pandey, PCQuest
✉ pcquest@cybermedia.co.in

The Vol II of PCQ Enterprise Choice Awards 2022 is designed to understand what happens in the enterprise solutions market

PCQ Enterprise Choice Awards 2022 is the only and largest survey, where we determined factors why professionals chose their existing products and solutions, and what they will prefer in the future. The survey was conducted to identify the top brands across 20 different categories. Based on the survey, the winners have been declared.

We have covered 1,024 enterprises spread over all major verticals such as Manufacturing, BFSI, IT / ITeS, Education, Healthcare, Retail, Media, FMCG, etc.We are presenting a comprehensive analysis of awareness and usage of various solutions with their reasons, familiarity index, and the future preferences. Check out the winners in each of the categories.

Vol 1 Awards Categories
1. Commercial laptop
2. Commercial PC
3. Server
4. Networking Products

Vol 2 Awards Categories
1. Network-attached Storage
2. Virtualization
3. Enterprise Security Solutions
4. Data Centre Service Providers
5. Software-defined Storage
6. Enterprise Cloud-Based storage

Vol 3 Awards Categories (Next Issue)
1. Cloud Service Provider (IaaS)
2. Enterprise Resource Planning (ERP) solution provider company
3. CRM Solution providers
4. Business intelligence / Business Analytics Solution providers
5. AI Solutions Providers
6. Email Solution Service providers
7. Unified Collaboration Solutions
8. Bandwidth Management and Monitoring Software
9. Financial & Accounting Software
10. Video Conferencing Solutions

New winner in the form of Dell EMC

Satya Sundar Mohanty, CyberMedia Research
Ashok Pandey, PCQuest
✉ pcquest@cybermedia.co.in

For citation details and process kindly connect with rajivp@cybermedia.co.in

Quality of product and after-sales service are the most important factors when selecting any brand of NAS

The pandemic is over, but it has impacted the industry in different manners, leading to a new way of working. Work from home and hybrid working has become part of our lives. This leads to network and cloud storage. Thanks to the rapid adoption of next-gen technologies like 5G, now users can store their data over connected storage quickly and easily.

Last year, the NAS category winner was NetApp followed by Dell EMC and IBM. But this year, Dell EMC is on top. HPE grabbed the 1st runner-up spot followed by NetApp.

In our 2022 survey, Dell EMC and HPE were close competitors in the Familiarity Index. Dell EMC grabbed the top spot with a score of 98. HPE trailed with a score of 95. NetApp was a distant third with a score of 66, followed by Pure Storage and Synology at 47 and 42 respectively.

Familiar Index - NAS

Dell EMC	HPE	NetApp
98%	95%	66%

Pure Storage	Synology
47%	42%

Score out of 100
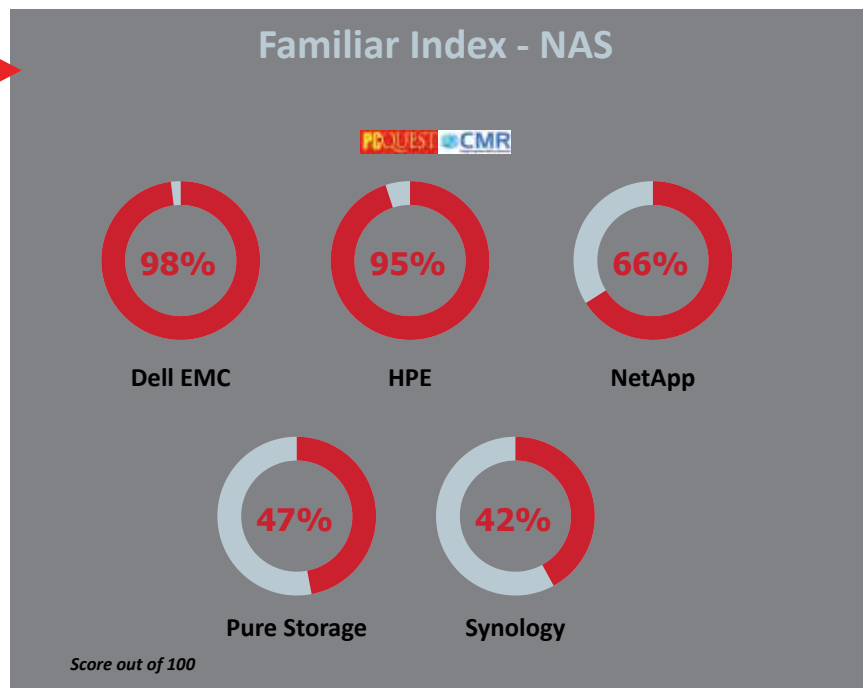
Three in every four users would consider Dell while buying their next NAS

In Spontaneous Awareness, most of our respondents recalled Dell EMC. HPE was quite close in the segment. Dell EMC scored the highest – at 98 and HPEgot 96, followed by NetApp at 73, Pure Storage at 62, followed by Synology at 56.

Spontaneous Awareness - NAS

98% Dell EMC
96% HPE
73% NetApp
62% Pure Storage
56% Synology

Figure in %
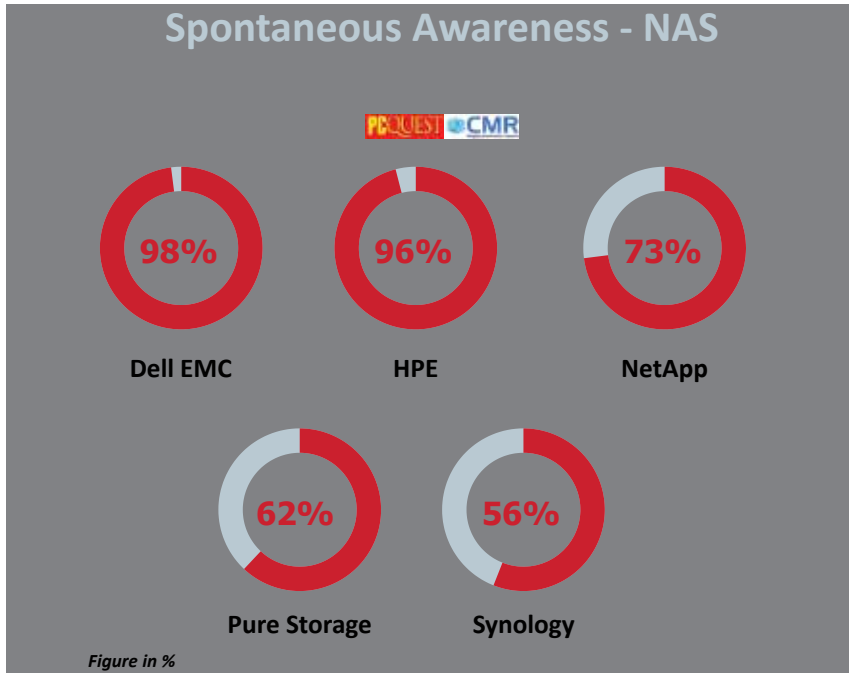
Last year, most of our respondents were using NetApp followed by Dell EMC and HPE. This year, most of our survey respondents were using HPE – 27%, Dell EMC – 25% sustained its second position this year as well, followed by NetApp – 17%. Synology is next in the top five with a score of 12% followed by Pure Storage – at 10%.

Current Usage - NAS

27% HPE
25% Dell EMC
17% NetApp
12% Synology
10% Pure Storage

Figure in %
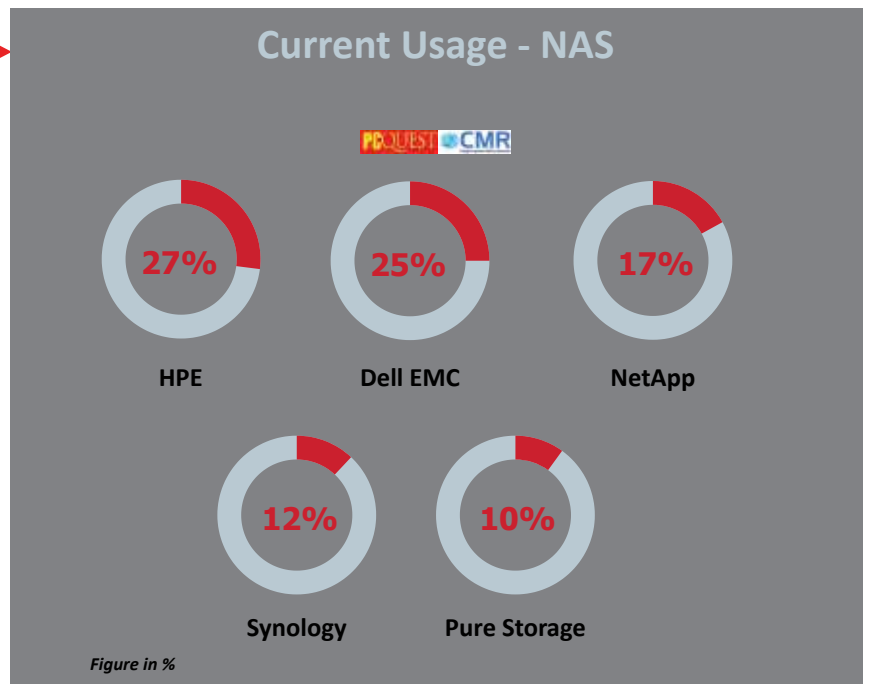
What would be the future? When we asked our participants for their future preferences, Dell EMC seems to gain against HPE. Dell EMC scored74 and HPE got the next spot with a score of 66. NetApp was the winner of last year's future preference, but this year it slipped to the third spot with a score of 45, followed by Pure Storage – 32 and Synology – 21.

Future Preference - NAS

Dell EMC	HPE	NetApp
74%	66%	45%

Pure Storage	Synology
32%	21%

Figure in %
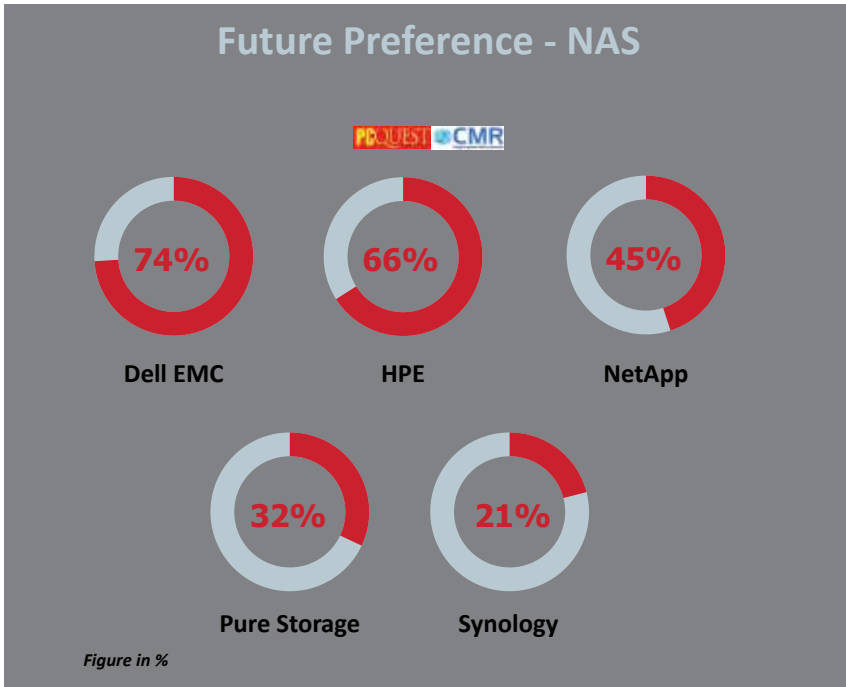
When we asked for the reason for choosing the current NAS solution, most of the participants chose the quality of the product and after-sales service as their top priority. Dell EMC impressed with brand name and quality of the product. HPE impressed with quality and after-sales support/service. NetApp for its price, Pure Storage for after-sales support/service, and Synology for the quality of the product.

Reasons for Using Current NAS

	Dell EMC	HPE	NetApp	Pure Storage	Synology
Brand Name	High				
Quality of Product	High	High			High
After Sales Support / Service		High		High	
Initial Price			High		

High

Illustration by Nadeem Anees

Continued domination by VMware

Satya Sundar Mohanty, CyberMedia Research
Ashok Pandey, PCQuest
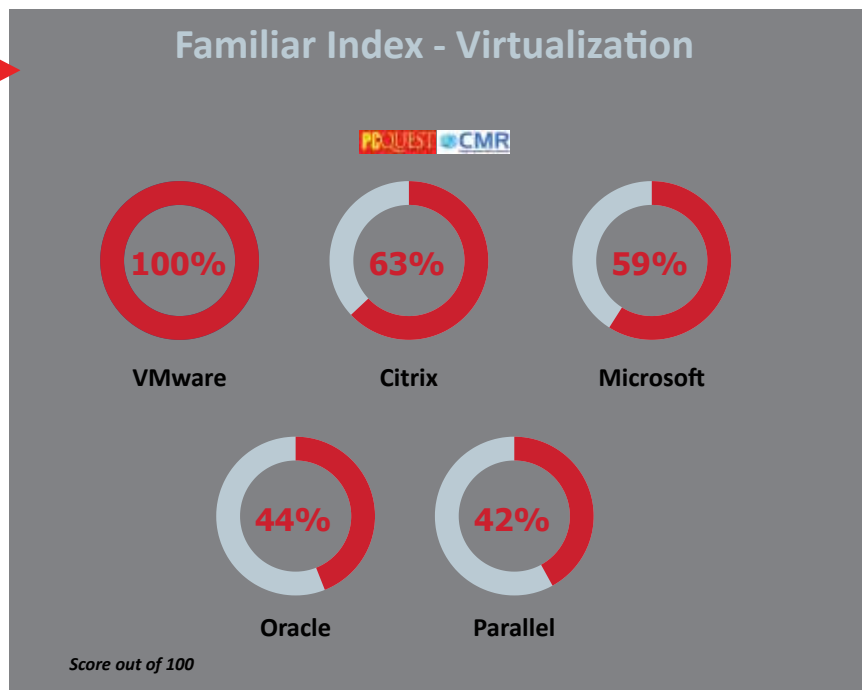✉ pcquest@cybermedia.co.in

For citation details and process kindly connect with rajivp@cybermedia.co.in

It seems like VMware has become a synonym for virtualization. Three in every four users would consider VMware while buying their next virtualization software

Mordor Intelligence reported that the virtualization industry would grow to US$ 120.41 billion by 2026. And due to the pandemic, it has grown speedily in the past couple of years. But when it comes to leaders VMware still leads the virtualization segment.

It looks like nothing has changed in the past year when it comes to virtualization solutions. Last year VMware was the clear winner, followed by Citrix and Microsoft. This year as well, VMware leads, followed by Citrix and Microsoft.

VMware is still on the top with a 100% score, similar to last year, leaving everyone behind. VMware is a synonym for virtualization for almost all professionals. Citrix got the 1st runner-up ranking with a score of 63% followed by Microsoft – 59%, Oracle – 44%, and Parallels – 42%.

Familiar Index - Virtualization

100%	**63%**	**59%**
VMware	Citrix	Microsoft

44%	**42%**
Oracle	Parallel

Score out of 100

▶ ▶ **Almost all the users could spontaneously recall VMware, Microsoft, and Citrix**

In our Spontaneous Awareness of the brand segment, VMware got a solid hold, however Microsoft gave a strong fight. Almost every brand has good recognition as they lost with a marginal difference. VMware the champion brand scored – 99%, followed by Microsoft – at 98%, Citrix – at 96%, Oracle –at 91%, and Parallel – at 76%.

Spontaneous Awareness - Virtualization

99%	98%	96%
VMware	Microsoft	Citrix

91%	76%
Oracle	Parallel

Figure in %
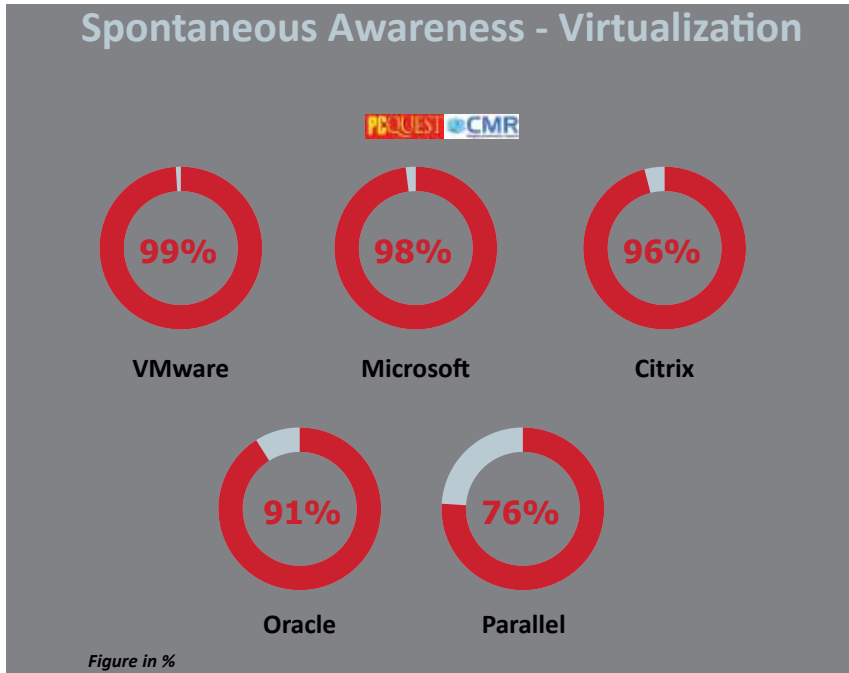
In our current usage segment, VMware became a clear winner with the highest score of 42%. This means, most professionals are using VMware for virtualization, and the rest of the brands are still struggling to grab a higher share. Citrix is the next preferred choice with a score of 16% followed by Microsoft – at 13%, Oracle – at 12%, and Parallels – at 10%.

Current Usage - Virtualization

42%	16%	13%
VMware	Citrix	Microsoft

12%	10%
Oracle	Parallel

Figure in %
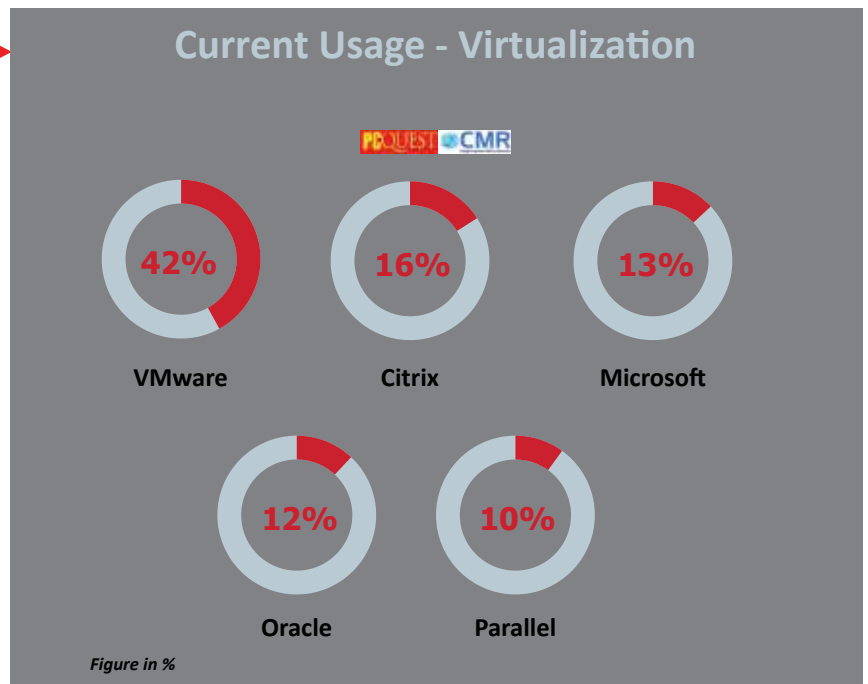
In the future as well, VMware will rule the virtualization market. Last year it was leading for future preference, and this year VMware got an even higher score compared to last year. Citrix is the next most popular brand with 42%, Microsoft is the third preferred choice with 38%, followed by Parallels at 22% and Oracle at 15%.

Future Preference - Virtualization

VMware	Citrix	Microsoft
76%	42%	38%

Parallel	Oracle
22%	15%

Figure in %
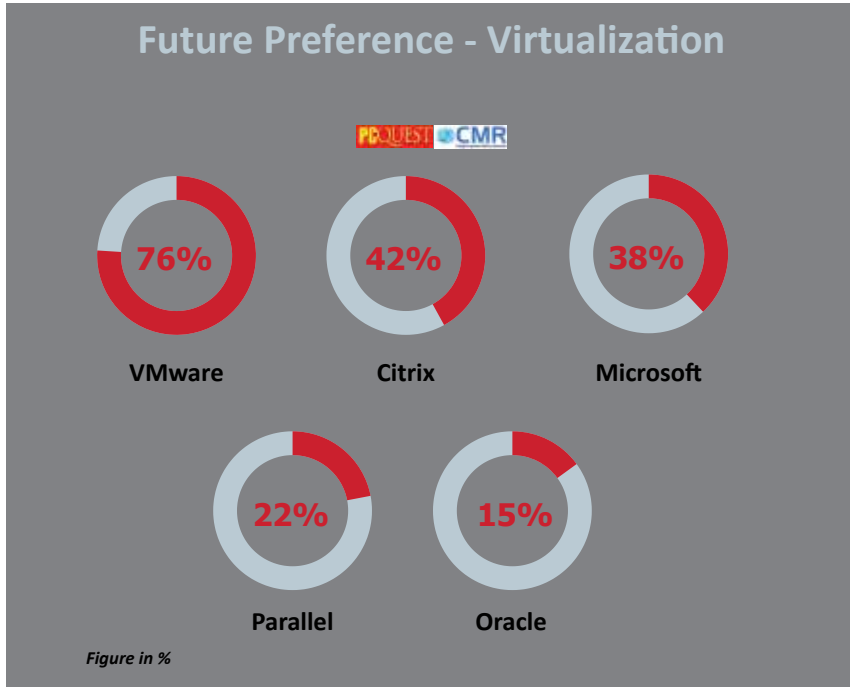
Why is VMware ruling the virtualization market? The answer is the brand name and the quality of the product. Citrix is considered for its brand name and price. Microsoft and Oracle are preferred for their quality and Parallels for their after-sales support/service.

Reasons for Using Current Virtualization

	VMware	Citrix	Microsoft	Oracle	Parallels
Brand Name	High	High			
Quality of Product	High		High	High	
After Sales Support / Service					High
Initial Price		High			

High

Illustration by Nadeem Anees

Fortinet gained the maximum trust

Satya Sundar Mohanty, CyberMedia Research
Ashok Pandey, PCQuest
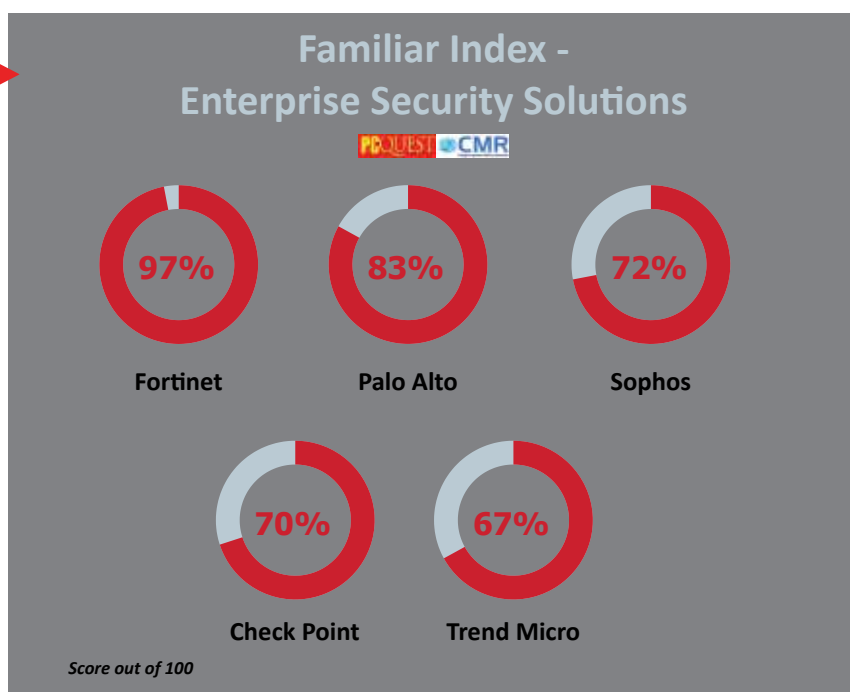✉ pcquest@cybermedia.co.in

For citation details and process kindly connect with rajivp@cybermedia.co.in

Around half of the users would consider Fortinet while buying their next Enterprise Security Solutions

Security is the prime concern among enterprises. According to research shared by Check Point, "Global attacks increased by 28%in the third quarter of 2022 compared to the same period in 2021. The average weekly attacks per organization worldwide reached over 1,130." Therefore we all have to have a robust enterprise security solution.

And for that most of our respondents trusted Fortinet. The champion brand gained the maximum trust and score securing the winning spot. Palo Alto grabbed the first runner-up space and Sophos is second.

Last year McAfee was the champion brand but this year, Fortinet is the most loved brand in the cybersecurity space with a score of 97%. Palo Alto grabbed the second spot with a score of 83% in our Familiarity Index followed by Sophos 72%, Check Point 70%, and Trend Micro 67%.

Familiar Index - Enterprise Security Solutions

PCQUEST CMR

97%	83%	72%
Fortinet	**Palo Alto**	**Sophos**

70%	67%
Check Point	**Trend Micro**

Score out of 100

More than four in every five users could spontaneously recall Check Point and Fortinet

Though the winner is Fortinet, Spontaneous Awareness, shows us that Check Point has a better hold in the market. Most of the respondents were able spontaneously to recall Check Point 91%. Fortinet is next in the top five with 82% of the score, followed by Palo Alto 72%, Trend Micro 71%, and Sophos 68%.

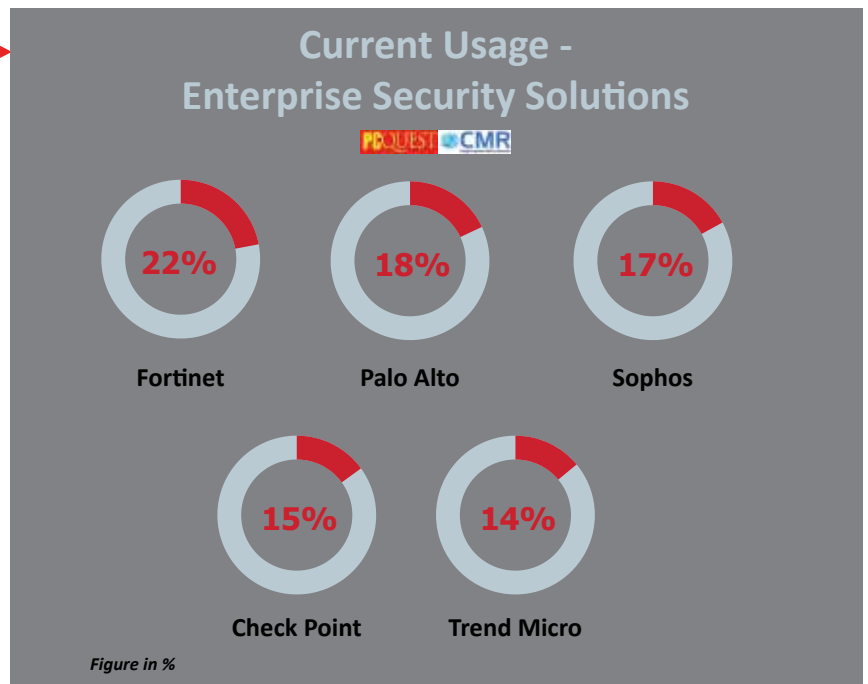## Spontaneous Awareness - Enterprise Security Solutions

PCQUEST CMR

91% Check Point

82% Fortinet

72% Palo Alto

71% Trend Micro

68% Sophos

Figure in %
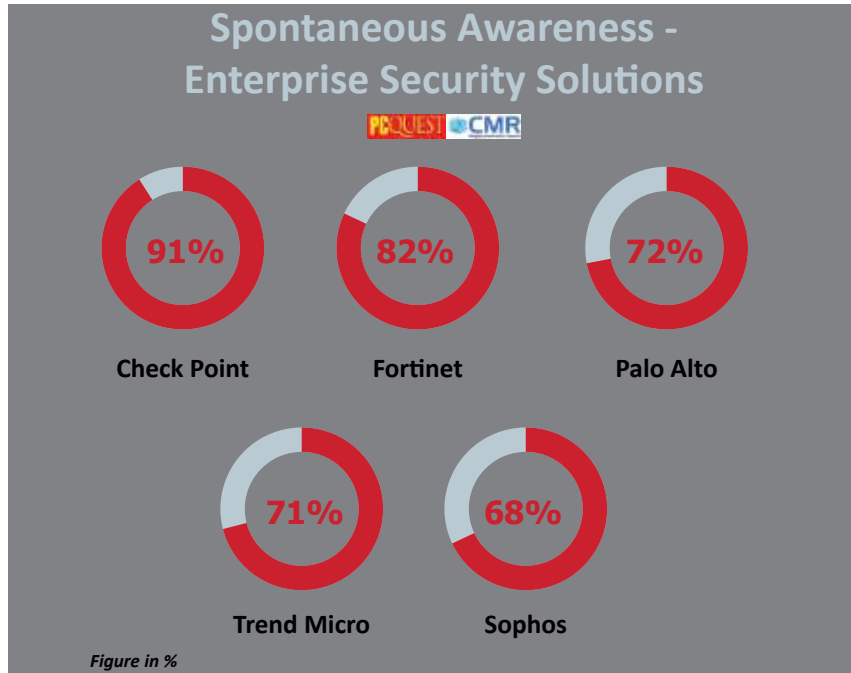
Fortinet gained the maximum score when we asked which solution they are using currently. Fortinet grabbed the first spot at 22%, Palo Alto is next with 18%, followed by Sophos - 17%. Check Point scored 15% and Trend Micro 14%.

Current Usage - Enterprise Security Solutions

PCQUEST CMR

22% Fortinet

18% Palo Alto

17% Sophos

15% Check Point

14% Trend Micro

Figure in %

Will Fortinet be able to retain its trust in the future as well? It seems Fortinet will be able to capture half of the cybersecurity space. In our Future preference index, Fortinet grabbed a 48% score, and Palo Alto is just a few steps behind with a score of 42%. Sophos is next with 32% followed by Trend Micro at 29% and Check Point at 24%. This shows that Check Point which is in the 4th place in current usage lost its ground for the future and Trend Micro got the benefit.

Future Preference - Enterprise Security Solutions

48% Fortinet	42% Palo Alto	32% Sophos
29% Trend Micro	24% Check Point	

Figure in %
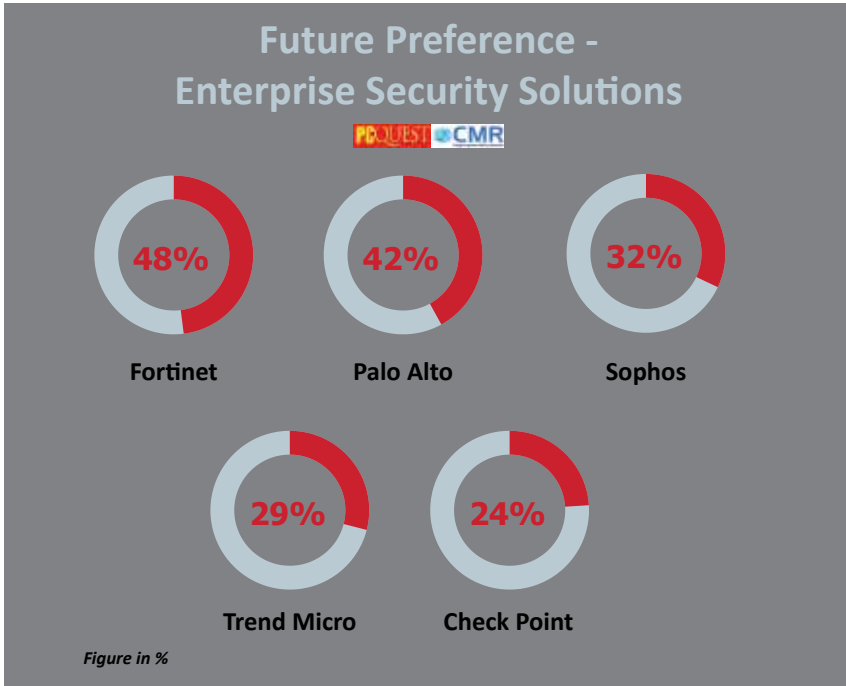
Why are professionals choosing a respective brand's solution? Fortinet is popular for two things, the quality of the product and after-sales support/service. Palo Alto impressed users with its after-sales support/service. Sophos is preferred for its brand name. Check Point for the quality of the product. And Trend Micro for after-sales support/service.

Reasons for Using Current Enterprise Security Solutions

	Fortinet	Palo Alto Networks	Sophos	Check Point	Trend Micro
Brand Name			High		
Quality of Product	High			High	
After Sales Support / Service	High	High			High
Initial Price					

High

Illustration by Nadeem Anees

Netmagic leads this growth area

Satya Sundar Mohanty, CyberMedia Research
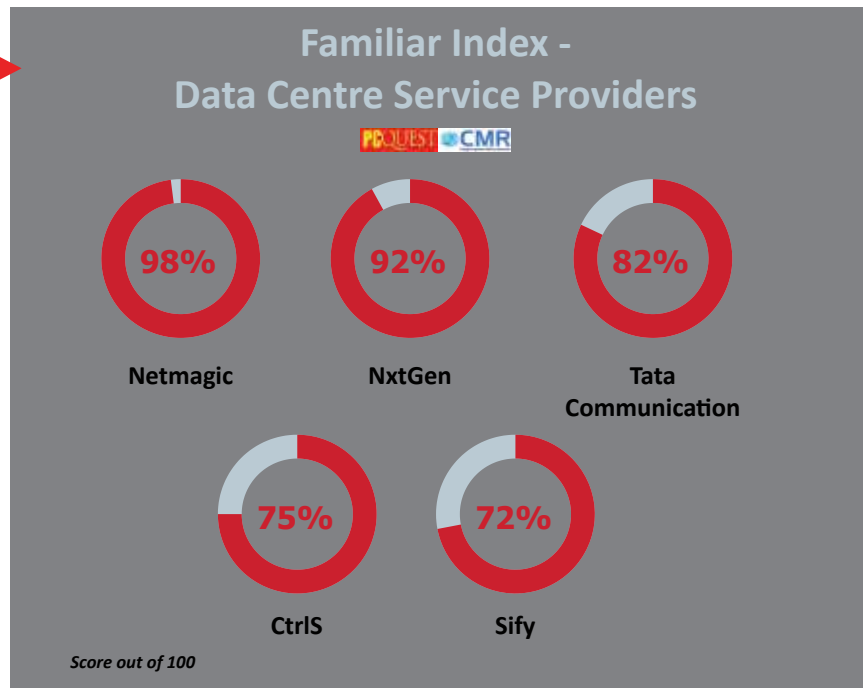**Ashok Pandey, PCQuest**
✉ pcquest@cybermedia.co.in

For citation details and process kindly connect with rajivp@cybermedia.co.in

Apart from brand name and quality of product, after-sales services are the important factor when selecting any brand of Data Centre Service Provider

During the lockdown not only in India, but the global market also witnessed a growth of data centres. The next-gen connectivity 5G will push it to the next level. Many have opted and several are planning to do. But which data centre service provider is most popular among professionals?

The winner of this segment is Netmagic which was the second runner up last year. And Tata Communication, which was the winner last time, loses to the second runner up. NxtGen grabbed the first runner up spot that was in the top five last year. It seems the data centre market is volatile and anyone can win next year, so gear up.

In our familiarity index, NetMagic got the highest score of 98% winning the race. NxtGen got the second highest ranking – 92% followed by Tata Communication – 82% which was on top with 100% core last year, CtrlS– 75%, and Sify – 72%was the second highest scorer last year but slipped this year.

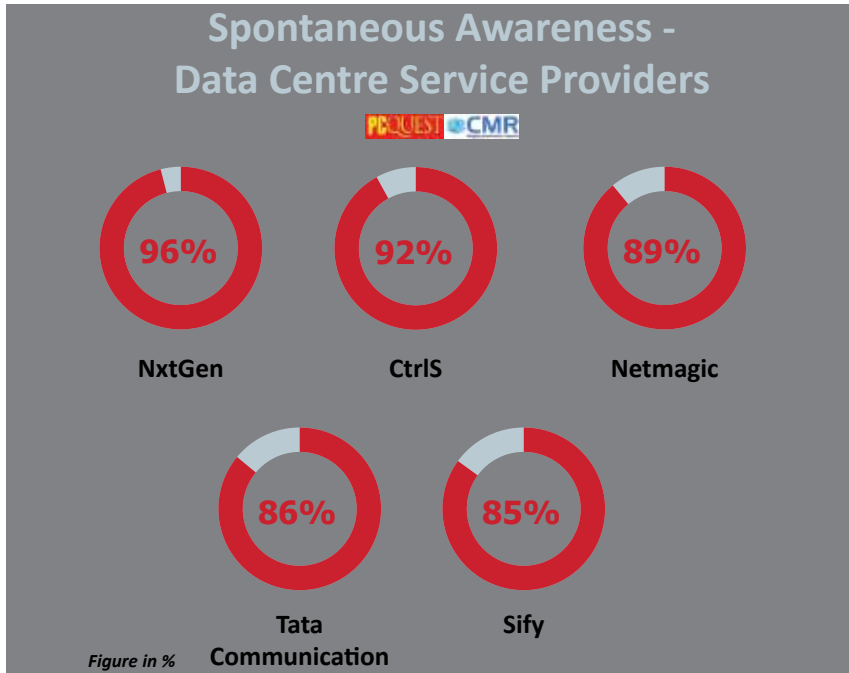## Familiar Index - Data Centre Service Providers

PCQUEST CMR

98%	92%	82%
Netmagic	NxtGen	Tata Communication

75%	72%
CtrlS	Sify

Score out of 100

Almost all the users could spontaneously recall NxtGen
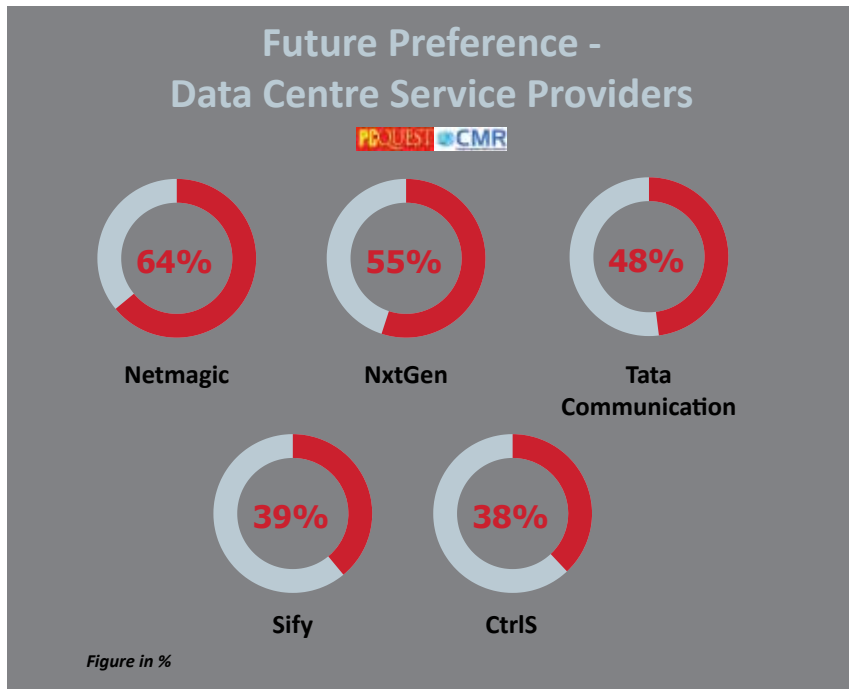
NxtGen won the spontaneous recall race with the highest 96% score, followed by CtrlS with 92%, leaving Netmagic to third place with 89%. Tata Communication and Sify got a fourth and fifth place with scores of 86% and 85% respectively.

Spontaneous Awareness - Data Centre Service Providers

PCQUEST CMR

96%	92%	89%
NxtGen	CtrlS	Netmagic

86%	85%
Tata Communication	Sify

Figure in %

Who is the leader in the current usage? Netmagic is the most used data centre service provider. NxtGen is the next in the race followed by Tata Communication, Ctrls, and Sify. It's a completely changed picture here, last Tata Communication was leading and Netmagic wasn't in the top five for the current usage index. And this year, Netmagic beats all the competition, and Tata Communication fell to third place. What would be the future!

Current Usage - Data Centre Service Providers

PCQUEST CMR

23%	21%	19%
Netmagic	NxtGen	Tata Communication

17%	16%
CtrlS	Sify

Figure in %
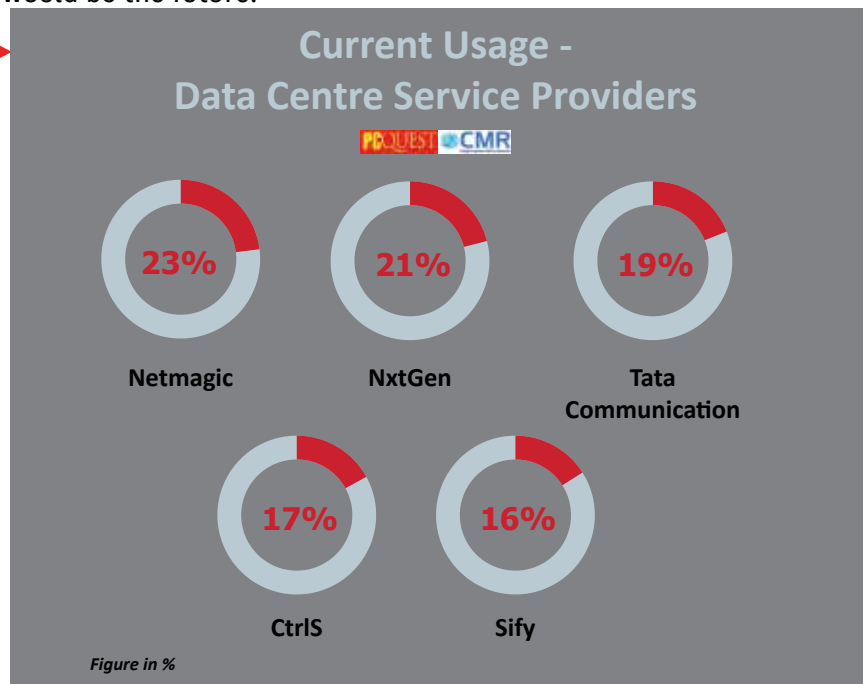
Our respondents are happy with the current service providers, at least the top three – Netmagic is leading with 64%, NxtGen is the first runner up with 55% and Tata Communication followed with 48%. Sify is winning the hearts and CtrlS is losing compared to current usage.

Future Preference - Data Centre Service Providers

PCQUEST CMR

- **64%** Netmagic
- **55%** NxtGen
- **48%** Tata Communication
- **39%** Sify
- **38%** CtrlS

Figure in %

Netmagic and NxtGen both are popular for the quality of their products. Tata Communication and Sify are attracting their customers for their brand names. And Ctrls is preferred for its after-sales support/service.

If we go back to last year's results, Tata Communications and Sify both were popular for their brand name and the quality of their products. But this year they lost trust in quality, a big problem for both brands to rethink and enhance their services.

Reasons for Using Current Data Centre Service Providers

	Netmagic	NxtGen	TATA Communication	CtrlS	Sify
Brand Name			▓		▓
Quality of Product	▓	▓			
After Sales Support / Service				▓	
Initial Price					

▓ High

Illustration by Nadeem Anees

IBM captures the top spot

Satya Sundar Mohanty, CyberMedia Research
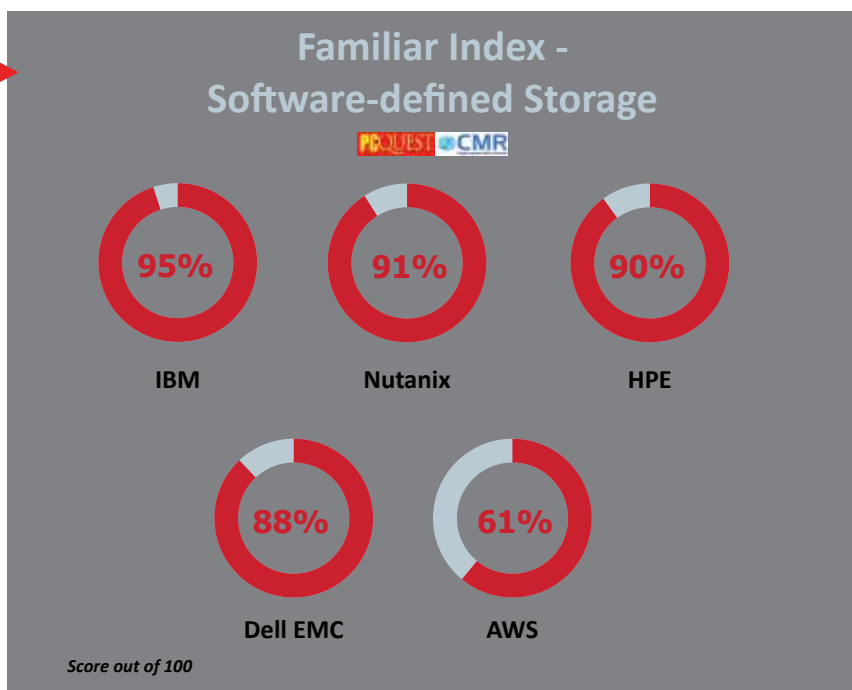**Ashok Pandey, PCQuest**
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IBM is the champion brand but almost all the users spontaneously recalled Dell EMC

For those who need more than just storage goes for software-defined storage (SDS). The SDS market is expected to grow at a CAGR of 25.8% over the forecast period (2022 – 2027) according to Mordor Intelligence. The industry giants do understand the requirements; thus they are ruling the market as well.

IBM is the winner of the SDS segment, which was the second runner up last year. Nutanix grabbed the first runner up place. And HPE become the second runner up that was the first runner up last year. This clearly shows that HPE loses its ground and IBM wins more attraction.

IBM is ruling the Familiarity Index with a 95% score. Its closest competitor Nutanix secured the 1st runner-up place with a score of 91%. There is a just 1% gap between the scores of the 1st and the 2nd runner-up HPE which scored 90%, followed by Dell EMC at 88% score and AWS at 61% score.

Familiar Index - Software-defined Storage

PCQUEST CMR

95%	91%	90%
IBM	Nutanix	HPE

88%	61%
Dell EMC	AWS

Score out of 100

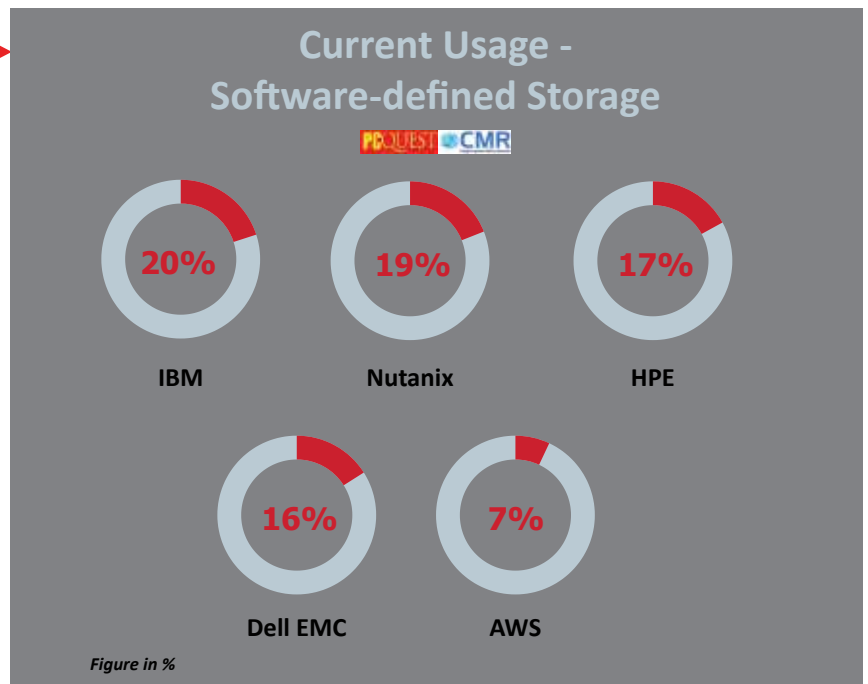## Around half of the users would consider Nutanix while buying their next Software Defined Storage
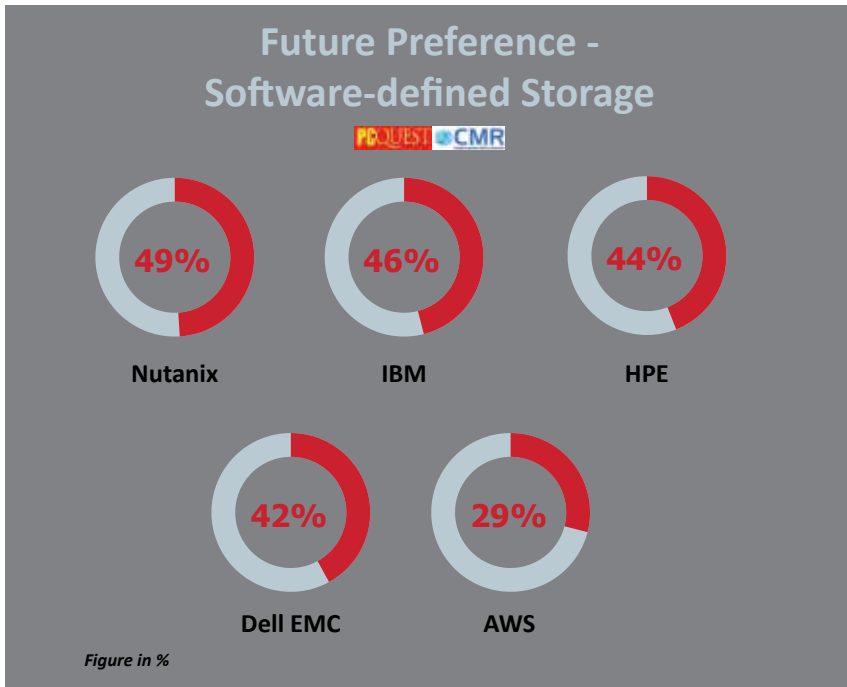
In the Spontaneous Awareness of brands, Dell EMC is still on top, last year with a 100% score and this time 95%. HPE which was sharing first place last year with Dell EMC, this time it is a bit behind securing the first runner up place with a 92% score. IBM secured the second runner up spot with a score of 86%. Followed by AWS – 84% and Nutanix – 71%.

Spontaneous Awareness - Software-defined Storage

PCQUEST CMR

95%	92%	86%
Dell EMC	HPE	IBM

84%	71%
AWS	Nutanix

Figure in %
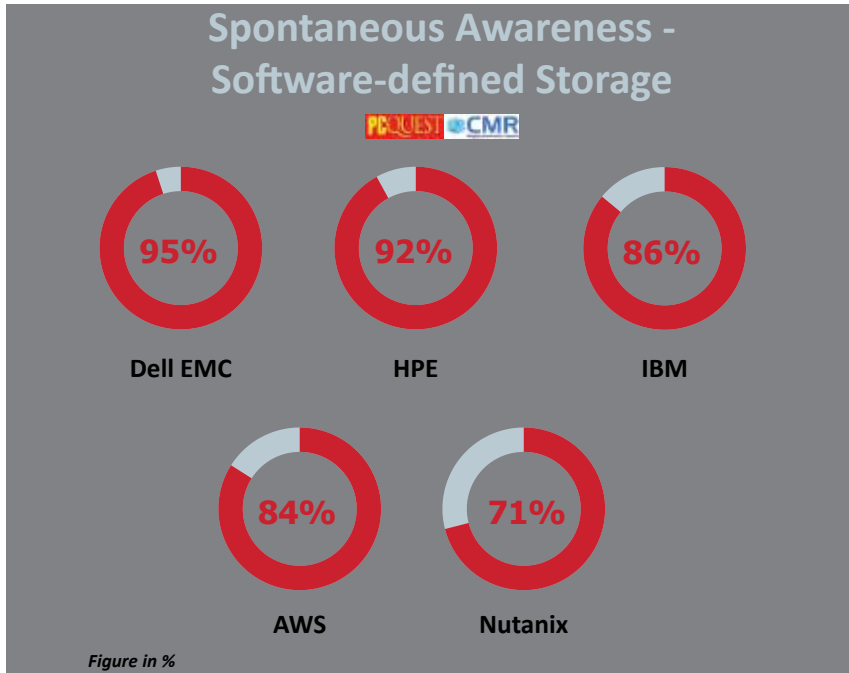
Dell EMC loses its market share. Last year most of our respondents were with Dell EMC and this year IBM is topping the charts. Nutanix was not even in our top five list last year, but this time it has become a strong contender, securing the first runner up spot. HPE lost a bit, and slipped to the second runner up place, followed by Dell EMC and AWS.

Current Usage - Software-defined Storage

PCQUEST CMR

20%	19%	17%
IBM	Nutanix	HPE

16%	7%
Dell EMC	AWS

Figure in %

IBM is on the top for current usage, but in the future, Nutanix can grab a major share. HPE, Dell EMC, and AWS are going to retain their positions. Interestingly, there is no major difference, the top four brands fall between the 40 to 50 range. Each one is a strong contender, and the game can be different in the future.

Future Preference - Software-defined Storage

PCQUEST CMR

- **49%** Nutanix
- **46%** IBM
- **44%** HPE
- **42%** Dell EMC
- **29%** AWS

Figure in %

We have three brands that are popular for the same reasons – IBM, Nutanix, and HPE – the quality of their products and after-sales support/service. Dell EMC is preferred for the brand name and quality of the product. AWS grabbed attention for its brand name and after-sales support/service.

Reasons for Using Current Software-defined Storage

	IBM	Nutanix	HPE	Dell EMC	AWS
Brand Name				High	High
Quality of Product	High	High	High	High	
After Sales Support / Service	High	High	High		High
Initial Price					High

High

Illustration by Nadeem Anees

HPE snatches crown from Dell EMC

Satya Sundar Mohanty, CyberMedia Research
Ashok Pandey, PCQuest
pcquest@cybermedia.co.in

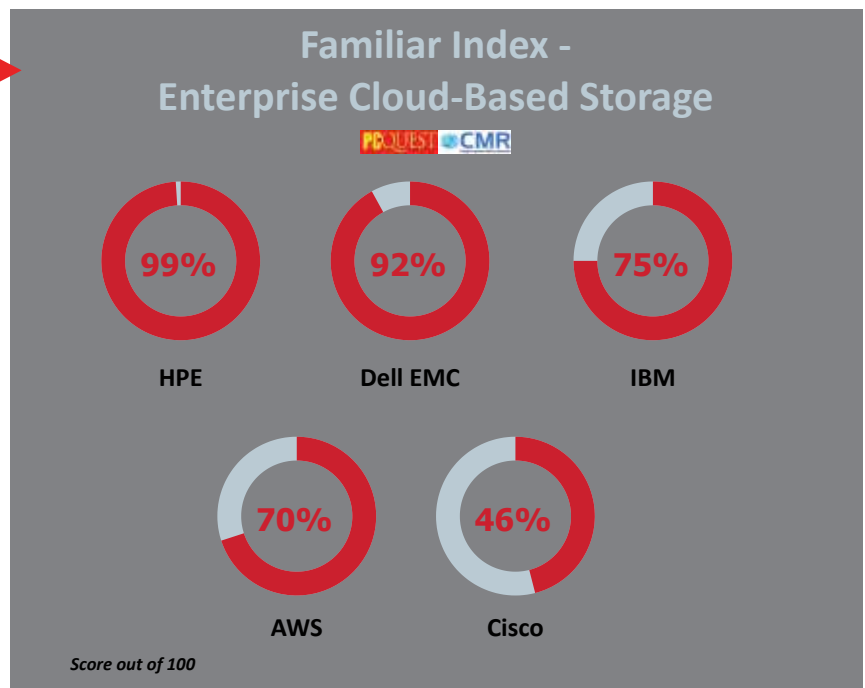Hewlett Packard Enterprise

DELLEMC

IBM

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HPE and Dell EMC are strong contenders, around half of the users would consider HPE and Dell EMC while buying their next Cloud-based Storage

According to a report published on Fortune Business Insight, the global cloud storage market is projected to grow from $83.41 billion in 2022 to $376.37 billion by 2029, at a CAGR of 24.0% in the forecast period, 2022-2029. Meaning, more exciting competition among the brands to become the leader.

Though IBM is the leader in the Software-defined storage segment, HPE leads the Cloud-based storage category. Dell becomes the first runner up and IBM got the next. In the previous year, Dell EMC was the winner, HPE was the first runner up and Google was the second runner up.

In our Familiarity Index, HPE scored 99%, however, Dell EMC isn't far behind – at 92%. IBM scored 75% and become second runner-up followed by AWS with a score of 70%, and Cisco with a score of 46%. Though Dell EMC isn't a winner but the most popular brand, how? Let's find out.


Familiar Index -
Enterprise Cloud-Based Storage

99%	92%	75%
HPE	Dell EMC	IBM

70%	46%
AWS	Cisco

Score out of 100

Brand name, as well as the Quality of the product, are the most important factors when selecting any brand of Cloud-based Storage
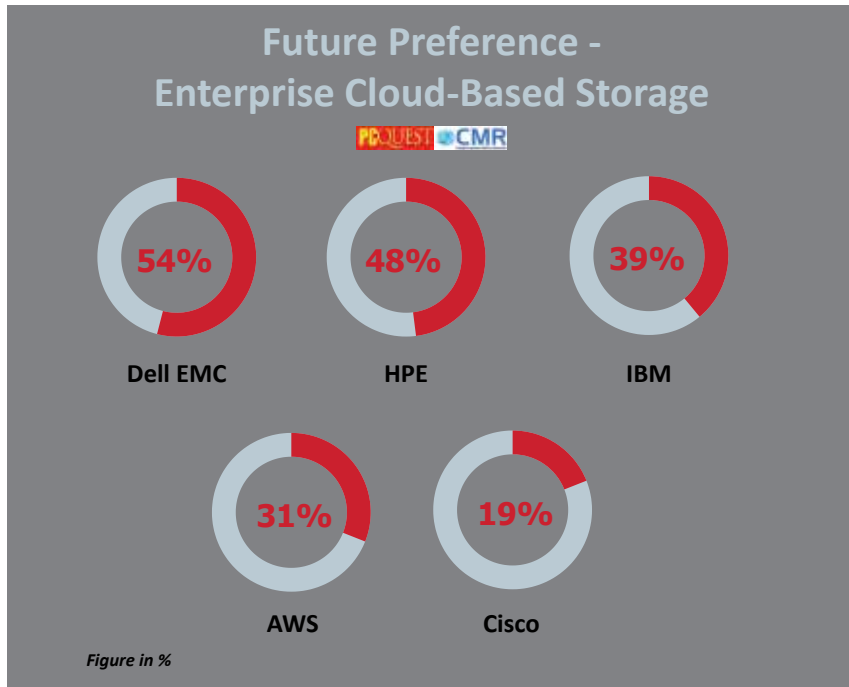
In our spontaneous awareness index, Dell EMC scored the maximum though HPE is just one point behind. This shows that both are strongly present in the market. AWS is the next with a score of 75%, followed by IBM – 68% and Cisco – 60%.

Spontaneous Awareness - Enterprise Cloud-Based Storage

PCQUEST CMR

85%	84%	75%
Dell EMC	HPE	AWS

68%	60%
IBM	Cisco

Figure in %
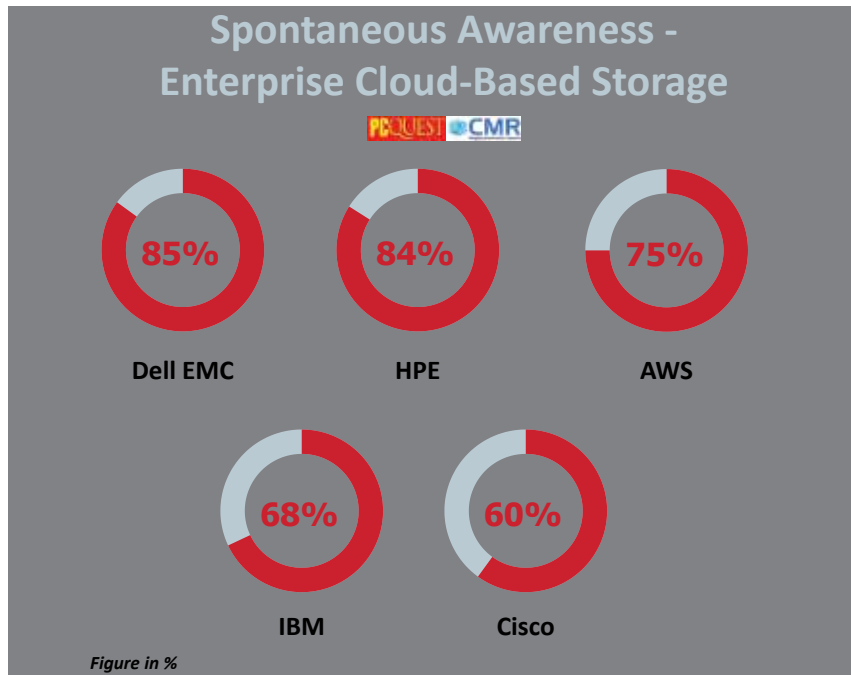
When we asked enterprises which brand's cloud-based storage they are using, HPE wins again, and Dell EMC followed with a very close difference. IBM is the 2nd runner-up with a score of 19% followed by AWS – 18% and Cisco – 9%.

Current Usage - Enterprise Cloud-Based Storage

PCQUEST CMR

26%	23%	19%
HPE	Dell EMC	IBM

18%	9%
AWS	Cisco

Figure in %
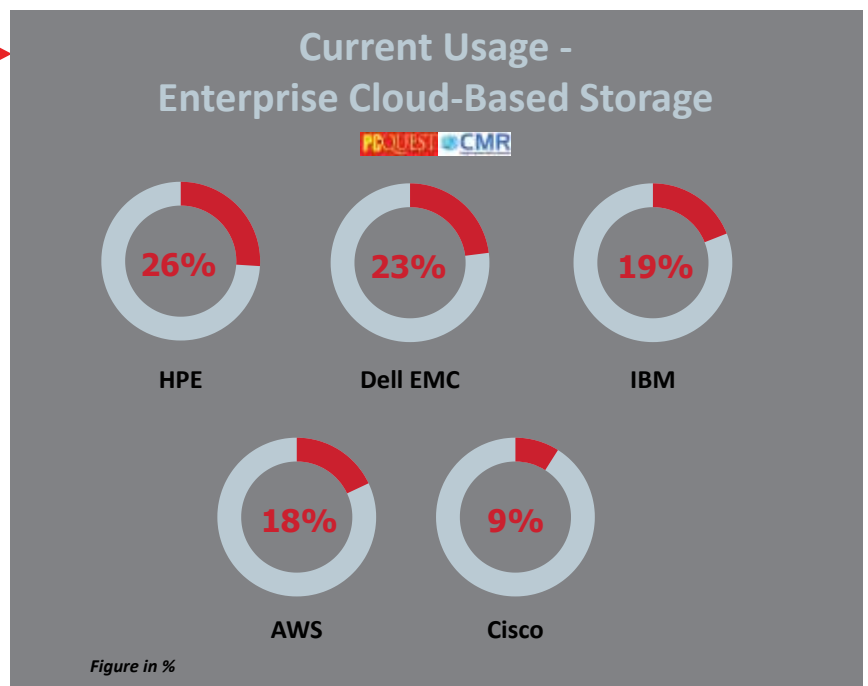
In the future as well HPE will lead, and Dell EMC will follow. Both brands are giving strong competition to each other, even last year both were neck-to-neck. Just Dell EMC was the winner and HPE was following. IBM also has a good hold followed by AWS and Cisco.

Future Preference - Enterprise Cloud-Based Storage

PCQUEST CMR

Dell EMC	HPE	IBM
54%	48%	39%

AWS	Cisco
31%	19%

Figure in %

HPE and Dell EMC both are popular for their brand name and the quality of their products. IBM is recognized for its price. AWS attracted professionals for its after-sales support/service. Cisco grabbed attention for the quality of the product.

Reasons for Using Current Enterprise Cloud-Based storage

	HPE	Dell EMC	IBM	AWS	Cisco
Brand Name	High	High			
Quality of Product	High	High			High
After Sales Support / Service				High	
Initial Price			High		

☐ High

Illustration by Nadeem Anees

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AI, ML, AR & VR: Empowering the future of gaming

Ashok Pandey
✉ ashokpa@cybermedia.co.in

Gameplay is already changing as a result of tech's role as a guide for ambient circumstances, non-player characters, interactive storylines, and path finding

The Indian gaming industry is expected to reach USD 4.88 billion by 2026. With one of the world's largest youth populations, India is expected to become one of the world's leading gaming market destinations.

Witzeal, a new age gaming technology company, specialised in creating futuristic games,is prioritising security to build trust with gamers resulting in higher engagement. *Ankur Singh, CEO and Founder, Witzeal Technologies* talked about new age gaming, where AI, ML kind of modern technologies are playing a crucial role.

▼ Role of Artificial Intelligence

Gaming with AI is more about using AI to make games that are more responsive, adaptive, and difficult than it is about playing games with AI characters as the main focus. Gameplay is already changing as a result of the technology's role as a guide for ambient circumstances, non-player characters, interactive storylines, and path finding.

AI enables not only the players but also the game designers and studios to do data mining on player behaviour to assist them in understanding how these gamers end up playing the game, the areas that people play the most frequently, and what drives them to start/stop playing the game. As the gaming environment develops, it can also get feedback from players' actions, playing styles, in-game choices, appearances, and methods.

AI can also extrapolate the data helping the gaming developers and companies strategize further. Moreover, the technology can certainly help in coping with digital threats involved.

▼ Adapting gamer behaviour

In order to give tailored experiences to users, machine learning adapts to the player's in-game behaviour and can propose the next step or suggest similar in-game items, it also automatically adjusts the game's difficulty level as per player's proficiency to keep the gamer interested in the game.

By using NLP(Natural Language Processing) to uncover correlations between players, establish relationships with them, and identify their toxic conduct. It also monitors the unusual activity of a certain player more

ANKUR SINGH, CEO and Founder, Witzeal Technologies

quickly and determines whether an account has been hacked before the person discloses it. If remedial action is needed, it can be taken as soon as it is discovered.

▼ Transforming the gaming world

Technology is continually evolving, with examples including artificial intelligence (AI), machine learning (ML), virtual reality (VR), and augmented reality (AR). Gaming is viewed as a chance for skill improvement when done so properly and within a set spending limit. The enjoyment of this kind of social interaction has also been enhanced by Augmented Reality (AR) and Virtual Reality (VR) technologies' lifelike immersive experiences.

The sensitive topic of children and gaming is being handled effectively using artificial intelligence (AI) and machine learning (ML) technologies, as game difficulty and material can be changed in accordance with a child's playing capacity. Additionally, Also, the kids can be shown the similar content which has done well for other kids with similar age group or demography.

The real and virtual worlds are blending thanks to augmented reality (AR) technologies. Real-time technology improves players' perception and contribute to the development of higher levels of player engagement. With the use of Virtual Reality, Augmented Reality, and Gesture Control, wearable gaming technology delivers an entirely immersive experience. Users can interact with their game experience by using their natural body movements using the gesture control. ∎

Evolution of the fitness industry

Ashok Pandey
✉ ashokpa@cybermedia.co.in

Consumers are now more concerned about their health and fitness after the pandemic breakout. The fitness-industry providers have adapted, technology, apps, AI, etc. for immersive fitness experiences

The technological revolution has dramatically affected various industries including the health and fitness. All thanks to technology, now without going to gym you can get in shape. More fitness technology tools and products continue to flood the market, building a strong affinity amongst fitness enthusiasts.

We spoke to *Prateek Sood, Director, Grand Slam Fitness* to understand the advancements and disruptions in the Fitness Industry.

▼ The biggest advancement in fitness equipment technology

Technology in the Fitness Industry has completely changed how people maintain their physical fitness. Previously, people had

to manually record their progress and results. Tracking advancements and setting records, however, has never been easier thanks to modern technology.

Modern gym equipment offers heart rate monitors, intensity monitors, and intensity training that respond intuitively to the user's abilities with posture assistance.

Some of the biggest advancements in fitness equipment technology include wearable technology, AI-based workouts, and tracking based on artificial intelligence which have been essential in workout routine. Users can immerse themselves in various virtual environments and learn virtually through virtual reality classes, by focusing on recovery and injury prevention, technology has transformed the fitness landscape.

▾ Transforming the fitness industry

Gym equipment technology has completely transformed how individuals stay fit and healthy. New technology, on the other hand, has made it easier than ever to track progress and achieve new records. Like Advagym by Sony, it not only delivers fitness content to the clients, but it also gives them the ability to track their workouts to ensure they are progressing and pushing past limits. No matter where clients are completing their workouts, they will have the ability to track their progress.

Alternatively, this technology enables gym owners to maintain track of their customers' entry and exit, keep a record of their attendance, count how many machines they used in a specific period of time and make suggestions to customers based on their performance and how they can improve.

▾ Benefitsof advancetechnology

Technology has become an integral part of daily life, as well as in our health and fitness by utilizing it to benefit our exercise, such as artificial intelligence-based workouts, virtual reality training, goal setting - tracking, and diet assistance, which allows one to keep track of their desired goals and activities.

Another technological advancement in recent years has been exercise equipment. A new popular trend is to purchase exercise equipment that includes mobile apps that

PRATEEK SOOD, Director, Grand Slam Fitness

allow you to access trainers and fitness videos from the comfort of your own home.

Purchasing an exercise machine that includes this type of trainer access eliminates the need to pay for a gym or personal trainers. It's only one payment, and you can do it all from home, knowing you're getting the same high-quality training.

▾ Technological disruptions

Businesses from all industries have hopped on the digital bandwagon as a result of digital breakthroughs and the emergence of new-age technologies. The fitness industry has undergone the same issue. Consumers have been more alert and concerned about their health after the pandemic breakout. As people prioritise health and fitness in the fallout of the Covid-19 pandemic, fitness-industry providers must adapt by increasing their value propositions through equipments, technology, apps, and immersive fitness experiences.

The most popular fitness technologies today range from apps and wearable technology to digital fitness platforms and equipment. Each gadget, in its own right, provides valuable data about progress and assists users in more efficiently tracking their fitness goals. Many aspects of the fitness sector are linked to technology, either directly or indirectly. As a result, technology has had a far-reaching impact on every aspect of fitness. ▪

SAP Build allows unified developer experience

Pradeep Chakraborty
✉ pcquest@cybermedia.co.in

Data should be behind every single decision in enterprise planning. Companies need to take data-driven decisions. Every organization needs to be data-driven. There are 30 billion rows of data in SAP HANA Cloud. You can also use this data strategically to analyze any game situation

SAP recently hosted the SAP TechEd 2022 in Las Vegas, USA. The SAP TechEd Keynote was presented by Juergen Mueller, Chief Technology Officer (CTO) and Member of the SAP Executive Board, SAP.

Mueller talked about how you can thrive in times of global disruption and environmental challenges, and learn from SAP's developer advocates how easy it is to succeed with SAP technology. You can also dive into topics that are of most interest to you. We are also celebrating SAP's 50th birthday in 2022.

We have created the SAP BTP because all of us run into the same business and technical challenges. There are challenges with automation, integration, AI, data analytics, etc. He said over 15,000 customers are now live with SAP BTP or business technology platform. SAP had over 400,000 visitors on their company web page. In automation and app development, etc., there are low-code, pro-code, and several other elements.

The worldwide market for low-code tools ballooned almost 23% in the last year. Today, 41% of non-IT employees are building or customizing applications, according to Gartner.

App development and automation includes low code and pro code. Today, every company is becoming a tech company. He predicted that there could be a shortfall of 4 million developers by 2025. We have to unleash the expertise of those who know the business best! These are the business users themselves.

▾ SAP Build is here!

Mueller announced that SAP is launching its low-code portfolio, SAP Build. It is the evolution of our low-code portfolio, which we started a few years ago with Build.me, and SAP App Gyver. SAP Build includes SAP Build Process Automation, SAP Build Apps, and SAP Build Work Zone. They have common project lifecycle, BTP destination, and in-app content store. You can build an app, an automated process, or a business site. You can get a unified developer experience.

Access to data is now very easy and secure. There is the world's largest domain of contents. Customers can select from 1,300+ workflows and automations, etc.

JUERGEN MUELLER, Chief Technology Officer and Member of the SAP Executive Board, SAP

With SAP Build, you can now collaborate seamlessly among business, development, and governance teams. SAP Build, low-code development solutions enable everyone to develop with drag-and-drop simplicity. SAP Build relies on existing SAP BTP services for security and compliance. IT teams can be secure that all apps developed are meeting the IT teams' governance and security requirements.

Drawing on the unique depth and breadth of SAP Business Technology Platform (SAP BTP), SAP Build gives business users direct access to the end-to-end processes, data, and context they need to make smarter decisions and drive innovation quickly. With SAP Build, users can easily integrate systems, intelligently monitor, analyze, and automate processes, and build applications for the last mile of innovation – all without moving their data into an external system.

▾ Sustainability at NHL

Omar Mitchell, VP, Sustainable Infrastructure and Growth Initiatives, National Hockey League (NHL) Green, said ice hockey relies on cold weather, fresh

water, and healthy communities. Today, climate change has been impacting all of us. Professional ice hockey is played in a giant refrigerator. There are increasing resources constraint and rising energy costs that are also impacting us. We need to do our part to reduce environmental impact internally. The first part of our journey includes measuring our environment. We cannot have impact, if we do not measure!

In NHL, there are 32 ice hockey teams across North America. Managing the footprint of each one of our arenas is an incredible and most critical aspect of our sustainability programs. We have co-innovated with SAP HANA Cloud, etc. We are working with SAP to help track, measure, and have deeper insights into our innovations. Our teams also share best practices, and we can also continue to improve.

To achieve more visibility and innovativeness, we co-developed the NHL Venue Metrics with SAP. It specifically uses the SAP Hana Cloud and SAP Analytics Cloud data collection app. It collects, processes, and reports on venue data collections from our clubs and the venues.

Earlier, data collection used to be manual and time consuming. There were many required fields. We took the information captured. Once the information has been submitted, it needs to be reviewed and approved. We needed to create an approvals process. The approval process has been composed within the SAP Build Process Automation. After the data is approved, all data points within the NHL Venue Metrics will get populated. This also cuts down lot of manual process for the teams. Time means everything in our business. Our clubs are geared toward operational efficiency. We have all the information that a team needs in one place. Everyone can easily access that. There are also energy conservation arenas, ranked from 1 to 32.

This is an important part of the sustainability platform. Sustainability is all about continuous business improvement and optimization, often by using advanced technology. Technology in the hands of business experts helps drive cost and innovation, receive buy-ins from the ultimate stakeholders, and ultimately, helps us achieve our sustainability goals.

NHL Venue Metrics has now been built using the SAP Build Work Zone. This has been an important part of our sustainability program. Eg., the use of LED lights in the sports arenas for playing our games. Environmentally-friendly LED lights also save energy and reduce resource consumption, approximately 20-30%. It also improves the broadcast products. Eg., in ice hockey, ice continues to pops off the TV screen from time to time, and you can also follow the puck better. These types of innovations are a win-win for the environment, and also for the business perspective.

▼ SAP Lobby

Mueller also mentioned the Visual Cloud Functions. Visual Cloud Functions is a way to build your entire cloud logic that happens in the background without writing any code. We are also integration SAP Signavio with SAP Build. SAP Signavio can now recommend over 135 pre-built automations. We can have trigger-based innovation. SAP Build Work Zone brings together the environment.

The SAP Lobby was demonstrated by Daniel Wroblewski, Developer Advocate. He added that people having all types of skills can now work together. All of the apps are available here for collaborating with team-mates. We can see all BTP destinations. We can build SAP TechEd Las Vegas activities using this. If you use any activity from NHL, that can be approved, as you can now watch the San Jose Sharks game. Triggering is extremely simple. We have quickly created a workflow and checked its status.

Mueller said people of all skills are working together. Building things are part of the DNA. We have an intrinsic motivation to take building blocks and build something. Dak, 12, a junior app developer, Massachusetts, stated that coding for app development is his passion. Publishing apps for the world has been a great experience for him, and especially, getting them downloaded from all across the world. He has to refer to the map for countries he has no idea about! Feedback is always appreciated. You can create whatever you want. He now knows

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how to solve problems if they may come up again. He can learn about other skills. He added that you can do anything once you put your mind to it!

▼ Ahoy, ABAP Cloud!

Mueller noted that SAP is also developing certain other things. One such thing is composability. Our goal has been to allow developers to solve problems. SAP has ABAP (Advanced Business Application Programming). There are also Restful Application Programming (RAP) model, and Cloud Application Programming (CAP) model, respectively.

Professional developers focus on low- and pro-codes. SAP has RAP and CAP. That is, RAP is the preferred model for 'ABAP in the Cloud' and S/4 HANA environments. The programming language of RAP is proprietary SAP language ABAP, and runs on a proprietary NetWeaver ABAP stack called Steampunk. CAP is the opposite of RAP in most cases. CAP applications are written in the open-source languages like Java and Javascript/TypeScript, and run on open-source runtimes like JVM or Node.js. The decision to use open-source languages and runtimes for CAP brings the environment a lot of advantages.

ABAP is the primary programming language supported on the SAP NetWeaver ABAP application server platform and applications that run on it, such as SAP ERP (formerly R/3), S/4HANA and CRM. SAP ABAP is an object-oriented programming language that SAP developed in 1983 for use within SAP's enterprise resource planning (ERP) platform.

With Steampunk (official brand: SAP BTP ABAP Environment), customers and partners have built cloud applications and loosely coupled side-by-side extensions for SAP's flagship solutions S/4HANA and S/4HANA Cloud.

Mueller said that ABAP is key success factor for SAP ERP. We need to turn modifications into ABAP code, allowing for SAP S/4 HANA applets. We are introducing ABAP Cloud for S/4 HANA Cloud and S/4 HANA Premise. You can take all steps from Steampunk into S/4 HANA. ABAP Cloud includes public SAP APIs, Public SAP Extension Points, and ABAP Development Tools. It also means that you can continue using RAP.

Once you switch the ABAP Objects to the ABAP Cloud, the ABAP Compiler makes sure that you stick to the roots of the ABAP Cloud. You can now get to the clean core in a much simpler way! The ABAP Cloud is available for all S/4 HANA editions, including public and private editions, from 2022 onwards. He advised to kickstart the ABAP training immediately.

Mueller noted that ABAP has been running very successfully for many years. He introduced ABAP Cloud. SAP S/4HANA Cloud ABAP Environment offers SAP customers and partners the opportunity to build tightly-coupled extensions running directly on the S/4HANA Cloud technology stack. This extensibility option complements existing key user extensibility and side-by side extensibility options. It also means using public SAP APIs, strong tooling support, and continuing using RAP.

CAP is another area. CAP includes libraries and tools for building enterprise apps. Born Digital, Melbourne, Australia, is an app house. It has been using SAP for a long time. Mueller said CAP and ABAP can be easily connected. Nicolai Schoenteich, Developer Advocate, SAP, and Ms. Mamikee Kanneh, Developer Advocate, SAP, demonstrated on CAP and ABAP. Mueller said that CAP also allows you to code with little coding experience. You can discover business apps on SAP.

▼ SAP and Apple

Mobile devices can find your way to the work site. You can get up-to-date data to your fingertips. We have also partnered with Apple — the folks who know enterprise mobility best. We can take advantage of Apple's powerful software and hardware to build powerful and compelling business apps that people love. Our long-standing association with Apple goes well beyond apps. We also enable our joint customers to decide their users. Today, customers are already using BTP and Apple to transform customer experiences.

Scott Hawks, Senior Director of Enterprise Systems, Apple, said SAP has been an essential part of Apple's business infrastructure for many years. Today, BTP

is powering many of the mobile apps that our teams are using, from supply chains to operations. Our own retail teams use apps from BTP for various aspects, such as pickup and delivery, backhouse operations, inventory management, etc.

Apple is also building apps for its own employees using BTP and iOS. BTP SDK for iOS also makes it possible to tap into powerful iPhone and iPad hardware features, such as cameras, sensors, on-device ML, etc. We can get critical baseline features like secure transactions, offline data synchronization, role-based data access, and other advanced BTP services. Teams have gained incredible efficiency in terms of app performance, BTP, etc. We can also build apps 40% faster than before, and can develop and deploy apps in less than six weeks. We can ensure privacy and security at every point with a single app.

The combination of BTP services and HANA Cloud has enabled teams to go ahead with build iOS apps with best possible performance, scale, and very tight integration. We can serve customers in entirely new ways. BTP enables access to latest innovations from SAP and Apple.

Juergen Mueller, SAP, noted that it is remarkable to see such scale of development. We are learning every day from Apple. We are introducing even more capabilities for BTP SDK for iOS. These include concurrency support for Swift, new APIs for Apple Watch and AR, filming capabilities, accessibility capabilities, etc.

▼ Building integration

SAP has made great improvements. We have the SAP Build, along with SAP Build Apps, SAP Build Work Zone, and SAP Buid Process Automation. We have over 1,300 use-cases specific workflows. ABAP Cloud is now available with all SAP S/4 HANA editions. We

also have AI capabilities. SAP Business App Studio now runs on VS Code. We have the SAP BTP iOS SDK. We also have the SAP Signavio integration and SAP S/4 HANA and other SAP and non-SAP application data access.

We also need to look at integrations. SAP systems also need to be integrated with the other systems. You need a powerful and versatile solution to handle that complexity. That is, the SAP Integration Suite, as part of SAP BTP. Its main capabilities are process integration, event mesh, cloud integration, API management, etc. We support every type of integration.

Ben Walker, Head of Strategic Partnerships, Barclays Payments, said payments processes are becoming seamless and frictionless as far as possible. Barclays Card utilizes SAP Integration Suite. By doing so, we have allowed more integration. We have created a seamless payment mechanism. We are now providing an integrated solution for all the merchants in the market. We have integrated that with their finance processes.

Mueller said SAP Integration Suite is open, and provides over 200 connectors. There are 2,600 pre-packaged integration flows, and 3,400 APIs. These are available in SAP API Business Hub. We are also providing Community Content on GitHub. Antonio Maradiga, Developer Advocate, SAP, gave a demonstration about the Integration Suite.

Mueller noted that we are also helping you to get into the cloud even smoother. We have three offerings. These are: Migration factory program, asset assessment and migration tools, and free regression test partner tools. You can modernize your integration solutions with SAP Integration Suite. We are also having SAP Integration Suite for Edge Integration Cell Beta. It should be available in the next year. It enables you to run process integration, event integration, and API scenarios in premise and on private cloud. SAP Integration Suite is a market leader having some integration scenarios as community content, secure APIs via API management, and edge integration cell beta.

▼ Data and analytics

Finally, data and analytics! Data should be behind every single decision in enterprise planning. Companies need to take data-driven decisions. Every organization needs to be data-driven. We can help you with data and analytics solutions.

Paul Bray, Finance and Tax Platform Technology Leader, Maersk, said they have been SAP for several years. Data is key to achieve our strategy. Our journey started with SAP from late 2020. We have managed to standardize an error-prone process, with over 1,000 leaders from across the globe. We have stepped up to predictive analytics. We have now become a data-driven company.

Mueller said that SAP HANA Cloud has doubled to +100% for year-on-year of data volume. It supports all security standards, such as encryption, user management, authentication, and data masking. We have double growth of active customers.

Henkel has also benefitted from SAP. SAP HANA Cloud now supports Mongo DB. Imagine the reduction of complexity and improvement of data strategy! Intelligent data apps are being developed by many, using SAP HANA. Team Liquid, for instance, has 5K data points for every match, and 6 million sports matches are imported. There are 30 billion rows of data in SAP HANA Cloud. You can also use this data strategically to analyze any game situation. Witalij Rudnicki, Developer Advocate, SAP, presented on the intelligent data strategy.

Mueller said SAP HANA Cloud now supports Mongo DB Wire Protocol. We are also announcing Flexible Core Memory Ratio. It helps you get more memory. We have also seen 60% growth of active users for analytics.

In SAP Analytics Cloud, we have added an undo/redo button. It was one of the most requested features. We have also added Unified Story into Analytics. It brings together data visualization and app creation. There can be seamless transition to analytical app development. You can easily extend your dashboards with no-code features. Red Bull is very excited with this. They are using it for many mission-critical use cases. ■

The author was hosted by SAP for their SAP TechEd 12022 in Las Vegas

We are seeing the emergence of hybrid multi-cloud world

Pradeep Chakraborty
✉ pcquest@cybermedia.co.in

> Customers are now looking for vendors who can provide simplicity and consistency, security and protection, sustainability and savings, etc. You can speed up the technology and business innovation by leveraging data of your hybrid, multi-cloud estate

NetApp held a roundtable, to update on the industry activities and the NetApp Blue XP.

Puneet Gupta, MD, NetApp India, said India's Internet usage has shot up to 14.1GB per month. India's data center market is expected to grow at CAGR 11-14% during 2022-27. Physical has now been replaced or complemented by digital. Work and IT architectures are now hybrid. They are resilient, agile, and digital. On-prem and public cloud will likely co-exist. There is the emergence of the hybrid multi-cloud world.

NetApp is today well-positioned for success. It has unique partnerships with Microsoft Azure, Google Cloud, and AWS. It is accelerating momentum with 73% public cloud ARR, YoY. Gartner has ranked NetApp as the no. 1 platform for shared storage services. As the industry now

pivots to the cloud, we need to ensure that they do not face any problems. The cloud story is changing, and is now going beyond data.

NetApp has built and acquired some of the best-of-breed solutions. These include Cloud Insights, Spot, StratCloud, Cloud Jumper, instaclustr, Fylamynt, Data Mechanics, etc. NetApp has now become a cloud-led, data-centric software company. NetApp has also had a record year. It expanded cloud partnerships, and has more all-Flash arrays. NetApp already has over 100 customers from Spot.

Today, market leaders are relying on NetApp. The top 10 financial institutes are prime customers. Some others include the top 3 telcos, governance bodies in 10 states, top 6 IT/ITeS companies, 10 cloud-native delivery

aggregators, and startups.

We are now witnessing the evolved cloud, and the emergence of NetApp Blue XP. Blue XP is delivering the industry's leading approach. Sustainability is also built into the product portfolio. We are also focusing on storage efficiency. This includes deduplication, compression, and compaction, leading to 4:1 storage efficiency. Also, Spot by NetApp has suite of products for automating and optimizing the cloud infrastructure.

▼ Hello hybrid multi-cloud

Shuja Mirza, Director, Solutions Engineering, NetApp India and SAARC, said that we have an evolved cloud state. Customers are now looking for vendors who can provide simplicity and consistency, security and protection, sustainability and savings, etc.

You can speed up the technology and business innovation by leveraging data of your hybrid, multi-cloud estate. NetApp is now making the hybrid multi-cloud work for customers. We also have solutions that throttle cyber threats.

NetApp Blue XP is delivering the industry's leading solutions for unified management of hybrid multi-cloud. We leverage a single, unified control plane for the simplicity of management of the data/services of the hybrid multi-cloud. Blue XP provides storage, health, protection, governance, observability, and mobility. Blue XP is now available for customers globally. They are using ONTAP on-prem and also sending data to the cloud.

He gave examples of Narayana Healthcare, where NetApp Cloud Volumes ONTAP provides the management of storage. Another customer, Sleepwell, has improved their data resiliency. NetApp storage delivers rock-solid uptime for critical ERP data. NetApp partnered with Sheela Foam to modernize their storage infrastructure and deliver 24/7 availability. Airtel Payments Bank has also chosen NetApp. With robust underlying infrastructure built on NetApp, Airtel Payments Bank can now support banking services.

Spot is also changing the game for the cloud. India is among the top 5 largest markets for Spot. It has substantial footprint in cloud-born companies. A case study is of Freshworks.

NetApp is now preparing organizations for the future. There are industry trends such as

SHUJA MIRZA, Director, Solutions Engineering, NetApp India and SAARC

data lakes, metaverse, AI/ML, from edge to core to cloud, containers, app modernization, digital transformation, common data plane across data centers and cloud (ONTAP), enterprise social governance, cyber resilience, storage efficiencies, and cloud.

▼ Accelerating growth

Ganesh Arumugam, India Partner Leader, NetApp, stated that NetApp is accelerating growth with shared portfolio using co-innovation. We help develop and promote highly specialized, and services-led partners. We are delivering successful customer value and successful business outcomes. NetApp is accelerating the partners' cloud solutions and customer adoption of cloud portfolio. We are also targeting net new customers.

NetApp's FY24 partner program offers transformative cloud-ready training, promotes partners differentiated by competencies and services, provides flexibility in a single framework, and accelerates growth via progressive tiers.

There are categories available, such as cloud, hybrid cloud, and AI/analytics, where they can provide predictable journeys. NetApp offers integration, that is project-based, keystone, that is subscription or contract-based, and lifecycle, that is project-based + subscription or contract-based. ■

Today's vehicles need more dedicated software development and code-driven systems

Pradeep Chakraborty
✉ pcquest@cybermedia.co.in

With the rise in digitization, increasing automation and new business models, automotive incumbents are making strategic moves to shape the industry's evolution. Incumbent players are implementing a strategic approach towards the industry challenges to get ahead of the inevitable disruption

Advanced technologies are making us all more competitive. Today, we are hearing, and even seeing connected cars. Automotive electrification today drives the use of design IP. Future mobility is getting enabled by sensorization. Also, there is software innovation driving automobiles. There are many such trends happening.

Here, *Anup Sable, CTO at KPIT Technologies*, tells us more. Excerpts from an interview:

▼ How has the experience of software innovation been with automobiles?

Traditionally, automobiles have been mechanical. Over the past 40 years or so, we have seen the gradual introduction of software and electronics technologies that have enabled new features and functions e.g., power windows, antilock braking systems, climate control, etc. Today, the automobile is effectively 'software on wheels.'

The industry megatrends of Connected, Autonomous, Shared and Electric or CASE, demand more dedicated software development and code-driven systems in modern next-generation vehicles. A modern car will have more than 150 million lines of code and the next generation autonomous electric vehicles can have approximately 500 million lines of code. The software sits inside several powerful electronic control units or advanced chipsets where all the processing and computation take place.

Software technology is helping vehicle manufacturers create differentiated products and is also driving innovation. As the role of software and electronics increases in the development of vehicles, so does the complexity. Vehicle manufacturers must now develop deep software competence and electronic capabilities to build next-generation vehicles.

▼ How are cloud services being incorporated/ adopted by the automotive and mobility industry?

The benefits of cloud technology in the automotive companies are well known for providing reliable and scalable vehicles and speeding up time to market. The automotive

ANUP SABLE, CTO at KPIT Technologies

companies are leveraging modern cloud services to create a comprehensive software development methodology—all of which is directly linked with the increased connectivity in the vehicles. Cloud-enabled software management is beneficial for the vehicle lifecycle and is the backbone of connected vehicles to enable new features and user experience. It is beneficial for the following reasons:

Internal system development
External application lifecycles, and
Extended life of the vehicles.

This way, the potential of a car gets better, where performance, safety and comfort can be fixed or upgraded through such cloud-based software updates. These benefits are needed now more than ever. Cloud infrastructure today has enabled a two-way connection for the vehicles, where original equipment manufacturers (OEMs) can access almost all vehicles, including the non-connected vehicles.

Moreover, cloud technologies are not only helpful for the vehicle software integration, but they are also helpful to manage the quantum of data that is generated in such processes. Data is further stored in various cloud-based applications and when

needed, the OEMs can leverage this cloud infrastructure to process, validate, manage the data, and make it available for the engineers across the globe.

▾ How is the connected vehicle market evolving across India?

In India, the connected vehicle is still in its nascent stage. OEMs are ramping up their capabilities to improve connectivity in the cars. Currently, only a few brands have introduced connected cars in India, but it is likely to grow in the coming years. The vehicle with the Connected Car Technology comes loaded with smart features and consumer benefits like advanced navigation systems, safety and security features and infotainment/entertainment services on the go.

Users can experience dedicated EV features, remote commands, and location-based services. They can find the nearest charging stations and service stations, use the safety and security functions, alert services and driver monitoring features. Moreover, the next gen 5G connectivity will improve the technology and connected vehicles will be even smarter and smoother to use.

As per Deloitte's report on connected cars, the Indian connected car market is projected to grow at a CAGR of 22.2 per cent during the forecast period, to reach USD 32.5 billion by 2025 from an estimated USD 9.8 billion in 2019. India's share of connected vehicles is expected to grow as connected vehicles technology becomes more accessible.

▾ When you say that integration of technology into vehicles is the future of the industry, what integration are we talking about?

Software integration is a complex area for the OEMs and suppliers. Currently, the industry is going through a significant shift of enabling Centralized Computing Architecture or developing the brain of the car, where most of the software computing process will be centralized or integrated into a particular chipset inside the vehicle. It will help to enable vehicle functions, including safety, convenience, connectivity, security and driving performance to be upgraded Over-The-Air (OTA) software updates.

After this shift, all the functionalities of the car will be integrated to a centralised chip or a 'supercomputer,' which will have higher processing power and the car will also operate with a higher speed of network, supported by Ethernet.

How complex is it to develop vehicle software today?

Software innovation in the automotive industry is always a critical point for the manufacturers, especially with the growth of software complexity for automotive features. As OEMs, suppliers, and new players across the industry hope to capture critical control points in this new, software-driven value chain, it is more important for the companies to focus on efficiency, security, and safety of the customers.

Automakers that lack sufficient software capabilities may face risks, which could lead to recalls or safety issues like cyber security attacks. Since the overall level of software innovation will not decline, companies must also increase their software-development and maintenance output to deliver the offerings currently required to be successful in the market.

▾ How is software written, tested, and deployed in vehicles?

First, the complex software architecture is created for the given feature or function that is to be achieved and it is modular so that changes can be incorporated in the future. There are different pieces of code written pieces and integrated in high-performance computers. The software development follows the Agile format, where testing and validation is a continuous process in every step of development.

Another trend observed here is virtualisation. Earlier, code used to be written, then flashed on the hardware (ECU) of the vehicle and then tested Now, with the process of virtualisation, a virtual environment is created where the hardware is emulated, the code is tested without the actual physical hardware (ECU). KPIT has developed numerous solutions and accelerators in this domain of virtualisation which saves a lot of time, and the features can be tested and approved even

before putting them in the physical hardware.

▼ What are the key technologies and trends shaping the automotive industry?

With the rise in digitization, increasing automation and new business models, automotive incumbents are making strategic moves to shape the industry's evolution. Incumbent players are implementing a strategic approach towards the industry challenges to get ahead of the inevitable disruption.

Architecture shift – With the introduction of high-performance computers or super computers, complex architecture is being solved with a single software integration. Such architectural shifts are transforming every aspect of the software capabilities in the automotive industry.

Enabling of cloud services – The automotive industry is a leader in leveraging cloud computing services to solve problems. It is changing the industry in every aspect, from using applications, data, and computing services to manage information, communication, and computing. The other aspect of using platforms, such as Internet-based apps and online digital services, is to manage car features and data. The introduction of AI, ML, and data analytics to manage certain car features and data helps to enhance the reliability of the software solution integrated in the vehicle.

Digital Twin – The process of virtualization has a tremendous impact on the automotive industry. With this process, a digital twin of the vehicles can be created with the help of cloud and augmented reality. It helps in software integration processes and in staying connected with automation, even after the vehicles are sold.

Software-defined Vehicles (SDV) – Focusing on the software-oriented solutions, future vehicles will be highly mechatronic intelligent devices and will come loaded with features and new functioning. ∎

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Ashok Pandey
✉ ashokpa@cybermedia.co.in

SMARTWATCH

PTRON
FORCE X11

Price: **₹ 2,799**

O ut of hundreds of smartphone choices, pTron's Force X11 outshines for its price and Bluetooth calling feature. The Indian electronics manufacturer has numerous products in different categories, focusing on budget consumers. It's not only affordability, but the company also adds exciting features to beat the market.

▾ Build and features

The smartwatch has a solid metal alloy body that looks premium. It has a large rectangular 1.7-inch full touch HD 2.5D curved (240x280p) resolution color screen. Force X11 is a slim and lightweight watch with thin bezels but the bottom chin is thick.

On the right side, it has a crown that acts as a button to turn the on/off the watch and go back to the main screen. Navigate the apps and settings easily with a swipe. Just swipe up for notification alerts, down for watch settings like brightness, call connectivity, etc., swipe right for various applications, and swipe left for the watch menu, which is displayed in honeycomb and 9 square formats.

Overall: 8/10

SCORE

PRICE: **9**/10
PERFORMANCE: **8**/10
FEATURES: **9**/10

KEY SPECS
1.7-inch Full Touch Color Display; Bluetooth 5.0; Calling Smartwatch; Heart Rate Tracking; Health/Fitness Trackers; IP68 Waterproof

PROS:
Numerous health and fitness trackers; Solid build metal case; Dedicated sensors; Battery life; IP68 rating

CONS:
Inaccurate cycling and running trackers; Mic and speaker could be better; Outdoor visibility

The watch is packed with Bluetooth v5.0 connectivity, which lets you connect your Android or Apple smartphone. The connectivity range is up to 10 meters without any obstacles. Force X11 is backed by a 250 mAh battery and comes with dual-pin USB magnetic charging.

Having a built-in microphone, the smartwatch lets you receive calls, operate your camera, check messages, and more. Using the watch, you can make calls once given access to your contacts or dial directly as it has a dial-pad that helps to call any number without using your phone. You can accept or reject the call from the watch directly, no need to touch your phone.

Large 1.7"
Full Touch HD Color Display for Clear View

240*280px Resolution | 2.5D Curved Glass | Alloy Metal Frame | Multiple Watch Faces

You can also receive notifications from different messaging apps and read them. The Da Fit app provides details data about your daily activity, like steps, sleep, heart rate, continuous heart rate, BP, blood oxygen and outdoor running, etc. It also has 'Drink Water Reminders' that remind you to drink water after regular intervals, which we need to set in the Da Fit app. You can also control your smartphone camera with this watch. Using the app you can enable this feature and then move your wrist to click the picture.

▼ Performance

The IP68-rated waterproof Force X11 has a fairly evident TFT screen that is smooth to operate, all thanks to the optimization. Brightness is pretty decent, but you might struggle with it on a sunny day in outdoor conditions. The screen is fairly responsive, but the gesture control like the option of 'waking the screen by lifting the wrist isn't always a success.

The UI is pretty clean and navigating the watch features and the setting is quick. The Da Fit App lets you add skins and customize your watch as

per your preference. The Bluetooth connectivity is solid and the built-in microphone eases the calling struggle. No need to touch your phone, you can answer calls and read messages directly.

I used the watch to take calls, with most of the calls, we were fine at both ends but it majorly depends on how I am keeping my wrist. Plus are you ready to publicize your conversation when you are in the office or another place?

The health and fitness tracking features work perfectly, though I noticed a few gaps or shorts with cycling and step counts. It is also packed with heart rate and blood oxygen monitoring that works fine. Overall, though it's not the best smartwatch yet packs numerous features in a small casing, the calling feature is a highlight.

▼ Battery

The company claims to offer a week's battery life with all these features. I used it for more than a month while using all the features, it was able to manage for four to five days. But when I switched to manual heart rate and stopped taking calls, it was able to deliver a week's battery life. ■

Bottomline: The Force X11 is a solid budget smartwatch with premium looks, numerous features, and week-long battery life. The square-shaped watch works perfectly with most of the features just some small glitches but overall performance is satisfactory, for the price you pay.

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