Clouds, services, servers

IT TECHNOLOGIES

Clouds, services, servers

Cloud is an online storage eco-system where the Storage aspect can contain applications such as cloud desktop systems (Internet-based operating system) , store records, host data/internet/business supported services and much more.   
  
  
  
*"Cloud computing has recently emerged as a new paradigm for hosting and delivering services over the Internet. Cloud computing is attractive to business owners as it eliminates the requirement for users to plan ahead for provisioning, and allows enterprises to start from the small and increase resources only when there is a rise in service demand*

there are four types of cloud

* IaaS: cloud-based services, pay-as-you-go for services such as storage, networking, and virtualization.
* PaaS: hardware and software tools available over the internet.
* SaaS: software that’s available via a third-party over the internet.
* On-premise: software that’s installed in the same building as your business.

 In Summary    
  
Cloud can be physical servers hosting a variety of in-house or external service provider based resources for the end device user be it a PC, tablet, smart-phone, developers, designers, even mechanics can use the service. It does this through the following classifications   
  
Public –Pooling of virtual services that provide Storage and resources to everyday users –  (Storage, workloads, virtualisation) avoiding facilitation of costly storage mediums (SD cards in phones/cameras, larger external/internal hard drives on computers and other media such as DVD/Blu-ray optical discs)   
  
Private – Same resources as Public Cloud, however, usually used by one client/customer/business entity. It's not shared with others outside of the infrastructure. This provides the possibility of on-premise Cloud in a data centre, at higher cost needing physical servers, and management of the equipment.   
  
Hybrid-cloud – Generally purpose-built Private/Public combination cloud services. Examples of providers that utilise this type of service

Top 5 Hybrid Cloud Providers:

* Amazon
* Microsoft
* Google
* Cisco
* NetApp

NetApp provides on tap storage, mainly for businesses, Cisco focuses on security, networking, and governance. Amazon provides on-demand virtualisation primarily as well as Storage (think of an appliance) Microsoft provides Storage and is a competitor to Amazon with its Azure service. In the future, I believe Cloud will be the more prominent default storage option and also provide a virtualised desktop on the move which people will be able to access from just about any machine and integrate storage cloud solutions into this. Applications, files, desktop settings, preferences – basically everything is available to the person with far less risk of things going wrong.

So in summary – Cloud is a service requiring the use of higher-end computing servers either on-premise or remotely accessed providing a convenient means of storing information that can be accessed anywhere with an internet connection. This is what makes it all possible, faster bandwidth. Cloud would not have thrived in the days of Napster, Lime-wire and 56K Dial-up Internet when Operating systems struggled to run basic software without crashing at the best of times.  Corporations can use the cloud to spin up servers, manage IT costs - host applications on cloud servers rather than use ancient localised applications that need constant patching and updating. Maintenance is much easier. Machines can quite literally be cloned in a matter of minutes and spun up remotely. Essentially cloud has improved convenience with a huge margin. Gone are times where you need to stick an operating system DVD in the drive, rackmount a heavy server on a trolley struggling to carry it in and go through a huge amount of setup to get things going. Storage isn’t relegated to localised disks, you can add virtually as much storage as you need with a few clicks.   
  
If a power supply dies in your rackmount for a primary server and the disks go with it, it’s countless hours staying overnight to correct the issue to raise the uptime. Cloud services don’t face this issue as there are layers of redundancy. A range of sectors can use it and I see this emerging even more.

What is the likely impact?

Speaking from personal experience through my workplace - The likely impact of using cloud services is reduced cost and increased availability. During the production of business, this means there is a cost-saving the accountant doesn’t put on the books because it is not as quantifiable as the actual cost savings which are. That is money not expended in resources and time leading up to standing up a cloud service means that any time or production loss that would have otherwise been spent waiting for physical hardware to arrive for installation.  
  
It’s not unimaginable to have a windows 2016/2019 server ready for deployment and role assignment within an hour or two.

Jobs will open up in other areas of Information technology requiring the use of trained staff, which may also need a better understanding of networks, virtualisation, IT Security and any other specialised aspects of applications in use demand it.   
  
The next saving in the overall picture is reliability. Larger hosts have geographic redundancy built in. These companies have service level agreements. It may be possible that more companies utilise SaaS cloud solution in order to move away from legacy mainframe applications. There are still some companies hanging onto very old programs and by having it all migrated to the Cloud can help reduce the cost of maintaining such archaic systems (Example – Telstra are known for using Oracle Siebel as their front end program that interfaces with Old VMS Applications that originated on Windows 3.1 and even before this in the ’90s90’s. Some of those systems date back to IBM 370 mainframes and required emulation up until much later on! This would benefit a SaaS cloud solution!

How will this affect you?

being able to access applications as an IT Tech  means tha it’s possible access your custom administrator desktop with a horde of services available at your fingertips / mouse clicks  from any site, anywhere, anytime need to solve problems you may be facing. For me, I will be able to leverage the Cloud to save my work everywhere between places and have access to my software without needing to carry the same PC around – I can visit a friends house and get my work or study done. Google Docs, OneDrive, iCloud make this possible. I can store code / scripts / libraries of software if I need to. The fundamental requirement is a stable internet connection.  By businesses being able to leverage this type of resource by saving money the end user of many services (health care/industry / retail/telecommunications) will wait less time on the phone once more businesses absorb cloud resourcing. People relying on cloud to store more files, pictures, applications mean that there is less reliance on the local device and more on the remote server. This means in some shape or form there should be less landfill from the need to discard old USB thumb drives, discs, mechanical hard drives - e-waste should be reduced. So this benefit is environmental. I now don’t need to carry a bunch of USB sticks around, I have the images stored in the cloud for deployment over the network now.   
  
 *“In addition to the technological and financial benefits of cloud computing, there are often environmental benefits that are overlooked. It reduces energy consumption, waste, and carbon emissions”*

So this now also means that where companies move to renewable energy sources for data centres it will also reduce the carbon footprint. Looking at examples of Service based cloud - we have Google Apps, DropBox, Slack, Discord which are all cloud based. Platform as a service with Azure mean that I can essentially start up a windows server , assign it roles - download my scripts from the cloud and have it up and running much quicker than if it was a hardware order from a supplier.    
  
Everyone benefits from cloud, with the main concern being IT Security which is another topic altogether but there are concerns around this (DDos Attacks, insecure servers, account hijacking….. to name a few)   
  
For me Cloud has been quite a life saver at times - being able to just grab my work on the go. I’d just like to see operating systems involve cloud more deeply with software licensing (Microsoft 365 is a good example of this happening) so that way not only your files move with you but the software does too.

CITATIONS for in-text and research shown/provided.

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Cyber Security

**What does it do? (600 words)**

Cyber Security is the process of defending computers , servers , mobile devices , electronic systems , networks and data from malicious attacks . Cyber Security is also known as information technology security or electronic information security . Cyber security can be further divided into types of security .

Network Security - Securing a computer from network intruders .

Application security -Securing software and devices .

Operational security - The processes and decisions for handling and protecting data assets

Information security - Integrity and privacy of data .

Identity management- The process of understanding the access every individual has in an organization

Disaster recovery - How an organization deals with a cyber security breach and how it can recover .

User Education - Teaching users good security practices .

Types of cyber threats cyber security is designed to prevent are :

Cyber Crime - Targeting systems for financial gain or to cause disruption .

Cyber Attack - Information gathering usually politically motivated

Cyber Terrorism - Undermining electronic systems to cause panic and fear .

The most common types of cyber threats are:

Malware - Malicious software

SQL injection - Structured Language Query injection is where a user takes control of and steals data from a system .

Phishing - Targets users with emails that appear from a legitimate company asking for sensitive information .

Man in the Middle - Interception of communication to steal data .

Denial of service - Prevents a computer system from fulfilling a legitimate request by overwhelming networks and servers with traffic.

We’re living in a far more technologically-advanced world than we were a decade ago.Consider the fact that the iPad has only been around since 2010, and the iPhone only came out a few years before that. Average broadband speeds have increased by roughly five-fold in the last decade, making it possible for businesses and individuals to do far more online. This has facilitated the rise in cloud services, working from home and massive amounts of data being thrown back and forth .Businesses and individuals now take for granted such things as easy online document sharing, email that’s available on every device, and databases being accessible from everywhere.

The most difficult challenge in cyber security is the ever-evolving nature of security risks themselves. Traditionally, organizations and governments have focused most of their cyber security resources on perimeter security to protect only their most crucial system components and defend against known threats. Today, this approach is insufficient, as the threats advance and change more quickly than organizations can keep up with. As a result, advisory organizations promote more proactive and adaptive approaches to cyber security. Such as a shift toward continuous monitoring and real-time assessments, a data-focused approach to security as opposed to the traditional perimeter-based model.

Nobody can tell exactly what the next major cyber threat will be or where it will come from, but experts still have a good idea of the general direction that we’re heading in. AI systems are sure to become a major target for hackers when more and more companies start to use them. In response, future cybersecurity software and personnel will be forced to develop techniques to detect and counteract AI corruption attacks. Many now believe that cyberwarfare, where one nation hacks or embeds viruses in the computer systems of another, will become the frontier on which wars are fought around the world . There is good reason to believe that the number of people with the skills and motivation to hack legitimate systems will grow in the future as education improves all over the world as the potential pays off are large. Companies around the world are continuing to expose themselves to cyber risk by continuing to use vulnerable legacy technology. Usually, this is done to save money or because the business doesn’t recognize the security benefits offered by upgrading.

**What is the likely impact? (300 words)**

It’s estimated that the global cost of cybercrime for 2017 added up to around $600 Billion. With the number mounting up every year, and by 2021 experts are suggesting a figure of up to $6 Trillion per year.

54% of companies have had their network or data compromised in 2016 . The average cost of recovering from a cyber attack, is around $5 Million for a large company . 60% of small businesses who experience a major cybercrime incident go out of business shortly after.One particularly chilling statistic is that there are now over 4000 hacks every single day using ransomware alone. It’s extremely misguided for anyone to think they can't be affected.

Antivirus software is still an essential part of IT security , but it’s not enough on its own to protect from modern threats. Technical teams need many more tools, resources and solutions, and some of them are expensive. However, they’re not likely to be as expensive as the cost of recovering from a cyber attack.

It’s no longer realistic to expect an IT department to mitigate every IT security risk as many modern cyber security threats originate from social engineering, user error, exploits to web browsers, and other things that technical teams can only do so much to protect you from. Cyber security is something everyone needs to take notice of, and a huge number of incidents are caused by people ignoring IT advice such as avoiding clicking on suspicious links and maintaining secure passwords . Another good example of why cyber security isn’t merely a technology issue is how easy it is for any one in any department to cause a data breach. A breach can happen by something as simple as a distracted employee leaving an unencrypted personal device on a bus on the way to work. Everyone needs to be aware of the implications of not using cyber security .

**How will this affect you? (300 words)**

Cyber Security affects companies and big businesses so does it affect me , my parents or friends? You don't need to be a big company or big business to be targeted , breaches in personal cyber security can result in hackers claiming your financial information, work files, and even more personal information like photos and social media messages. Bad credit ratings, an inability to access your computer, or even total identify theft. If you're online you can be targeted from your emails , gaming passwords , social media and internet banking to name a few , cyber security affects Everyone in everyday life . 47.1% of Australian homes have more than five smart home devices connected, according to the Avast Smart Home Report 2019. At least 33.4% of these include at least one vulnerable connected device, this has the ability to compromise the entire home network’s security.

Currently, Australia’s cyber security workforce is short of approximately 2,300 workers, with the country needing up to 17,600 additional cyber security employees by 2026.

What can you do to increase your own security and make it harder to be targeted ?

A few simple steps can be made every time you log on :

Passwords - Big security organizations cannot protect consumers against phishing or hackers who can guess passwords like “1234.” Common sense and password hygiene can go a long way to protect you from cyber threats.

Websites- Be careful about which websites you go to , a lot of well known websites have additional security attached to make it harder to gain your information , but a dodgy website won't have the same security , some are even designed to steal your information by asking personal questions , which they can use themselves or sell/pass on to someone who will use that data for their own gain .

Anti-virus software - Subscribe to anti-virus software and keep your system up to date with automated, scheduled scans.

Phishing attacks - Be careful about opening file attachments. Phishing and spear phishing emails are ones that look real but are not. if you pay attention. For instance, if you get an email that says “past due invoice” with a PDF attachment, don’t open it unless you are 100% sure you know who sent it. If you double check, you’ll probably see it comes from an unusual email, like this one, from anny234526426@gmail.com .

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Blockchain + Cryptocurrencies

What does it do?

Blockchain is a public electronic ledger that is primarily built around a peer-to-peer system that is open to everyone and can show transaction history. As a transaction is made, a new block is created and has all the details of what was done but a link to the prior block to show the history of the purchase. Blockchain technology has a process called Proof or work, this is mainly in Cryptocurrency, this slows down the transaction so nothing can be doubled or corrupted in the process. Each block has 3 main points about them: Data, Hash, Hash of the previous block. Blockchain technology cuts out the middle-man costs like transaction charges on card fees and does not have a turnaround time when transfer funds (Cryptocurrency).

Right now, with Blockchain you can, transfer cryptocurrency, transfer money, certify a supply chain i.e. Walmart, De Beers, and many other things. The state of which blockchain is in right now is unsure, people and companies around the globe are unsure on how it will go in the future and the privacy around what other people can see. Transactions take a while and there are some technologies around that do similar, if not the same as Blockchain. The different types of blockchains are: Private, Public, Federated and Hybrid.

Within a few years we could see Cryptocurrency and Blockchain technology take over the world with transactions like buy music or a book or ride-sharing apps, companies like Uber and Spotify could take a massive hit in the way we get around and artists making more of the money not just a small profit from how many listens/views per song. Major financial institutions will be using this type of technology to help with security and make transactions a smoother and faster transition from person to person.

Currently, blockchain is being tested with proof on concepts (POCs) in many different industries around the world. Providers, like IBM and R3. Both these companies are leading the way of blockchain technology, focusing on financial assistance and healthcare. Blockchain is the way for a massive improvement for security for business’s and financial companies moving forward. The Security benefits from blockchain is not something to pass up. The top developments for blockchain are:

Blockchain as a Service (BaaS) – is a new trend that is allows users to develop digital products, smart contracts, decentralized applications (Dapps). Large companies like Amazon and Microsoft are using this service. Corda is an open source blockchain platform allows companies to make transactions and privately do so using smart contracts.

Federated Blockchain – This is the opposite of what a public blockchain is and is also known as permissioned blockchain, this service will allow a company to provide a more upgraded version of the basic blockchain model and companies can have a more personal and customizable blockchain for their users.

Social Networking – a large populist of the world uses social media, blockchain technology will assist in solving problems related to scandals, privacy violations. One task for social media platforms would be the privacy laws like GDPR.

Financial – Blockchain and Cryptocurrency are successful in the way transactions are done online, financial institutions have already begun to consider the use of blockchain technology for lower cost transactions and improved secrecy.

IoT (Internet of Things) – Devices and IoT network hacking will become commonplace it is up to the network operators to stop intruders from causing massive problems with a company or service. IoT is a massive target for cyber-attacks and blockchain technology can assist in stopping or slowing this problem down dramatically.

What are the likely impacts?

The impacts moving forward in to the future will be a positive improvement to the security around the globe and less shady business going on, due to most of the information being public, it becomes more transparent for the individual or company to see what’s going on. With cyber security this will make the job easier on blocking unauthorized charges and hacks on what they are protecting, having a centralized service can be susceptible to loss of data and hacking but using blockchains decentralized system will allow everything to be stored in the cloud with great protection against hacking

Change will come with blockchain and smart contracts around transactions with money and cryptocurrency. The impact of blockchain technology within the finance industry will see less banks in a physical location and might even see some of the smaller bank institutions fall under, due to the possible rise of cryptocurrency. Blockchain being implemented in crowdfunding and charities will become easier to see who would be truer to their word over others, seeing the money you donate going to the right place is what everyone what’s. The healthcare system would benefit from the private blockchain technology so no matter where you are in the world, you have your medical record with you. This allows you to not be given something you are allergic to in an emergence situation or medication that you need to top up on if you run out while in another country.

This will create more jobs around the IT department to help maintain the security and any issues that might arise because anything can be penetrated with the right knowhow, this will see a massive rise in the cyber security job market. This will replace a lot of jobs for cyber security and IT jobs and will make some job roles redundant due to this. It will not completely make financial institutions redundant due the incorporation of blockchain technology within their systems, allowing them to keep with the current trend of security and what the market is wanting and needing.

How will this affect you?

Blockchain technology will affect everyone’s day to day life, this could be in a small or massive way. This could be from banking to investing to buying produce. It is not affecting myself or any of my friends and family but to the people who invest in cryptocurrency or using a bank that has invested in blockchain with the company for extra security and the benefits of it. One day I might have a look at investing and buying cryptocurrency I would be making sure I am update to date with the current trends and what state blockchain technology is in, it’s hard to say the direction but it’s going in a very positive way as we speak and write this.

Transferring money now for myself, is terribly slow, going between two banks. If I try and do anything after 6pm, the money will not transfer till the next day around midday, but if I do it between 9am-4pm its almost right away. Blockchain would eliminate the transfer time during the closing hours of the financial institutions. When family transfers me anything it takes almost 2 days before I receive the money due to being with a different financial institution, makes this difficult when buying gifts for family or friends.

The day I want to propose to my partner the ring I buy with diamonds or any type of gem, being able to see where the gem is from and the tracking of it to make sure its authentic. In the world a lot of people get scammed by not having real gems in rings or jewellery, they are not happy about this but with blockchain technology with supply tracking will negate scammers from passing it off as real when it is not. The same can be said for food, being able to see where and who is selling the food to the shops, this could be fresh food or snap frozen food like fish. Being able to see the tracking of items like this puts minds at ease knowing its responsibly sourced.

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Robots

**What does it do? (600 words)**

Robot comes from the Czech word “robota” which means “forced work or labor.” We use the word "Robot" today to mean any man-made machine that can perform work or other actions normally performed by humans, either automatically or by remote control. Robotics is the science and study of robots.

Roughly half of all the robots in the world are in Asia, 32% in Europe, and 16% in North America, 1% in Australasia and 1% in Africa. 40% of all the robots in the world are in Japan, making Japan the country with the highest number of robots.

Robots can be made from a variety of materials including metals and plastics. Most robots are composed of 3 main parts:

The Controller ‐ also known as the "brain" which is run by a computer program. Often, the program is very detailed as it gives commands for the moving parts of the robot to follow.

Mechanical parts ‐ motors, pistons, grippers, wheels, and gears that make the robot move, grab, turn, and lift. These parts are usually powered by air, water, or electricity.

Sensors ‐ to tell the robot about its surroundings. Sensors allow the robot to determine sizes, shapes, space between objects, direction, and other relations and properties of substances. Many robots can even identify the amount of pressure necessary to apply to grab an item without crushing it.

All of these parts work together to control how the robot operates.

It’s not easy to define what robots are, and it’s not easy to categorize them either. Each robot has its own unique features, and as a whole robots vary hugely in size, shape, and capabilities.

Aerospace: This is a broad category. It includes all sorts of flying robots and robots that can operate in space, such as Mars rovers.

Consumer: Consumer robots are robots you can buy and use to help you with tasks and chores. Such as a Roomba vacuum, AI-powered robot assistants, and a growing variety of robotic toys and kits.

Disaster Response: These robots perform dangerous jobs like searching for survivors in the aftermath of an emergency.

Drones: Also called unmanned aerial vehicles, drones come in different sizes and have different levels of autonomy. Such as military systems like Global Hawk, used for long-duration surveillance.

Education: This broad category is aimed at the next generation of roboticists, for use at home or in classrooms. It includes hands-on programmable sets from Lego, 3D printers with lesson plans, and even teacher robots.

Entertainment: These robots are designed to evoke an emotional response and make us laugh or feel surprise . such as the robot comedian RoboThespian.

Exoskeletons: Robotic exoskeletons can be used for physical rehabilitation and for enabling a paralyzed patient to walk again. Some have industrial or military applications, by giving the wearer added mobility, endurance, or capacity to carry heavy loads.

Humanoids: Robots which are designed to look like humans.

Industrial: Robots that mainly consist of a manipulator arm designed to perform repetitive tasks. such as systems like Amazon's warehouse robots and collaborative factory robots that can operate alongside human workers.

Medical: Medical and health-care robots include systems such as the da Vinci surgical robot and bionic prostheses, as well as robotic exoskeletons.

Military & Security: Military robots are used to replace the human need on the battlefield , either fighting or logistics .

Research: The vast majority of today’s robots are born in universities and corporate research labs. Though these robots may be able to do useful things, they’re primarily intended to help researchers .

Self-Driving Cars: Many robots can drive themselves around, and an increasing number of them can now drive you around.

Telepresence: Telepresence robots allow you to be present at a place without actually going there. You log on to a robot avatar via the internet and drive it around, seeing what it sees, and talking with people. Workers can use it to collaborate with colleagues at a distant office, and doctors can use it to check on patients.

Underwater: consisting of deep-sea submersibles, diving humanoids and bio-inspired systems .

As it is increasingly common for people to use or come into contact with robots in various situations at home and in retail stores, hotels and hospitals ,commercial and industrial robots are now in widespread use performing jobs more cheaply or with greater accuracy and reliability than humans. They are also employed for jobs which are too dirty, dangerous or dull to be suitable for humans. Robots are widely used in manufacturing, assembly and packing, transport, earth and space exploration, surgery, weaponry, laboratory research, and mass production of consumer and industrial goods.

Increasingly sophisticated machines may populate our world, but for robots to be really useful, they’ll have to become more self-sufficient. After all, it would be impossible to program a home robot to contend with every single situation it could come across , the robot would need to learn on its own and be able to adapt to the new situations it could face and that is where advances in artificial intelligence come in.

but with more advanced and sophisticated AI ,comes the questions of what ethics , morals and judgements might govern robots' behavior and if by extension robots might be able to claim any kind of social, cultural, ethical or legal rights as a construct that can think on its own.

**What is the likely impact? (300 words)**

As Robots become more and more common in workplaces, people are getting more worried about their chosen careers, I came across several websites dedicated to answering just that question. "<https://willrobotstakemyjob.com/>", "<https://www.replacedbyrobot.info/>".

According to a new study from Oxford Economics, within the next 11 years, there could be 14 million robots put to work in China alone.

Economists analyzed long-term trends around the uptake of automation in the workplace, noting that the number of robots in use worldwide increased threefold over the past two decades to 2.25 million.

While researchers predicted the rise of robots will bring about benefits in terms of productivity and economic growth, they also acknowledged the drawbacks that were expected to arise to job loss and unemployment.

A recent example of human replacement involves Taiwanese technology company Foxconn who announced a three-year plan to replace workers with more robots. At present, the company uses ten thousand robots but will increase them to a million robots over the next three years.

Companies etc can only make money if they have someone to sell their goods to. This means that companies will eventually realize that automation doesn’t really benefit them as much as they first thought. They need customers with money if they want to make money themselves. Mass unemployment because of Robot's will have to involve some kind of redistribution of income that decouples it from work. Or a total rethinking of what “work” is. Or even a total rethinking of what wealth is in terms of buying or selling. The scariest thing is the fact that all these things WILL happen in our lifetime to a bigger or lesser degree, but its something governments and policymakers need to be prepared for and making decisions towards the best outcome for their populations before this happens.

**How will this affect you? (300 words)**

With the changes in the number and use's of robots in the industrial and civil sectors, the changes that I can see will be far more beneficial than detrimental. Some of the benefits I can see are that mass-produced goods and foods items should become cheaper as overheads drop in price due to a lot of the labour etc being conducted by robots. Household chores should be reduced as robots clean and maintain households mowing lawns, mopping floors and vacuuming freeing up a lot more time for relaxation and entertainment. We currently have a Roomba vacuum which we use 3 times a week while at the moment it doesn't do as good a job as a human vacuuming it won't be long before there are versions that can do as good a job if not better considering we have owned it for over 15 yrs. Having self-driving cars would mean you can go to parties and drink not having to worry about driving over the limit, driving would be far safer and long trips you wouldn't arrive tired due to having to drive yourself. Using exoskeletons would help with moving up and down stairs as currently, my parents find it difficult at times. The use of drones to transport goods around the country will become more sustainable, as well as robots being used in mail systems meaning it will be quicker to send and receive parcels and mail.

While we will eventually rely more and more on robots there will always be situations where the human brain will be far better at making choices, meaning that I see robots as a tool to help humans not to completely take over our lives or replace us in every job.

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