Website Design Synoptic

Task 1

Web Server:

What it is:

A specialised computer system called a web server is set up to store, process, and deliver web information, including HTML pages, pictures, videos, and other files. It reacts by transmitting the requested data after listening for incoming requests from users' browsers.

How to utilise it: One or more web servers host the MCAST website. The server receives the request when a user types the website's URL into their browser, processes it, and then provides the relevant web pages, multimedia, or application content. The web server effectively handles several concurrent connections to provide dependable and quick access.

Web hosting:

What it is:
The technology and infrastructure required for a website to be reachable online are provided by web hosting. Server space, bandwidth, security, and frequently other services like databases, content management systems, and email accounts are all included.

How it works: MCAST depends on a web hosting company to look after the servers that house the databases and website files. This hosting guarantees that the website is up and running around-the-clock with little downtime and offers the security and performance capabilities required to manage user traffic, particularly during busy periods like open days or enrolment periods.

IP Adress:

What it is:

Every internet-connected device is given a unique numerical identity known as an IP (Internet Protocol) address. IPv6 addresses are lengthier alphanumeric sequences, whereas IPv4 addresses are expressed as four sets of integers separated by dots (e.g., 192.168.1.1).

Use: The MCAST website is hosted on a server with a unique IP address. DNS converts this human-readable address into the IP address of the server when users type the domain name into their browsers. By enabling proper internet packet routing, this translation guarantees that customers arrive at the appropriate page.

Domain Name:

What it is:

A memorable, approachable address that corresponds to an IP address is called a domain name. The objective of the organisation or website is usually reflected in it, as in "mcast.edu.mt" for the Malta College of Arts, Science, and Technology.

How to use it: To visit the website, users input the domain name into their browser. The browser can then connect to the appropriate web server hosting the MCAST website after the domain name system (DNS) converts this into the appropriate IP address.

DNS (Domain Name system):

What it is: DNS converts domain names into IP addresses, serving as the internet's address book. This lookup procedure is effectively carried out by a dispersed global network of DNS servers.

How it works: The DNS system swiftly resolves the domain to its corresponding IP address when a user types "mcast.edu.mt" into their browser. This enables the browser to connect to the appropriate server and load the website.

HTTP/HTTPS protocol:

What it is:

Data is transferred between web servers and browsers using the HTTP (Hypertext Transfer Protocol) and HTTPS (HTTP Secure) protocols. The secure version, HTTPS, uses encryption to safeguard data.

How to use it: The MCAST website is HTTPS, meaning that SSL/TLS protocols are used to encrypt all data sent between your browser and the website. This guarantees that bad actors cannot intercept or alter sensitive data, such as payment information, login credentials, or personal information.

SSL/TLS certificate:

What it is:

Digital certificates issued by a reliable Certificate Authority (CA) are known as SSL (Secure Sockets Layer) or TLS (Transport Layer Security) certificates. It allows encrypted connections and confirms the legitimacy of the website.

How it works: "https://" in the URL and a padlock icon in the browser address bar signal that an SSL/TLS certificate is placed on the MCAST website, encrypting all data sent between the user and the server. By guaranteeing that user interactions are secure and private, this increases user trust.

2. Internet Services

a) Domain name system (DNS)

Operation:

The DNS is basically the domain name of the website. In this case its Mcast.edu.mt.

How it works:

- The CDN uses several geographically separated servers to pre-cache the MCAST website's static assets.
- The CDN determines the user's location and retrieves material from the nearest server when a user requests a web page.
- Overall, the CDN speeds up content delivery and lessens the strain on the primary server, however dynamic content that cannot be cached is still served straight from the origin server.

Its value:

- Enhanced User Experience: By reducing page load times, students and staff experience smoother and more responsive access to the MCAST website, regardless of their geographic location.
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- Overall, the CDN speeds up content delivery and lessens the strain on the primary server, however dynamic content that cannot be cached is still served straight from the origin server.

One improvement:

Install more localised edge servers: MCAST could work with CDN suppliers to set up additional edge servers in Malta and the surrounding areas to further optimise load times, particularly for users in distant or underserved locations. This would enhance access speed during peak hours and considerably reduce latency.

Internet services

1. Content Delivery Network (CDN) Function: A CDN uses a global network of edge servers to cache and deliver static assets (such as images, CSS, and JavaScript). Instead of coming from the origin server, these files are served from a nearby edge location when users visit the MCAST site. Page load times are accelerated and latency is decreased as a result.

Worth:

For users: improved user experience due to quicker access to site resources, particularly for large or bulky assets like photos.

For administrators: enhances resilience against traffic spikes or small outages, lowers bandwidth costs, and lessens the strain on the origin server.

One improvement: use HTTP/2/Brotli compression or Edge-side dynamic caching for HTML/API responses rather than just static files. Even for dynamic material, this would further increase loading speeds and save bandwidth.

2. Microsoft Azure Active Directory

(via connectivity with Office 365 and Microsoft Teams)

Function: MCAST's main synchronous learning platform is Microsoft Teams, which is connected to Office 365 accounts and Azure AD for chat, video conferencing, and authentication.

Value:

For users (staff and students): easy access to calendar, email, and Teams services with a single login provided by the school.

For IT administrators: safe provisioning across many services, streamlined access control, and centralised identity management.

One Improvement: integration of Single Sign-On (SSO) with SAML/OAuth across MCAST platforms, such as Moodle and Classter, allowing users to access all administrative and learning systems with a single login and eliminate the need for frequent authentication questions.