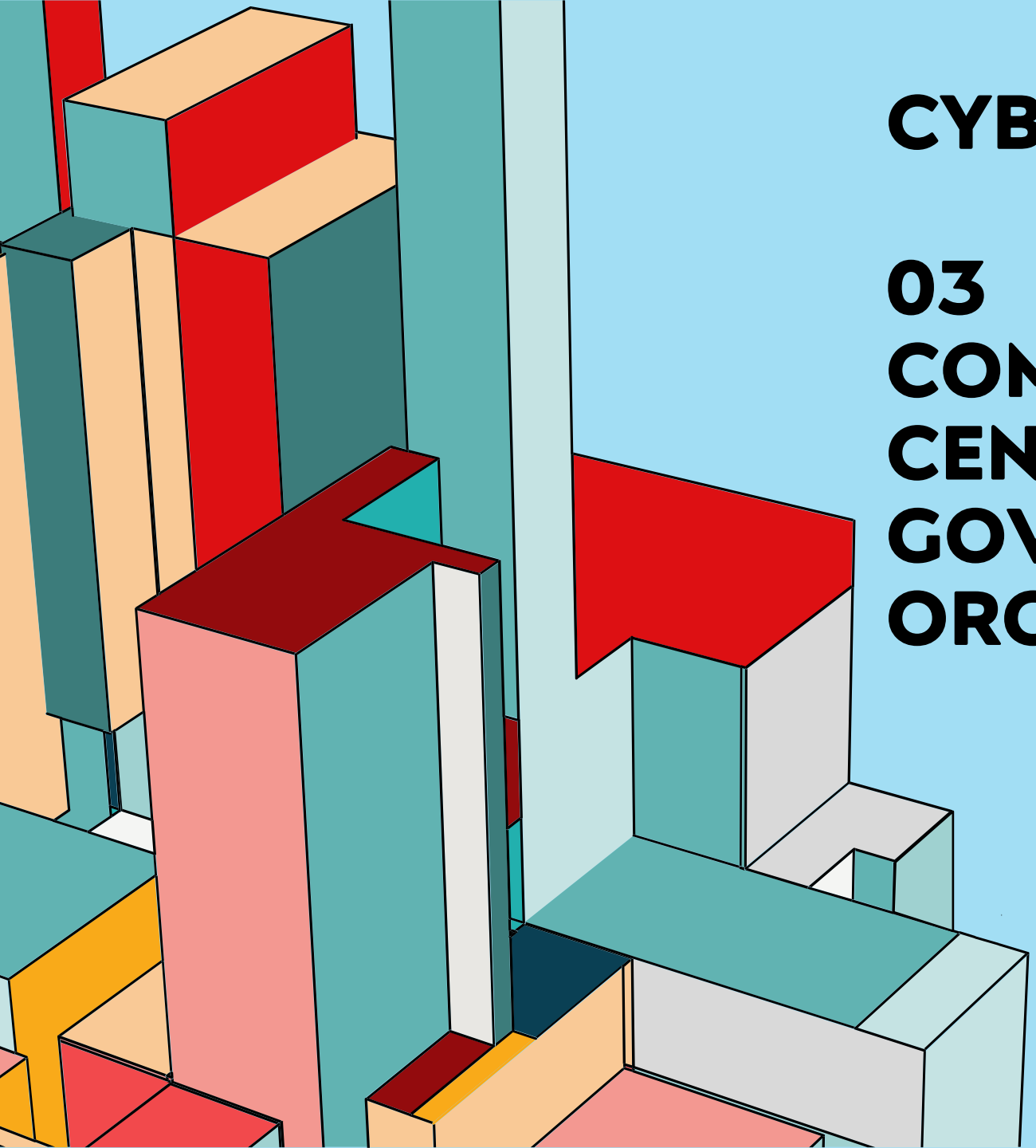

CYBER SECURITY

03
COMMUNICATION, DATA CENTRES AND INTERNET GOVERNANCE & KEY ORGANIZATIONS

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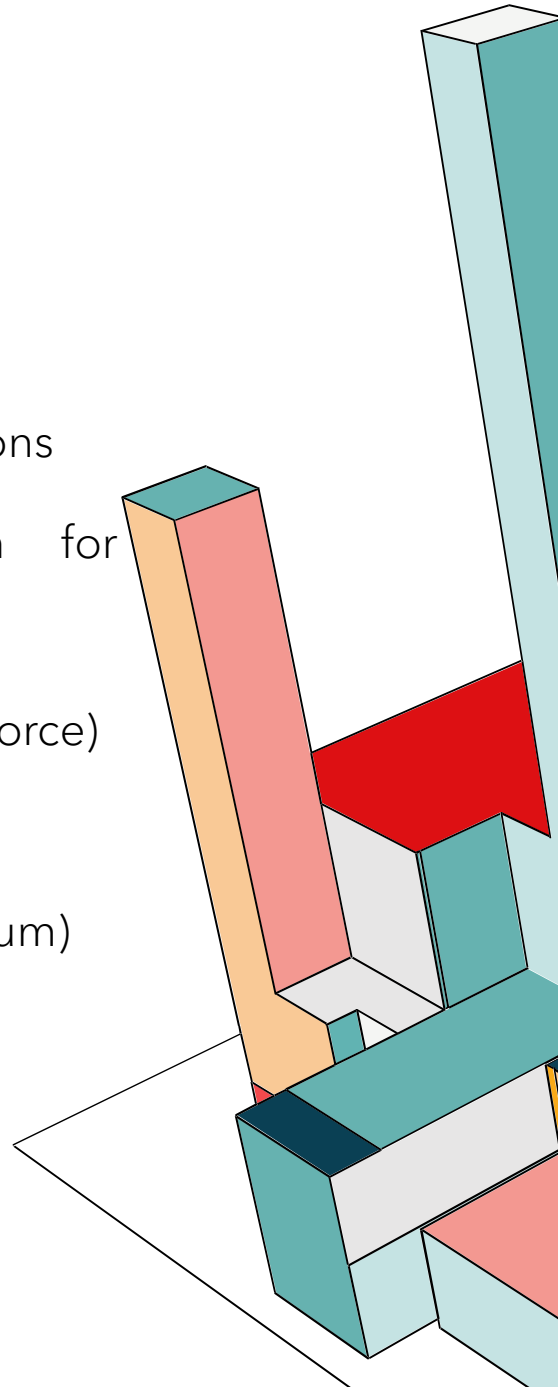
AGENDA

- Basics of Communication Technology
- Data Encoding and Modulation Techniques
- Uniform Resource Locator (URL)
- Data Centres
    - Types of Data Centers
- Servers
- Content Delivery Networks (CDNs)
- Internet Exchange Points (IXPs)
- Internet Governance & Key Organizations
    - ICANN (Internet Corporation for Assigned Names and Numbers)
    - IETF (Internet Engineering Task Force)
    - ISOC (Internet Society)
    - W3C (World Wide Web Consortium)
- Regulation of Cyberspace



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BASICS OF COMMUNICATION TECHNOLOGY

- Communication technology involves the transmission of data between devices.
- Key components: transmitters, receivers, and transmission mediums.
- Types of Communication Networks
  - Wired Networks: Use physical cables (e.g., Ethernet).
  - Wireless Networks: Use radio waves (e.g., Wi-Fi, Bluetooth).

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DATA ENCODING AND MODULATION TECHNIQUES

- Encoding: Conversion of data into a specific format.
- Modulation: Process of varying a carrier signal to transmit data.
- Internet Infrastructure
    - Comprises various hardware and software components.
    - Includes routers, switches, servers, and communication protocols.

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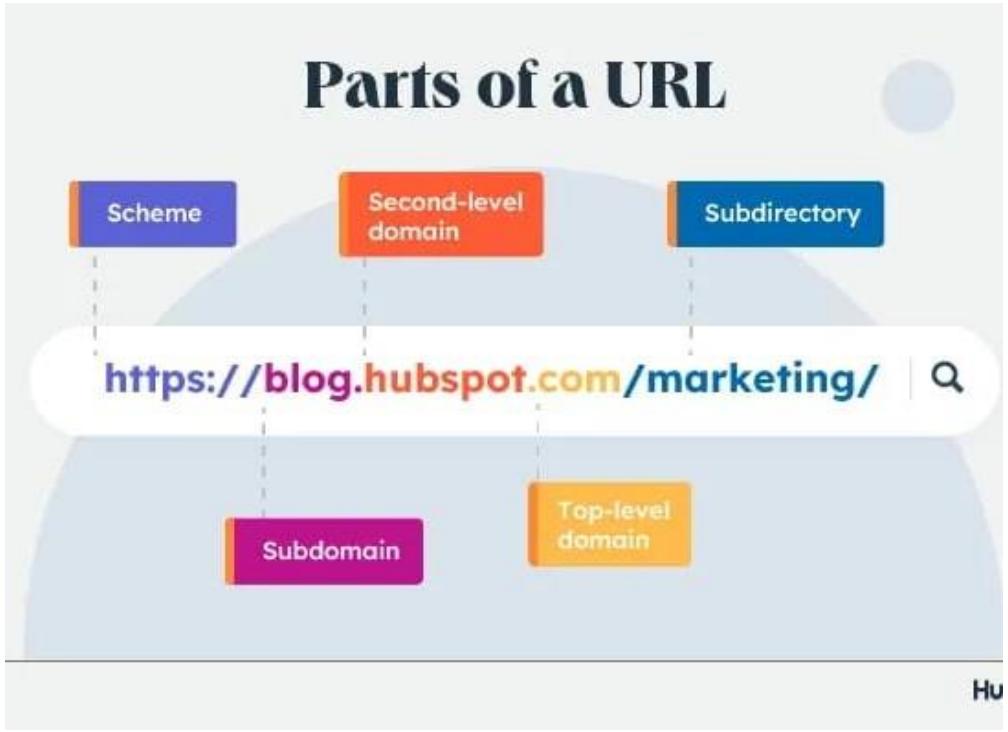
UNIFORM RESOURCE LOCATOR (URL)

- A uniform resource locator (URL) is the address of a specific webpage or file (such as video, image, GIF, etc.) on the internet
- The address of a resource on the web.
- Structure: protocol, domain name, path, and query string.



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DATA CENTRES

- A data center is a building, a dedicated space within a building, or a group of buildings used to house computer systems and associated components, such as telecommunications and storage systems

- Facilities housing networked computers and storage.
- Critical for hosting websites, applications, and data services.

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TYPES OF DATA CENTERS

- Enterprise Data Centers: Owned by individual organizations.
- Colocation Data Centers: Shared facilities managed by third parties.
- Cloud Data Centers: Operated by cloud service providers (e.g., AWS, Google Cloud).
- Google Data Centre
  - https://www.youtube.com/watch?v=XZmGGAbHqa0
- Google Data Centre Security
  - https://www.youtube.com/watch?v=kd33UVZhnAA

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SERVERS

- Computers that provide services to other computers (clients).
- Types include web servers, application servers, and database servers.

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CONTENT DELIVERY NETWORKS (CDNS)

- Distribute content across multiple servers to reduce latency.
- Enhance user experience by delivering content from the nearest server.
- A content delivery network (CDN) is a geographically distributed group of servers that caches content close to end users. A CDN allows for the quick transfer of assets needed for loading Internet content, including HTML pages, JavaScript files, stylesheets, images, and videos.
- The popularity of CDN services continues to grow, and today the majority of web traffic is served through CDNs, including traffic from major sites like Facebook, Netflix, and Amazon.
- https://www.cloudflare.com/learning/cdn/what-is-a-cdn/

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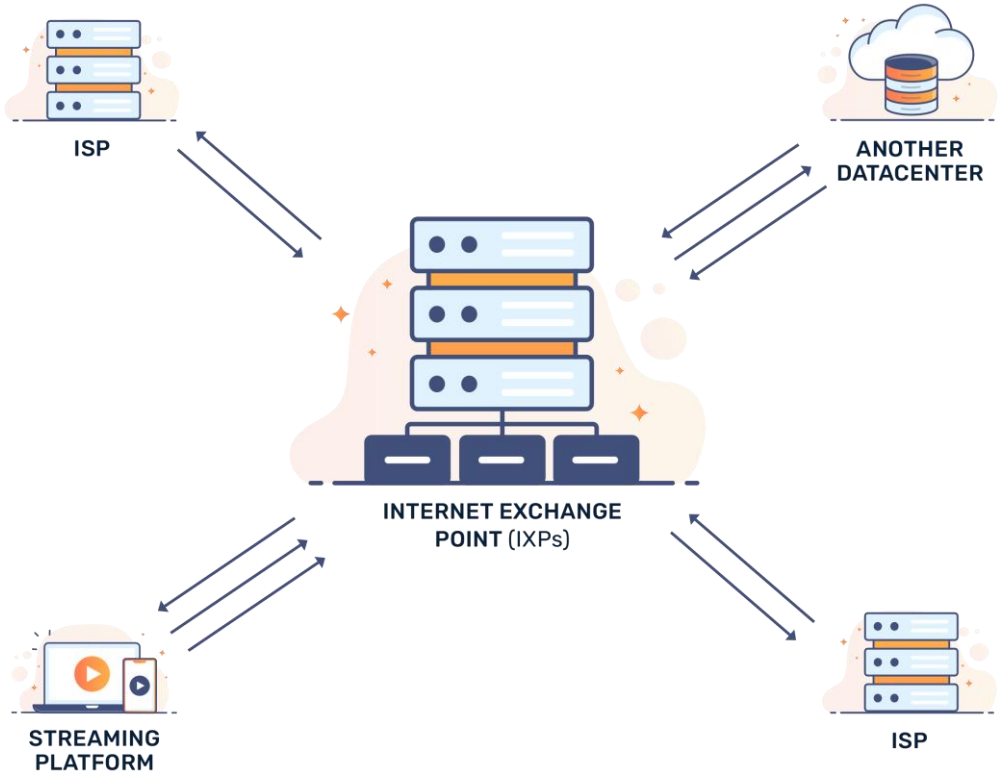
INTERNET EXCHANGE POINTS (IXPS)

- An Internet exchange point (IXP) is a physical location through which Internet infrastructure companies such as Internet Service Providers (ISPs) and CDNs connect with each other
- Physical infrastructure enabling ISPs to exchange traffic.
- Critical for efficient and reliable data transfer.



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INTERNET GOVERNANCE & KEY ORGANIZATIONS

- The processes and organizations that manage the internet's operation. Involves policy development and regulation.
  - ICANN: Internet Corporation for Assigned Names and Numbers.
  - IETF: Internet Engineering Task Force.
  - ISOC: Internet Society.
  - W3C: World Wide Web Consortium.

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ICANN (INTERNET CORPORATION FOR ASSIGNED NAMES AND NUMBERS)

- Manages domain name system (DNS) and IP address allocation.
- Ensures the stable and secure operation of the internet.
- ICANN is a global multistakeholder group and nonprofit organization headquartered in the United States responsible for coordinating the maintenance and procedures of several databases related to the namespaces and numerical spaces of the Internet, ensuring the Internet's stable and secure operation.

- https://en.wikipedia.org/wiki/ICANN

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IETF (INTERNET ENGINEERING TASK FORCE)

- Develops and promotes internet standards. Focuses on technical and operational aspects of the internet.
- The Internet Engineering Task Force (IETF) is a standards organization for the Internet and is responsible for the technical standards that make up the Internet protocol suite (TCP/IP).

- https://en.wikipedia.org/wiki/Internet_Engineering_Task_Force

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ISOC (INTERNET SOCIETY)

- Advocates for internet policies and education. Promotes open development and evolution of the internet.
- The Internet Society (ISOC) is an American nonprofit advocacy organization founded in 1992 with local chapters around the world. It has offices in Reston, Virginia, U.S., and Geneva, Switzerland.

- https://en.wikipedia.org/wiki/ISOC

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W3C (WORLD WIDE WEB CONSORTIUM)

- Develops standards for the World Wide Web. Ensures the long-term growth of the web.
- The World Wide Web Consortium (W3C) is the main international standards organization for the World Wide Web. Founded in 1994 and led by Tim Berners-Lee, as of 5 March 2023, W3C had 462 members.

- https://en.wikipedia.org/wiki/World_Wide_Web_Consortium

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REGULATION OF CYBERSPACE

- Legal frameworks governing internet use and security.
- Addresses issues like privacy, cybersecurity, and digital rights.
- Challenges in Internet Governance
    - Balancing global coordination with national sovereignty.
    - Addressing emerging threats and maintaining security.
- Future of Internet Infrastructure and Governance
    - Trends in infrastructure development (e.g., 5G, IoT).
    - Evolving governance models to address new challenges.

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THANK YOU