



14 August, 2024

DDoS attack

Context: Elon Musk's live audio interview with Donald Trump on X was delayed by 40 minutes and disrupted by glitches, which Musk attributed to a massive DDoS attack on the platform.

➤ What is a DDoS Attack?

- **Definition:** A Distributed Denial-of-Service (DDoS) attack overwhelms a targeted server, service, or network with excessive Internet traffic to disrupt normal operations.
- **Execution:** Utilizes multiple compromised devices, known as bots, to generate attack traffic.
- **Analogy:** Similar to a traffic jam clogging a highway, preventing regular traffic from reaching its destination.

➤ How Does a DDoS Attack Work?

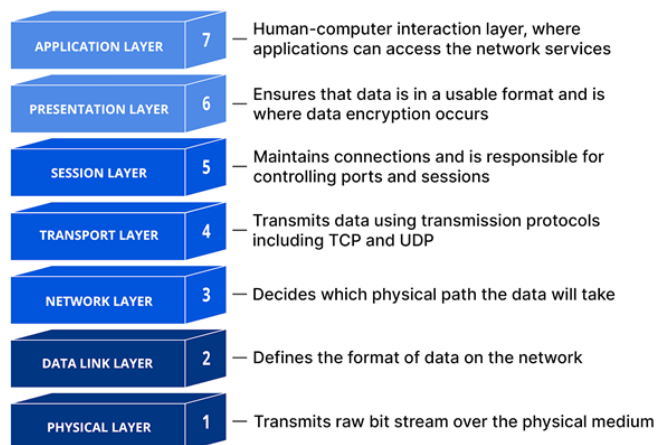
- **Botnets:** Networks of infected computers and devices controlled by the attacker.
- **Attack Execution:** Bots send requests to the target's IP address, causing resource overload and denial of service.
- **Challenges:** Differentiating attack traffic from legitimate traffic can be difficult due to the involvement of legitimate Internet devices.

➤ How to Identify a DDoS Attack

- **Symptoms:** Sudden slowdowns or unavailability of services.
- **Indicators:**
 - Suspicious traffic from a single IP or range.
 - Unusual traffic patterns or surges to specific endpoints.
 - Flooding of traffic with similar behavioral profiles (e.g., device type, location).
 - Odd timing of traffic spikes.

➤ Common Types of DDoS Attacks

- **Application Layer Attacks:**
 - **Goal:** Exhaust server resources by targeting the layer where web pages are generated.
 - **Example:** HTTP Flood—large volumes of HTTP requests overwhelm the server.
- **Protocol Attacks:**
 - **Goal:** Disrupt service by consuming server or network equipment resources.
 - **Example:** SYN Flood—sends numerous incomplete TCP connection requests to exhaust resources.
- **Volumetric Attacks:**
 - **Goal:** Create congestion by consuming bandwidth with massive traffic.
 - **Example:** DNS Amplification—sends large responses to a victim by exploiting open DNS servers.



➤ Mitigating a DDoS Attack

- **Identify Attack Traffic:** Distinguish between legitimate and attack traffic.
- **Mitigation Strategies:**
 - **Blackhole Routing:** Routes all traffic to a null route to drop it, but can make the site inaccessible.
 - **Rate Limiting:** Restricts the number of requests a server will accept in a given time frame.
 - **Web Application Firewall (WAF):** Filters requests and blocks malicious traffic at the application layer.
 - **Anycast Network Diffusion:** Distributes attack traffic across multiple servers to manage and absorb the impact.

➤ Steps to Take During a DDoS Attack

- **Immediate Actions:** Implement mitigation strategies such as rate limiting and using a WAF.
- **Consult Providers:** Work with ISPs or security providers for advanced mitigation options.
- **Utilize Distributed Networks:** Leverage Anycast networks to spread and manage attack traffic effectively.

Geomagnetic Storm

Context: On Monday, the National Oceanic and Atmospheric Administration's (NOAA) weather prediction center issued a warning about a prolonged geomagnetic storm at level G4 (severe).

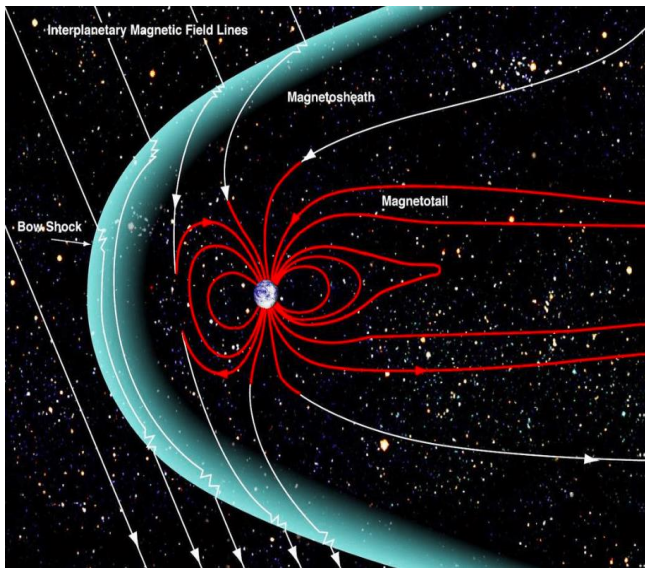
- **Geomagnetic Storm:** A temporary disturbance of Earth's magnetosphere caused by a solar wind shock wave.
- **Driving Factors:** Can be caused by a solar coronal mass ejection (CME) or, less severely, a co-rotating interaction region (CIR).
- **Sunspot Cycle:** Frequency increases during solar maxima, primarily driven by CMEs.

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➤ Impact on the Magnetosphere

- **Initial Compression:** Solar wind pressure compresses the magnetosphere.
- **Magnetic Field Interaction:** Solar wind's magnetic field transfers energy to Earth's magnetosphere.
- **Plasma Movement:** Increased plasma movement and electric current in the magnetosphere and ionosphere.
- **Magnetic Boundary:** Electric currents push out the boundary between the magnetosphere and solar wind.

➤ Associated Phenomena

- **Solar Energetic Particle (SEP) Events:** Increased activity of high-energy particles.
- **Geomagnetically Induced Currents (GICs):** Currents induced in electrical systems.
- **Ionospheric Storms:** Disturbances affecting radio and radar signals.
- **Auroral Displays:** Aurorae seen at lower latitudes than usual.

➤ Historical Examples

- **Carrington Event (1859):** Major storm causing fires and telegraph disruptions.
- **1989 Storm:** Disrupted Quebec's power grid and caused aurorae in Texas.
- **Miyake Events:** Extremely rare storms causing spikes in carbon-14.

➤ Phases of a Geomagnetic Storm

- **Initial Phase:** Characterized by a sudden increase in the Dst index.
- **Main Phase:** Dst decreases to below -50 nT, with values potentially reaching -600 nT.
- **Recovery Phase:** Dst returns to quiet time levels, lasting from 8 hours to 7 days.

• Intensity Classification

- **Moderate:** -50 nT > minimum Dst > -100 nT
- **Intense:** -100 nT > minimum Dst > -250 nT
- **Super-Storm:** Minimum Dst < -250 nT

➤ Measuring Intensity

- K-index and A-index
- **G-scale:** Ranges from G1 (weakest) to G5 (strongest).

➤ Impact on Systems and Infrastructure

• Electrical Systems

- **Geomagnetically Induced Currents (GICs):** Affect transformers and transmission lines.
- **Power Grid Disruptions:** Potential for large-scale outages and damage to transformers.
- **Preventive Measures:** Disconnecting transformers or inducing temporary blackouts.

• Communication Systems

- **HF Radio Systems:** Affected by ionospheric storms, causing signal fluctuations.
- **Military Systems:** Over-the-horizon radar and submarine detection systems can be hampered.
- **Satellites:** Damage can disrupt non-terrestrial communication links.

• Navigation Systems

- **GNSS Signals:** Disturbed by ionospheric scintillation, affecting positioning accuracy.
- **Backup Systems:** Navigators may switch to alternative systems during geomagnetic events.

• Satellite Hardware

- **Increased Drag:** Heated atmosphere increases drag on low Earth orbit satellites.
- **Satellite Disruptions:** Increased atmospheric density and potential for premature reentry.

• Pipelines

- **Induced Currents:** Can cause errors in flow measurement and increase corrosion rates.

• Radiation Hazards

- **Astronauts:** Exposure to high-energy particles can cause health issues.
- **Aircraft:** Elevated radiation during high-altitude flights.

• Effects on Animals

- **Migratory Species:** Potential impacts on animals using magnetoreception for navigation.
- **Whales and Bees:** Some theories suggest geomagnetic storms may influence these animals.

MSCI Index

Context: India's weight on the MSCI Global Standard Index has reached a record high, potentially attracting \$3 billion in equity inflows.

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- **India vs. China on MSCI Index:** India's weight on the MSCI Global Standard Index will increase to 19.8%, while China's will decrease to 24.2%.
- **Effective Date:** Changes take effect after markets close on August 30. India's weight may surpass 20% by end-November.
- **Inflows:** Expected inflows into India are between \$2.7 billion and \$3 billion.
- **MSCI India Small-cap Index:** About 25 new stocks will be added, with potential inflows of \$3 million to \$26 million.

CUMULATIVE INDEX PERFORMANCE – GROSS RETURNS (INR) (JUL 2009 – JUL 2024)



➤ What Is MSCI?

- **Full Name:** MSCI stands for Morgan Stanley Capital International.
- **Services:** Provides stock indexes, portfolio risk and performance analytics, and governance tools.

- **Origins:** Formed when Morgan Stanley acquired Capital International's data licensing rights in 1986.

➤ MSCI Indexes

- **Purpose:** Track performance of various stocks and serve as benchmarks for mutual funds and ETFs.
- **Number of Indexes:** Over 280,000.
- **Popular Indexes:**
 - **MSCI Emerging Markets Index:** Launched in 1988, covers 24 emerging economies.
 - **MSCI Frontier Markets Index:** Focuses on 28 volatile markets, including regions like the Middle East and Africa.
 - **MSCI All Country World Index (ACWI):** Covers 23 developed and 24 emerging markets, representing about 85% of global market capitalization.
 - **MSCI EAFE Index:** Includes 766 stocks from 21 developed countries outside the U.S. and Canada.

➤ Index Review and Weightings

- **Weighting:** Market cap-weighted, with larger companies having more influence.
- **Review Process:** Indexes are reviewed quarterly and rebalanced semi-annually.
- **Impact on Funds:** ETFs and mutual funds adjust holdings to mirror index changes.

➤ Purpose and Comparison

- **Purpose:** Supports the investment industry with tools for market analysis and investment.
- **Comparison with S&P 500:** The S&P 500 focuses on the U.S. market, while MSCI indexes cover both developed and emerging global markets.
- **Stocks in MSCI World:** Includes over 2,800 stocks from 47 markets worldwide.

NEWS IN BETWEEN THE LINES

Jiyo Parsi Scheme Portal



The Union Minority Affairs Minister Kiren Rijiju recently launched the Jiyo Parsi Scheme Portal in New Delhi.

About the Jiyo Parsi Scheme Portal:

- The Jiyo Parsi Scheme Portal is a **Central sector scheme** to arrest/contain the population **decline of the Parsi community** in India.
- The Jiyo Parsi Scheme Portal **aims to provide financial assistance** to the Parsi community through **Direct Benefit Transfer (DBT)** mode.

Parsi Community:

- The Parsi community **follows Zoroastrianism**, one of the **world's oldest monotheistic religions**.
- Zoroastrianism was **founded by the Prophet Zoroaster** (Zarathustra) in ancient Iran around the 6th-7th century BCE.
- Zoroastrians **believe in one God, Ahura Mazda** (Wise Lord), who created the world.
- **Nowruz (Navroz)**, the Iranian New Year, is celebrated by the Parsi community in India on March 21.
- The Parsi population in India **decreased from about 114,000 in 1941 to 57,264 in 2011**, a **reduction of nearly 50% over 60 years**, while India's total population more than tripled during the same period.

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Long-Range Glide Bomb 'Gaurav'



Recently, the Defence Research and Development Organisation (DRDO) successfully conducted the maiden flight test of the long-range glide bomb (LRGB) Gaurav off the coast of Odisha.

About the Long-Range Glid Bomb Gaurav:

- The Long-Range Glid Bomb Gaurav is a **1,000 kg** class air-launched glide bomb designed to **hit targets at long distances**.
- It **utilizes a highly accurate hybrid navigation** scheme to steer towards its target.
- The test was carried out **using a Su-30 MK-I fighter jet of the Indian Air Force**.
- It has been designed and developed indigenously by the **Research Centre Imarat, Hyderabad**.
- During the test, the glide bomb successfully struck its target on **Long Wheeler's Island with pinpoint accuracy**.

Citizenship (Amendment) Act



Recently, a Hindu man from Bangladesh, living in Silchar, Assam since 1988, became the first in northeast India to receive citizenship under the Citizenship (Amendment) Act of 2019.

About Citizenship (Amendment) Act:

- The Citizenship (Amendment) Act, 2019 (CAA) amends the **1955 Citizenship Act**.
- Its **aim is to provide citizenship to undocumented migr ants** belonging to Hindu, Sikh, Buddhist, Jain, Parsi and Christian communities from Afghanistan, Bangladesh and Pakistan who entered India before December 31, 2014, due to religious persecution.
- It does not include Muslims among the eligible communities for citizenship, leading to concerns about discrimination based on religion.
- It **reduces the residence requirement** for naturalization of these migrants from twelve years to just six years.
- Tribal areas of **Assam, Meghalaya, Mizoram and Tripura** (including specific districts) are exempted under the Sixth Schedule of the Constitution from the provisions of the CAA.
- The Act includes a provision for the cancellation of **Overseas Citizen of India (OCI)** registration if the OCI cardholder violates any provision of the Citizenship Act or any other applicable law.

Hmar Community/Tribe



Recently, the Manipur government is set to begin peace talks with the Thadou, Paite and Hmar communities, amid ongoing ethnic conflict between the non-tribal Meitei and tribal Kuki-Zomi groups since May 2023.

About Hmar community/Tribe:

- The Hmar tribe, also known as **Mhar or Mar**, are an indigenous ethnic group of people who live in the northeastern states of India.
- They are recognized as a **Scheduled Tribe** under the **Constitution of India's 6th Schedule**.
- They are the **part of the Chin-Kuki-Mizo group of tribes** and are known for their bravery.
- They claim to have **originated in Singlung** (located in central or southwest China), and that their ancestors were part of the Chinese dynasty.
- The first group of Hmars entered the Cachar plains of **Assam in 1609**, and other groups followed in **1680, 1851 and 1864**.
- At present, the Hmar are mainly concentrated in the southern part of Manipur and the northern part of Mizoram.
- The Hmar tribes **depend on forest products**, with **shifting cultivation** as their primary occupation and various crafts and trades as subsidiary activities.
- They celebrate **agricultural festivals like Sikpuiruo and Butukhuonglom** in December or January.

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POINTS TO PONDER

- Which institute recently advised farmers on controlling 'Fruit Rot Disease' in arecanut plantations? – **Central Plantation Crops Research Institute, Kasaragod**
- In which country is Mount Kilimanjaro located? – **Tanzania**
- What is the Nankai Trough? – **A subduction zone between two tectonic plates in the Pacific Ocean**
- What is the theme of International Youth Day 2024? – **From Clicks to Progress: Youth Digital Pathways for Sustainable Development**
- In which region of India is the Neelakurinji plant mostly found? – **Western Ghats**

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