Assignment 2: Identify a real-world application for both parallel computing and networked systems.Explain how these technologies are used and why they are important in that context.

Parallel Computing: It involves utilizing multiple processing units or resources to simultaneously execute different parts of a network task or application.

Network System: Network system are computational systems that implement connectivity among networks or between a network and an end system.

In Weather Forecast both parallel computing and network system are used.

**Weather Forecast in Parallel Computing:**

* It involves complex mathematical equations that simulates atmospheric physics.
* These computations must process enormous datasets from satellites, weather stations, balloons, and ocean
* To make forecasts timely and accurate, weather centers use high-performance computing (HPC) clusters that run simulations in parallel across thousands of cores.
* Tasks like modeling cloud formation, wind movement, and temperature gradients are split into smaller chunks and calculated **simultaneously**.
* It reduces computation time from weeks to hours(sometimes in minutes).

Importance:

* Weather changes rapidly. If models took too long to run, the forecast would be outdated by the time it’s ready.
* Accurate and fast forecasts are vital for disaster preparedness (e.g., hurricanes, floods, wildfires).

**Networked System**:

* Weather forecasting relies on a global network of data collection and distribution.
* Data Collection: Weather stations, satellites, aircraft, and ships constantly send data through networks to central servers.
* Data Sharing: Agencies (like NOAA, ECMWF, and JMA) share data in real time via international networks.
* Forecast Delivery: The final forecasts and warnings are distributed to end users—governments, airlines, farmers, and the general public—through apps, websites, and alerts over the internet.

Importance:

* A single country’s data isn't enough. Global coordination is necessary because weather systems don’t respect borders.
* Rapid communication ensures timely warnings, helping save lives and reduce damage.