Cloud Technology

IoT & Mobile Cloud Technology

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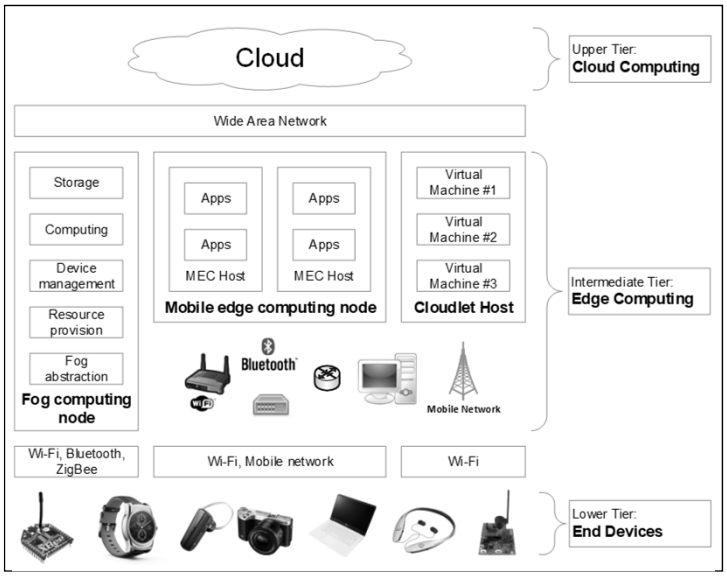

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MCC (Mobile Cloud Computing)

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❖ **Trends in Cloud Computing**

- User requirements for high data rates and QoS (Quality of Service) are exponentially increasing
- Technological evolutions in smartphones, IoT devices, sensors, and actuators enable new highly advanced services and apps
- New IoT and mobile devices have more powerful CPUs (Central Processing Units)

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❖ **Issues in Cloud Computing**

- However, CPUs are not sufficient to process all data and provide results in time
- Optimal decisions based on comprehensive SA (Situational Awareness) are needed
- Not all data is available at a node
- Collected data size is too big to compute at one node
- Limited battery energy restricts fast & large amounts of computing

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❖ **MCC (Mobile Cloud Computing)**

- MCC (Mobile Cloud Computing) allows cloud computing to mobile and IoT users
- UE (User Equipment) and IoT systems can use power computing and storage resources of a distant CC (Centralized Cloud) through a CN (Core Network) of a mobile operator and the Internet

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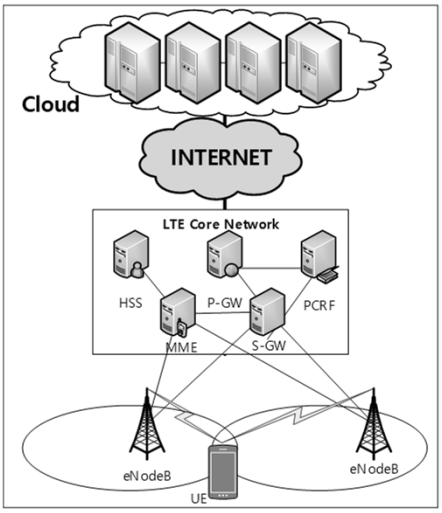
❖ MCC over LTE Networks



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❖ MCC (Mobile Cloud Computing)

- MCC Major Advantages
  1. Extends battery lifetime by Offloading energy consuming computations to the cloud
  2. Enables faster sophisticated application support (i.e., IaaS, PaaS, SaaS) to mobile users and IoT systems
  3. Provides massive data storage to mobile users and IoT systems

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Edge Computing

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❖ Comparing MCC & Edge Computing

- Conventional MCC
  - Cloud services to the mobile device are accessed via the Internet connection
  - Conventional MCC Characteristics
    - Long delay time & QoS performance
    - High usage of the network resources
    - High battery usage of IoT & Smart Devices
    - Significant packet interarrival time jitter
      - Large DBV (Delay Bound Violation) for real-time multimedia services

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❖ Comparing MCC & Edge Computing

- Edge Computing
  - Computing & storage resources are moved closer to the edge (i.e., near the BS (Base Station) or AP (Access Point)) of the network closer to the UE
  - Edge Computing Characteristics
    - Very short delay time with high QoS support
    - Low usage of the network resources
    - Low battery usage of IoT & Smart Devices
    - More Complex: Prediction and pre-fetching of contents and control functions needed

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❖ Comparing MCC & Edge Computing

Technical Aspect	MCC	Edge Computing
Deployment	Centralized	Distributed
Distance to the UE	Far	Close
Latency	Long	Short
Jitter	High	Low
Computational Power	Abundant	Limited
Storage Capacity	Abundant	Limited

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