

Digital Campus

Optimal and Secured Network-Centric Computing Architecture to Ethiopian Higher Educational Institutions

By:

Goitom Fitsum

Ethiopian Institute of Technology – Mekelle (EiT-M)

Mekelle University

Critical IT Challenge

- IT Challenges of Academic Institutions
 - Access Challenges
 - Management Challenges
 - Performance Challenges
 - Security Challenges

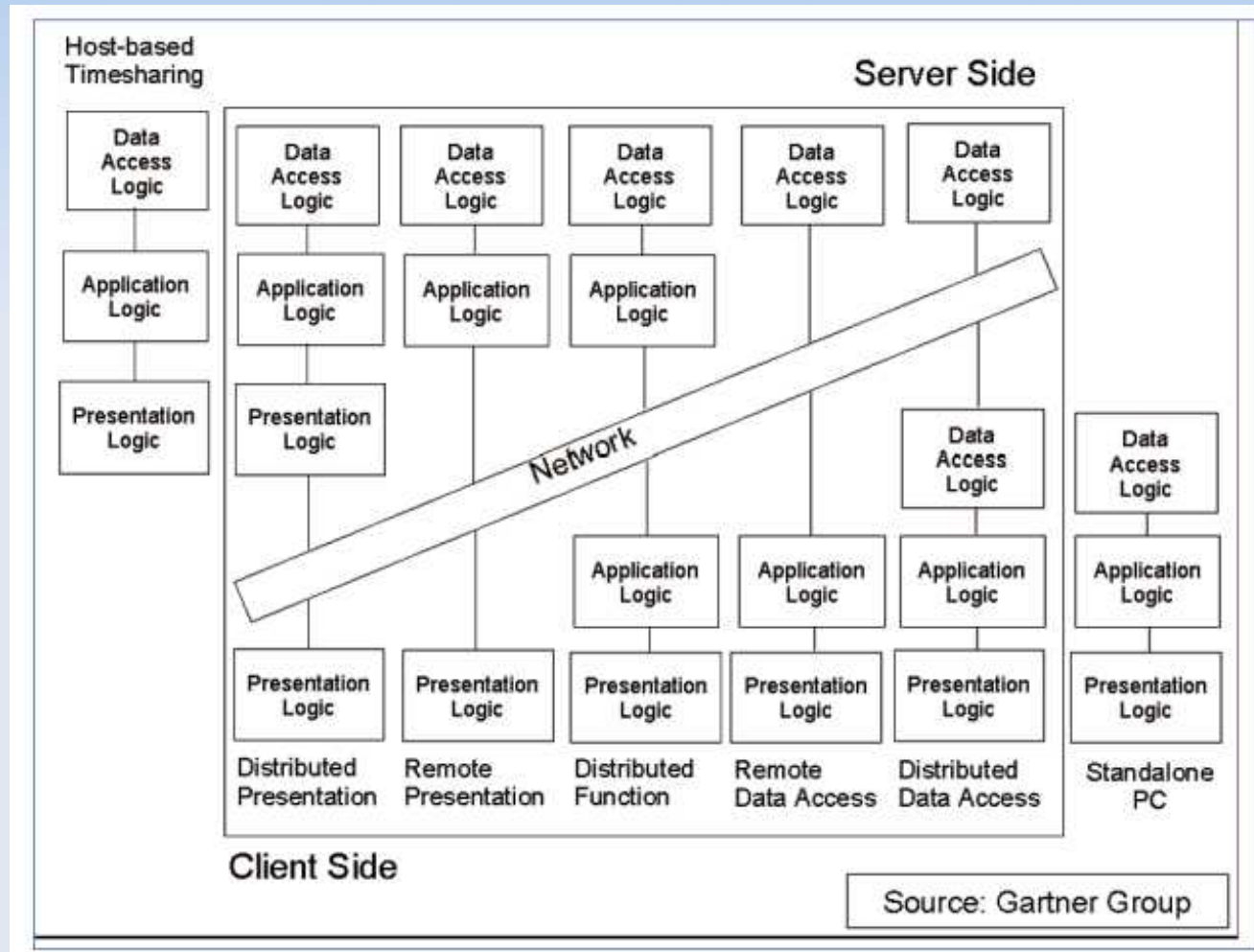
Ethiopian Higher Educational Institution

- Expanding and escalating their student enrollment
- Widening access to education
- Striving to improve quality of education and access to course materials and research documents
- Enthusiastic to start and integrate E-Learning into their system

Ethiopian Higher Educational Institution...

- However
 - Limited IT budget
 - Shortage of skilled IT staffs
- Hence
 - A cost-effective and secured computing solution that addresses the total scope of management, access and security challenges is required.

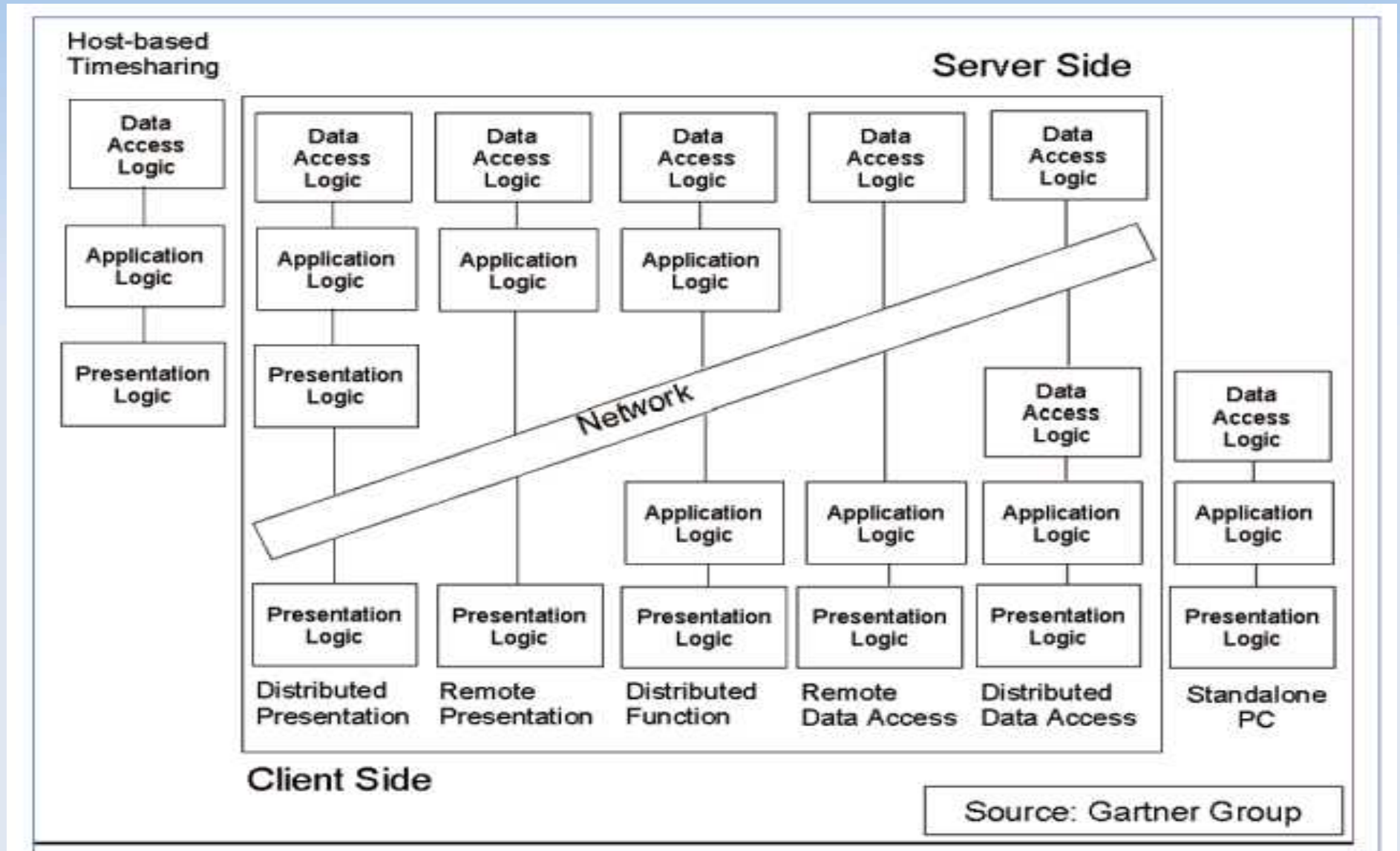
Computing Architectures



Distributed Desktop Environment

- Costly to deploy
- Inefficient in resource utilization
- Lack adequate security to critical applications and data
- Difficult to enforce institutional policy
- Cost and difficult to provisioning, managing and supporting
- Difficult to backup applications and user data
- Complex Patch and update management

Computing Architectures



Thin Client Computing

- **Centralized user desktop**: operating system, application and user data are hosted on a central servers in data center.
- All applications are deployed, managed, supported and executed on the server
- Users access the applications from **Thin Client** devices and get almost the full features
- The application logic is separated from the user interface at the server and transported to the client

Thin Client Computing . . .



Thin Client

- Device that relies on a server to operate.
- Very thin in features and functionality:
 - Does not store any data locally and requires little processing resources
- Managed at the server
- Can be:
 - Converted old PC
 - New dedicated thin client device
 - New low-cost PC with a thin client OS installed

Thin Client

- Fewer points of failure
- Less risk of viruses and malwares
- Longer lifespan (average of +8 years): twice the lifespan of a typical PC
- More reliable than a normal PC: average thin client MTBF is about 175,000 hours compared to 25,000 hours for PCs
- Low power consumption and heat generation : 4 to 50 watts, whereas a standard PC consumes 150 – 350 watts

Thin Client . . .



Thin Client Computing . . .

- **Reduced administration and end user support** - Thin clients are far simpler to manage since the thin client OS is deployed centrally and only includes a remote terminal client.
- **Adding or replacing thin clients is far easier**
- **Lessens the risk of data theft**
- **Disaster recovery:** Data is more secure and easier to backup
- **Smaller footprint:** Save on space

Thin Client Computing . . .

- **Easy licensing management** - Due to the centralization, software licensing becomes far easier to monitor and manage. Only the servers need to be audited, not the thin client itself.
- **Reduce capital expense on computer hardware** - Thin client devices are cheaper to purchase than PCs.

Thin Client Computing

- According to a study by Gartner (June 2006), thin client total cost of ownership(TCO) annual saving are measured as:
 - 79% less downtime cost per user
 - 16% capital cost savings
 - 34% less in maintenance
 - 19% less to operate
 - 48% overall lower total cost

Thin Client Computing . . .

- Server-Based Computing (SBC)
 - Traditional thin client computing
 - Revolves around groups of terminal servers running dozens of individual user sessions.
 - Each Terminal server can host multiple, simultaneous client sessions from a variety of desktops
 - Users share a common set of application per Terminal Server, and there are limitations on personalized configurations.

Thin Client Computing . . .

- VDI (virtual desktop infrastructure)
 - Using virtualization, it splits out each user session into a VM (virtual machine)
 - Each user can have a totally customized and personalized desktop, with a unique set of installed applications and configurations.
 - Each virtual machine has its own operating system, virtual NIC, MAC and IP address.
 - One virtual machine can be rebooted (or frozen, or crash) without impacting any of the other virtual machines on the host server.
 - Allows end users the same flexibility as a traditional distributed desktop environment





Thin Client Computing . . .

- Factors to be considered:
 - Total cost of ownership
 - Scalability
 - Performance over lower-bandwidth and higher latency connection
 - Overall manageability
 - User acceptance

Thank You