



# **GIEWS Workstation**

Global Information and Early Warning System

# **Communication Module**



# Outline

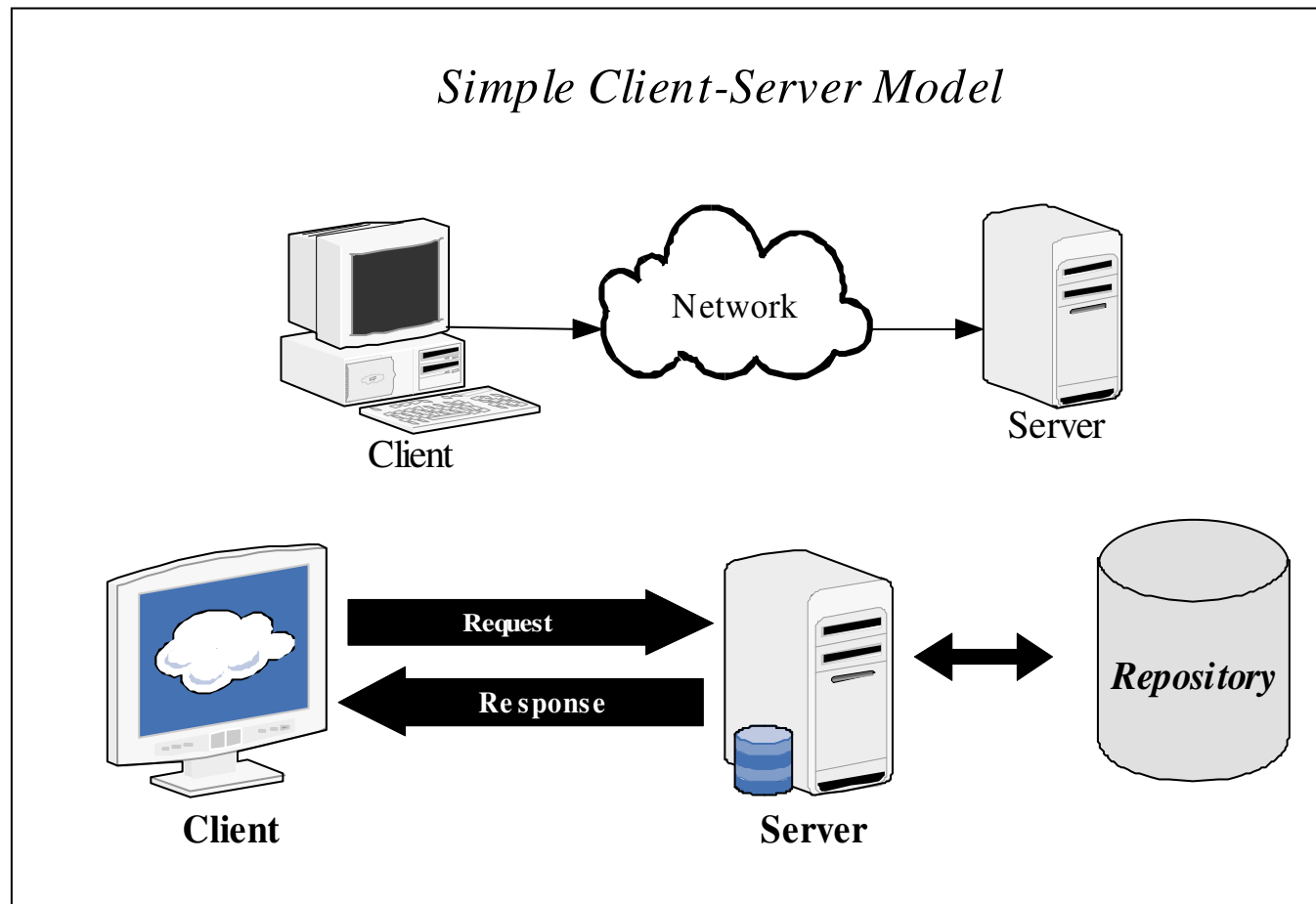
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- **Network Architectures: centralized systems/decentralized systems:**
  - features of each approach
  - advantages and disadvantages of each approach
  - reasons for which we chose the decentralized approach
- **Communication Module:**
  - architecture and functionalities
  - sharing resources into the GIEWS Network
  - security issues raised by Data Decentralization



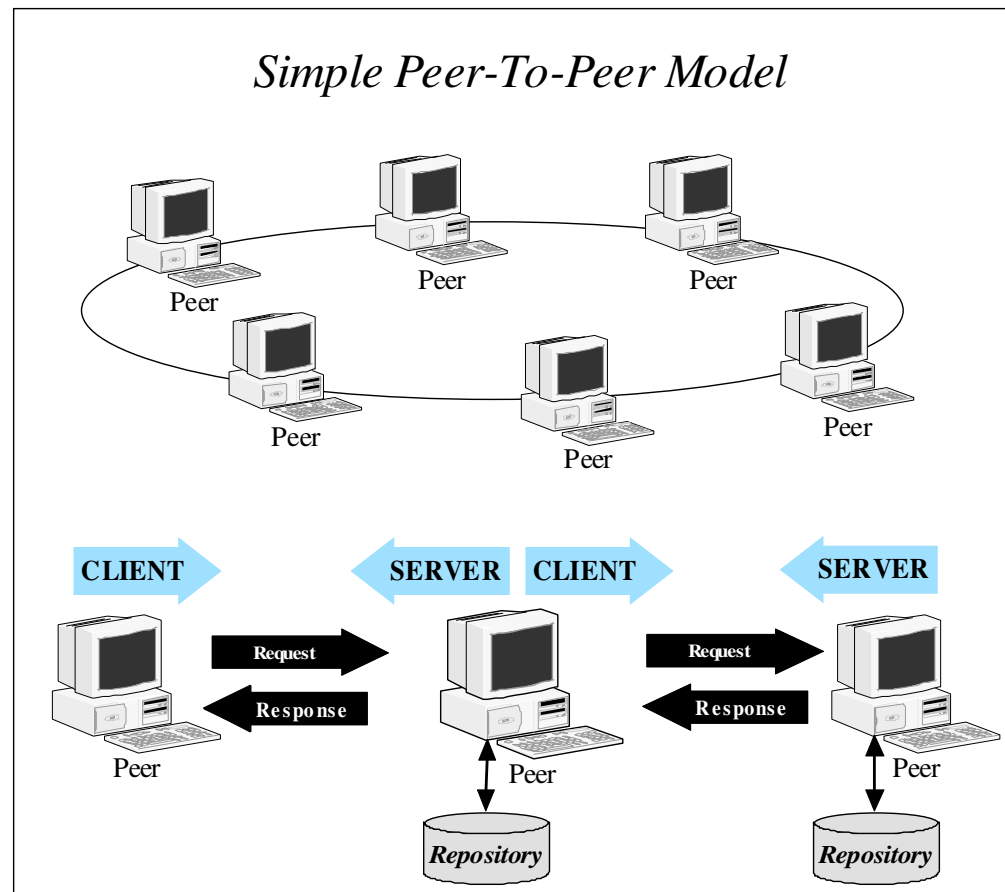
# Network Architecture (Centralized System)

- A classic centralized system is based on Client-Server Model
- One (or few) Server provides resources to many clients



# Network Architecture (Decentralized System)

- A classic decentralized system is based on Peer-to-Peer Model
- Nodes belong to the same functional layer (peer)
- A peer acts as both "*client*" and "*server*": request and provide services

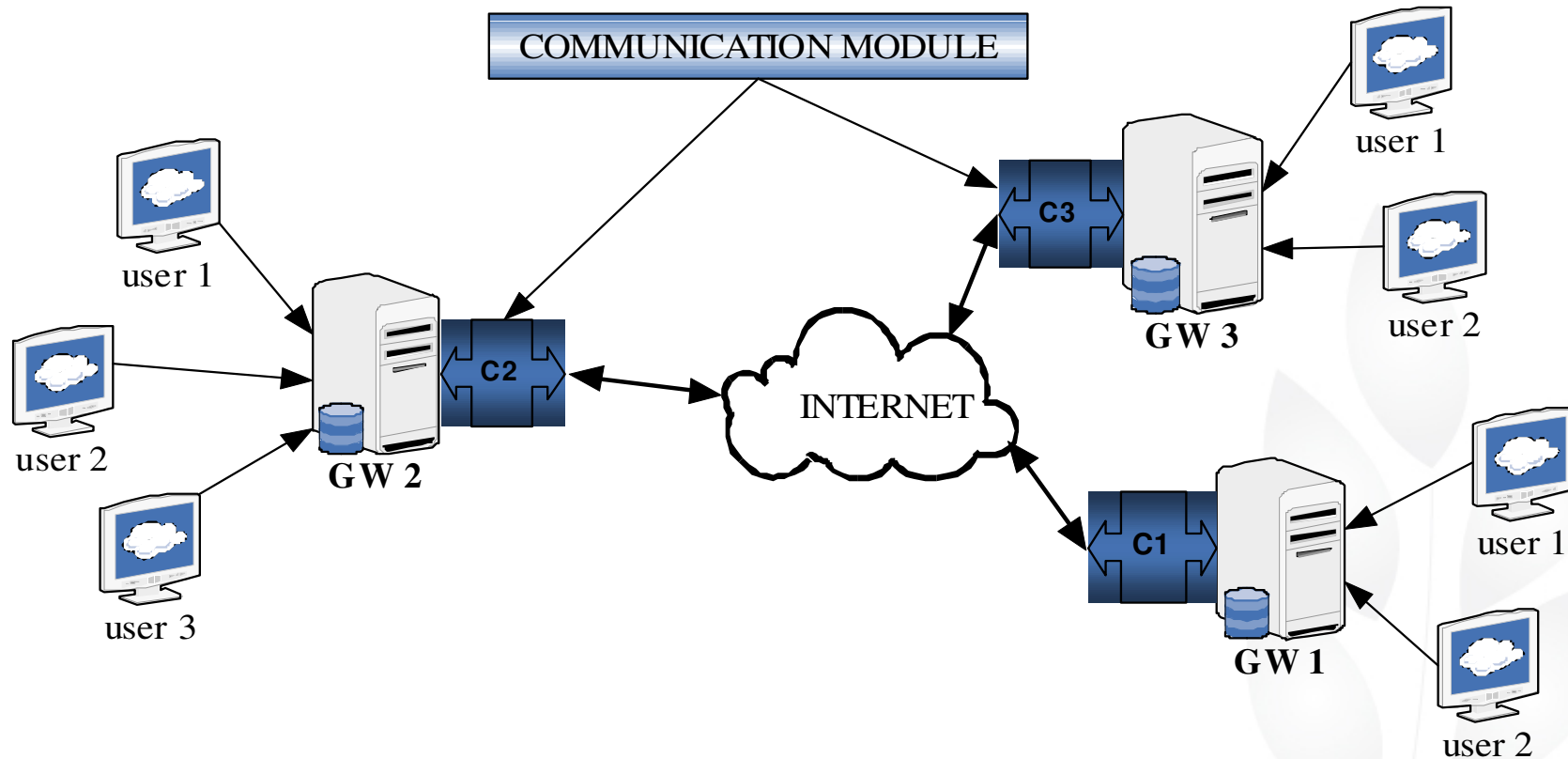


# P2P Model vs Client-Server



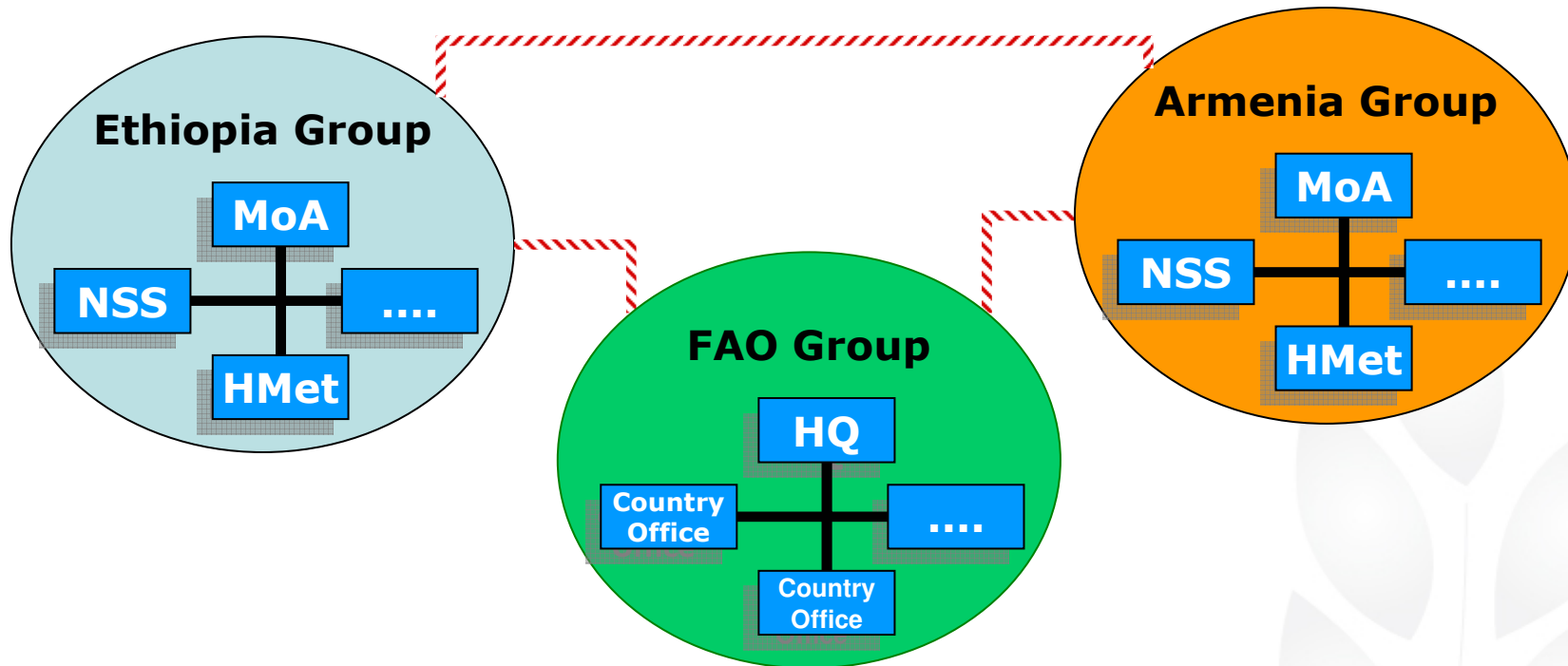
	Client/Server	P2P
+	<ul style="list-style-type: none"> <li>• full security: <i>It can easily authorize users. Full control of resources/services</i></li> <li>• easy implementation</li> </ul>	<ul style="list-style-type: none"> <li>• data decentralization</li> <li>• decentralize CPU computational load</li> <li>• reliability</li> <li>• better use of network bandwidth</li> </ul>
-	<ul style="list-style-type: none"> <li>• one repository</li> <li>• data stored over-load : <i>GIEWS Workstation stores high data volume</i></li> <li>• CPU computation over-load: <i>GIEWS Workstation is an analytical tool</i></li> <li>• single point of failure</li> </ul>	<ul style="list-style-type: none"> <li>• hard implementation:                             <ul style="list-style-type: none"> <li>• data security</li> <li>• data synchronization</li> </ul> </li> </ul>

# GIEWS Network: Communication Module



- Each workstation can be accessed by any number of users within the organization where it is installed.
- The various nodes of the GIEWS Workstation network are connected to each other through the workstation's **communication module**
- It partly overcome problems encountered by many countries with slow and inefficient internet connections

# GIEWS Network: Overlay Network



- Create an Overlay Network:
  - Nodes are organized in groups forming a local network.
  - A group defines a secure set of Workstations
  - Example: the Armenia Group consists of three nodes located at the Hydrometeorological Service, Ministry of Agriculture and National Statistical Service respectively.



# Communication Module - Functionalities (1)

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- **Administrative Functionalities:**
  - start / stop / set-up the communication module.
- **Visualize and access currently active Groups and Workstations.**
- **Share and Download resources:**
  - Projects – Datasets – Layers.
- **Send resources to a Workstation.**
- **Monitor download processes.**
- **Import downloaded data.**





## Communication Module: Functionalities (2)

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- Search Engine Tool
- Search resources (*projects, layers and datasets*) in the entire GIEWS Network or in selected groups or workstations:
  - make a query and send it to the GIEWS Network
  - visualize results set
  - download a resource
- Uses metadata information to find resources across the GIEWS network

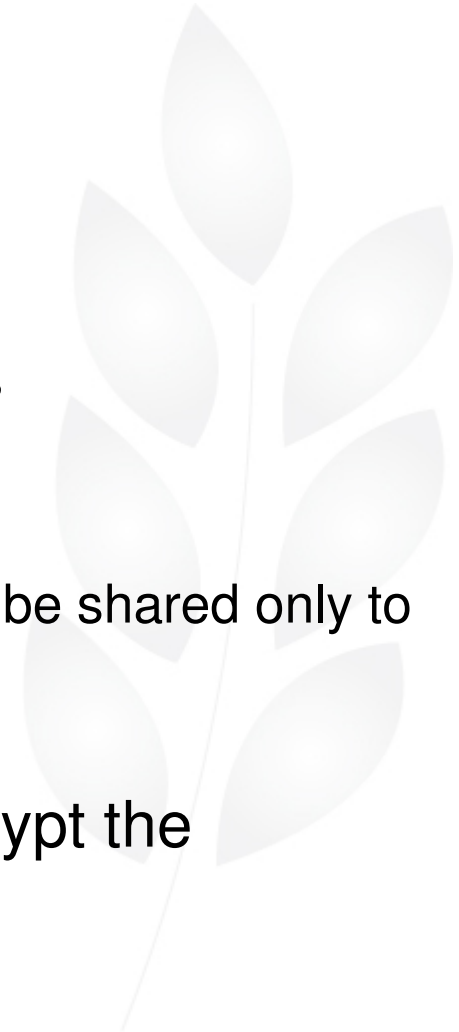




## Communication Module: Security Issues

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- The application will only be distributed to the authorized institutions:
  - the system is secure because only the authorized nodes will have access to the system.
- Levels of Security:
  - Private: resource is not shared
  - Restricted: resource is shared into the Group
  - Shared: resource is shared to all Workstations
- Groups define a security boundary:
  - some resources (classified as Restricted) can be shared only to the other Workstations of the same Group
- The module implements a service to encrypt the resources exchange.





Thank you for your attention

