

## PHOTOMOD RESOURCE SYSTEM: LOCAL AND NETWORK CONFIGURATION

The **Resource system** implemented in the **PHOTOMOD** system focuses primarily on the cooperative processing of data using a network configuration. Though data is arbitrarily arranged in the network, access to all data related to a particular project group is conveniently provided without cumbersome network file operations. Still, the resource system is flexible and open, allowing optimal data placement for specific tasks.

### Key concepts of the PHOTOMOD resource system:

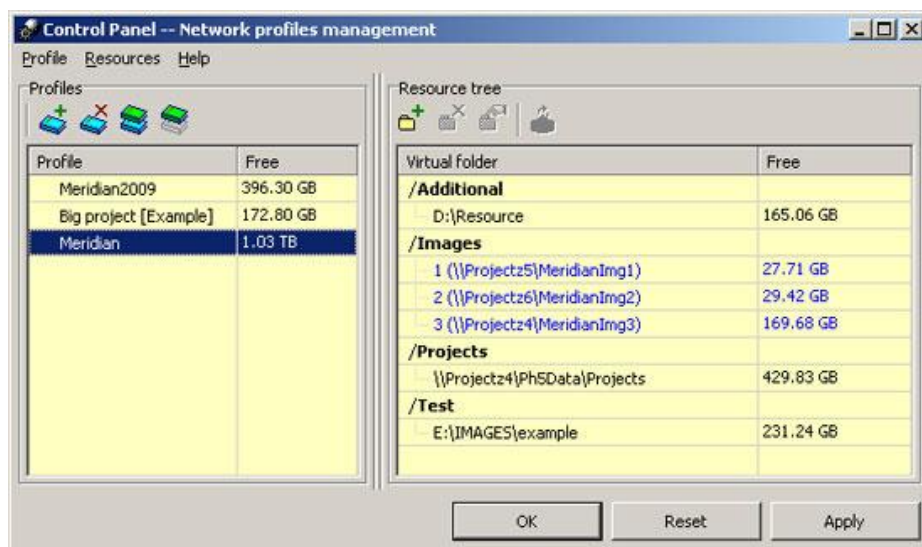
- **Profile** is an independent group of resources related to one project or project group.  
*Profile* defines the resource configuration. Profile has a virtual name and does not correspond to the actual file system. The Profile name is the root of the resource tree, and all the branches of profile resources are attached to it.
- **Virtual folders** — are the branches of the resource tree. All branches in the upper level of tree resources are virtual folders. Virtual folders are the virtual names for a real network of local folders (drives) or groups of folders allocated by the user for profile resources. Thus, one Profile can utilize the disk space of several computers. Using virtual folders, two types of resources can be connected to the tree—regular file system folders and storage folders. Storage folders are a special type of virtual folder. Resources are automatically placed in storage folders by the system on the basis of free space analysis. Thus, storage folders allow optimization of multiple disk usage for storage resources, which is advantageous when network processing large projects.
- **Resources**  
The Profile resource system includes all subfolders and files (except \*.meta files) from each regular folder/drive for which a virtual folder has been specified. \*.meta files contain metadata and are not resources.

There are two types of profiles: *local* and *network* profiles. A local profile is accessible only from the workstation where stored. A network profile is accessible on multiple workstations to provide cooperative processing of a project.

Only one (*active*) profile is accessible in a PHOTOMOD session. Any accessible network or local profile can be selected to become active.

The **Control Panel** program is used to create and manage profiles. The Control Panel window is used to create and edit profiles, connect virtual profile folders, create/connect a repository of network profiles, select an active profile, etc. The Explorer program is used to view active profile resources and is capable of some editing tasks.

### Sample network profile resource structure:



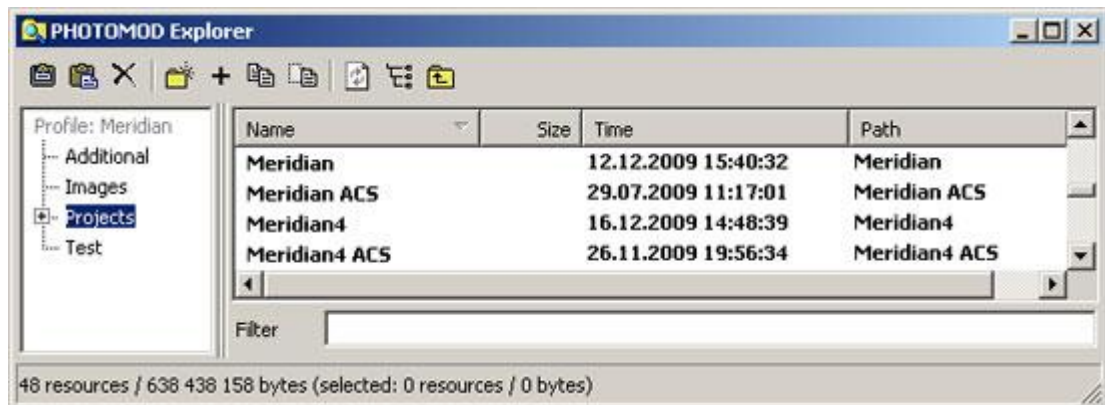
Network profile resource structure in Control Panel

*Meridian* — virtual name of the network profile with the following resource structure:

Virtual folders:

- Virtual folder *Projects* — virtual name of the folder on server used for project location;
- Virtual folder *Images* — virtual name of the group of storage (physical folders located on different servers) for automatic image file distribution;
- Virtual folder *Additional* — virtual folder name on local drive D for saving auxiliary data;
- Virtual folder *Test* — virtual name of local folder for saving image samples.

Explorer shows following resource tree for created profile:



*Resources tree of network profile in Explorer*

The virtual folder *Projects* contains projects for the **PHOTOMOD** system. Projects are stored in folders with a pre-defined structure for keeping different project files — configuration files, coordinate system files, camera data, block processing related files and so on. Several project folders can be attached. When working with large datasets, using groups of storage folders is preferable.

The virtual folder *Images* contains raster files. Physically, those files are located in network folders on three servers. However, owing to the storage structure, they appear as a single very large folder. Raster files are automatically distributed between physical folders, based on available disk space.

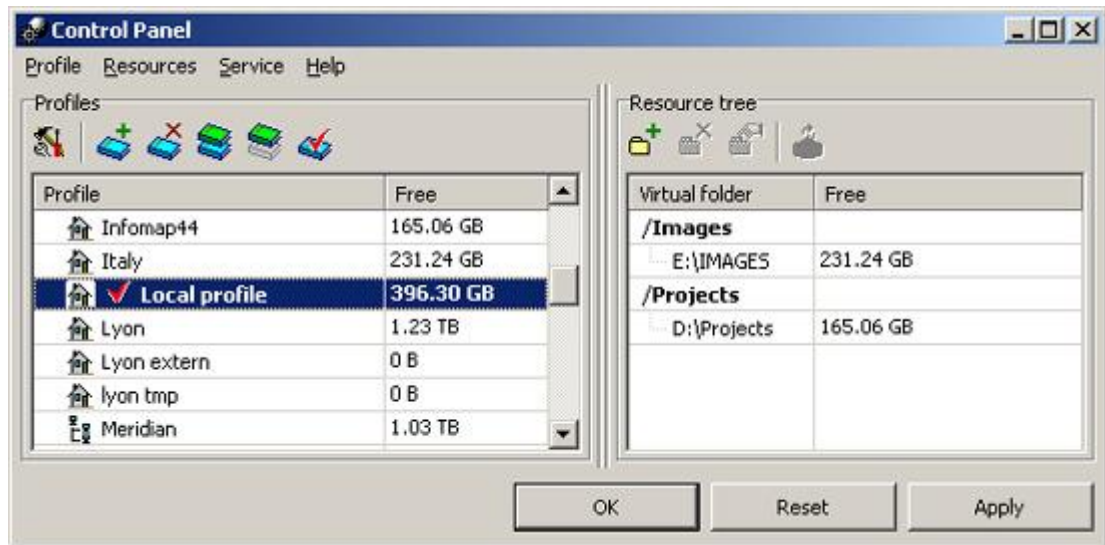
Any “manual” access to storage folders using OS tools is strictly prohibited. In the event of storage corruption, **Control Panel** runs a special restoration program.

#### **Advantages of PHOTOMOD resource system:**

- Open, flexible and easy to use. Resource system can be organized for specific tasks;
- Locates project on several machines or harddrives;
- Automatically manages data distribution through storage concept;
- Efficient use of disk space. Drives with more space are filled first;
- Facilitates cooperative work by allowing all operators to view all project-related folders.

## LOCAL WORK

When only one **PHOTOMOD** workplace is being utilized for a project, or only one operator is working on each project, and data exchange between workstations is not required, each workstation should organize a customized *local profile* with access to all project resources. This allows faster disk access than the network access configuration, where virtual folders containing the local profile are located on the disks of other workstations.



*Example of local profile*

## NETWORKING

The project data storage system, focused on distributed network processing, is a distinguishing feature of the PHOTOMOD system.

Network processing of projects (work via “profile”) is performed simultaneously from multiple workstations. Several options, each having its advantages as well as disadvantages, are involved in the implementation of network processing.

### Distribution of resources on workstations

Profile resources can be located on several workstations in the local network. Any number of profiles can be created in a network. All folders used for storing data should be open for public read-write access.

Recommendations:

- Resources should always be stored on a separate computer(s) that is not used as a workstation. This is to safeguard against resource data access failures caused by workstation malfunctions.
- Distribute resources among several drives to use available disk space most efficiently.
- Install the hard lock key on a separate computer without resource-intensive tasks, which can lead to protection failures and disrupt PHOTOMOD processing on workstations.

For simultaneous editing of the same file, the rule is always—except in the case of explicit messages or warnings — “the last saved data is stored.” Browsing is **not** limited, allowing the same project files to be open simultaneously on any number of computers.

The best way to organize network-based workflow using network computers to store resources is described below:

1. Create a central control folder on any workstation. Configure read-write network access to that computer.
2. Create network profile(s) in this repository and setup resource configurations for each. Connect the virtual folders.
3. Configure use of central control folder on all workstations. All network profiles, for which configurations are stored in the central control folder, will be available on workstations displayed in the **Control Panel** profile list. Select network profile and activate it. Restart all open **PHOTOMOD** modules for changes to take effect.

See also PHOTOMOD resource system.

### Distribution of resources on servers

When working with network projects, dedicated file-servers, which are not used as workstations, are recommended.

Close attention must be paid to choosing and configuring the OS for the computer intended for use as file-server in network processing. **FreeBSD** is recommended for this purpose; less preferable operating systems include **Microsoft Windows Server** and **Linux**. Our tests have shown that these operating systems are the best server platforms for photogrammetric processing. **Windows (XP, Vista, 7)** OS limits the number of simultaneous network connections. Simultaneous work with a non-server version OS will be difficult, if the number of workstations in a network exceeds 8.

Proposed network configuration:

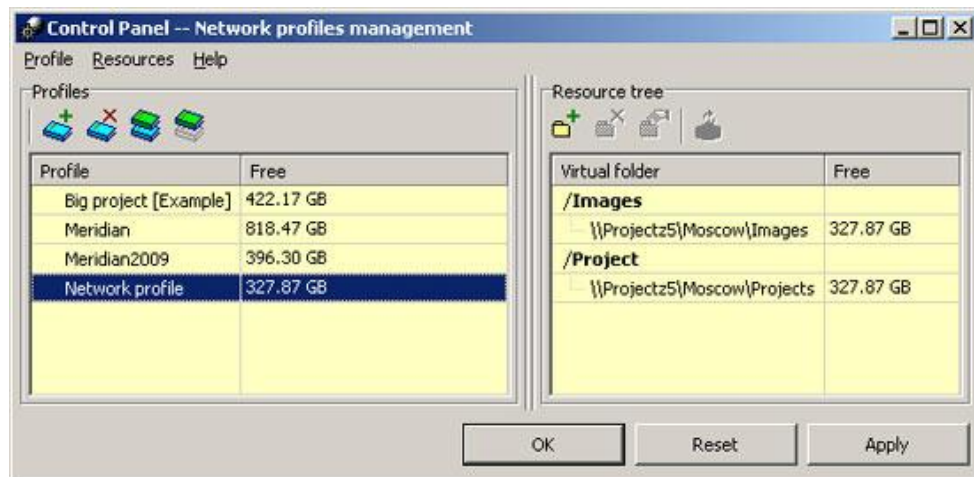
Profile resources should ideally be placed in multiple virtual folders located on different servers. The optimal number of folders will depend on volume. “One disk = one virtual folder” is a good rule of thumb.

When distributed processing can be performed using many workstations and a single profile, a more uniform load distribution is provided across the aggregate bandwidth of the disk system of servers and network.

Organizational examples of network processing using file-servers.

- A small project or *group of projects*:
  1. Create a network profile in a centralized directory server. Select one drive or folder server (depending on project size), allocate virtual folders for resource storage and define the virtual folders.
  2. Connect created network profile to all workstations participating in network processing. To do this, specify central control folder in initial setup of each workstation, select network profile and activate it. Then, restart all open **PHOTOMOD** modules for changes to take effect.

This data organization makes backups convenient, since all resources are placed in the same location, and there is no loss in speed while simultaneously processing small volumes.

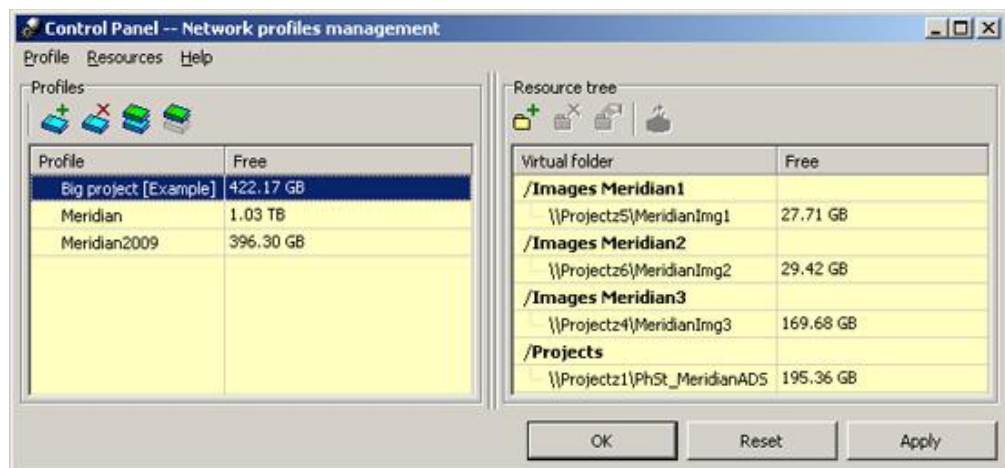


*Example of network profile creation using one server drive to store resources*

- If a project (or group of projects) assumes large volumes, resources should be placed on multiple file servers or several different server drives. Resources should be allocated with convenient backup in mind.

Server resource allocation strategies:

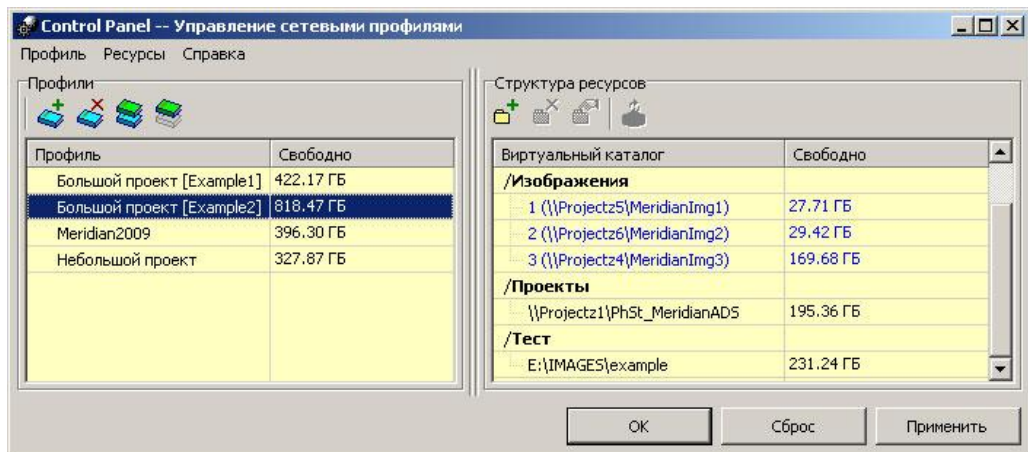
- **Strategy 1.** Connect server drives as virtual folders to store images, and separate server drives to store projects. Administrator involvement is desirable for structural organization and to monitor availability of free space on server drives.



*Example of network profile creation using different server drives to store images and separate network profile for project files*

- **Strategy 2.** Select server drives (folders) to store images and connect them to a profile by using a virtual folder. Separate server drive(s) should be selected as virtual folders to store projects. All storages connected using a virtual folder will be filled with data automatically. PHOTOMOD system

analyzes free space and distributes resources accordingly. This strategy uses all storage space allocated for images, and facilitates the work of the administrator.



*Example of network profile creation using a group of storages for images and separate server for project files.*

Connect network profile, created by one of the above strategies, to all workstations participating in network processing. To do this, specify central control folder in initial setup of each workstation, select network profile and activate it. Then, restart all open PHOTOMOD modules for changes to take effect.