

INTRODUCTION

Problem

No native access to Grid facilities from mobile devices

Add gateways / portals to the Grid architecture

Classical Solution

No direct and transparent integration of mobile devices into Grid computing systems

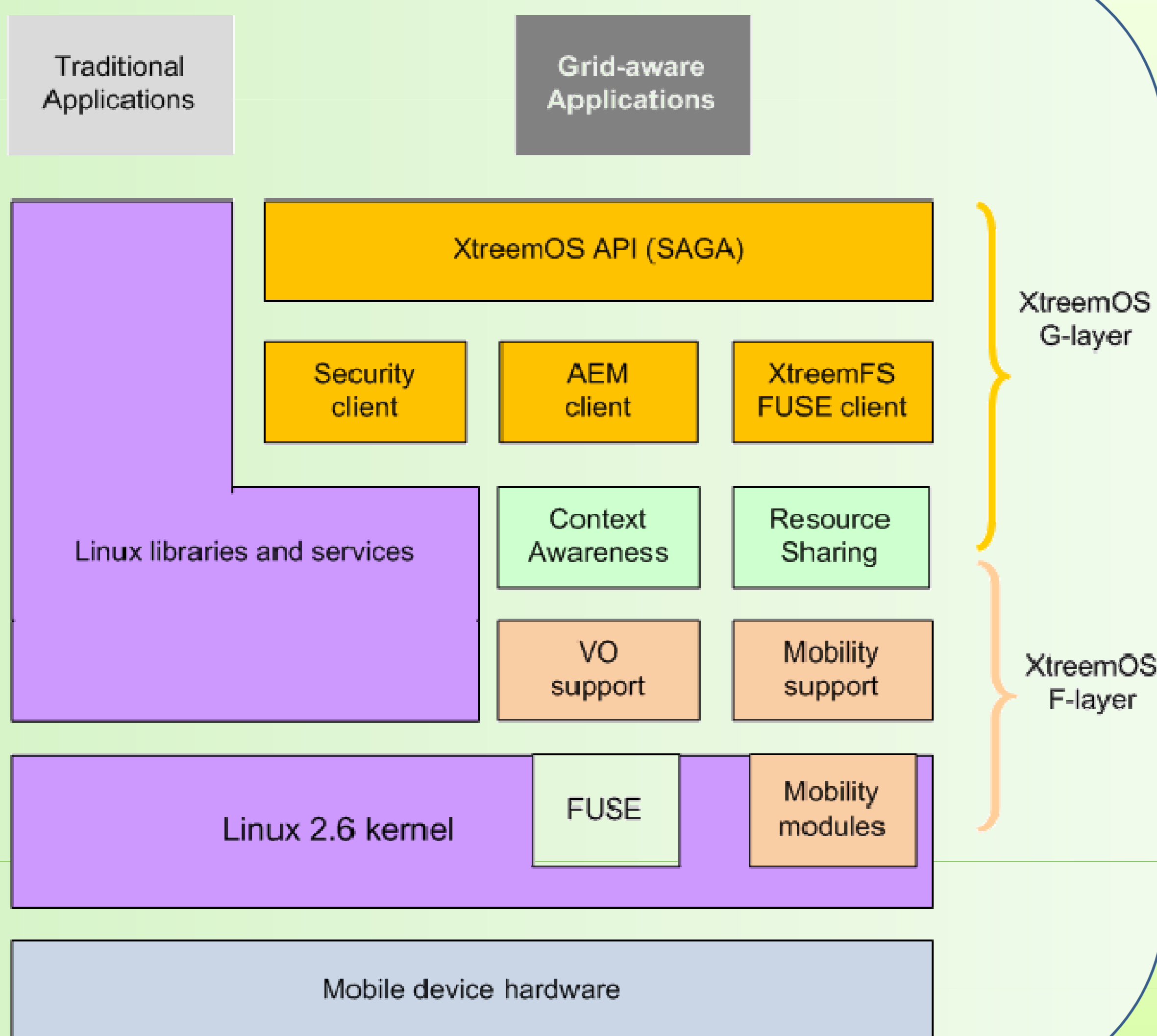
Linux-based operating system to support Virtual Organizations (VOs) for Grids

XtreamOS solution

Real native access of different devices to the Grid, including mobile devices (*XtreamOS-MD*)



XTREEMOS-MD ARCHITECTURE



XtreamOS-MD architecture is similar to XtreamOS one:

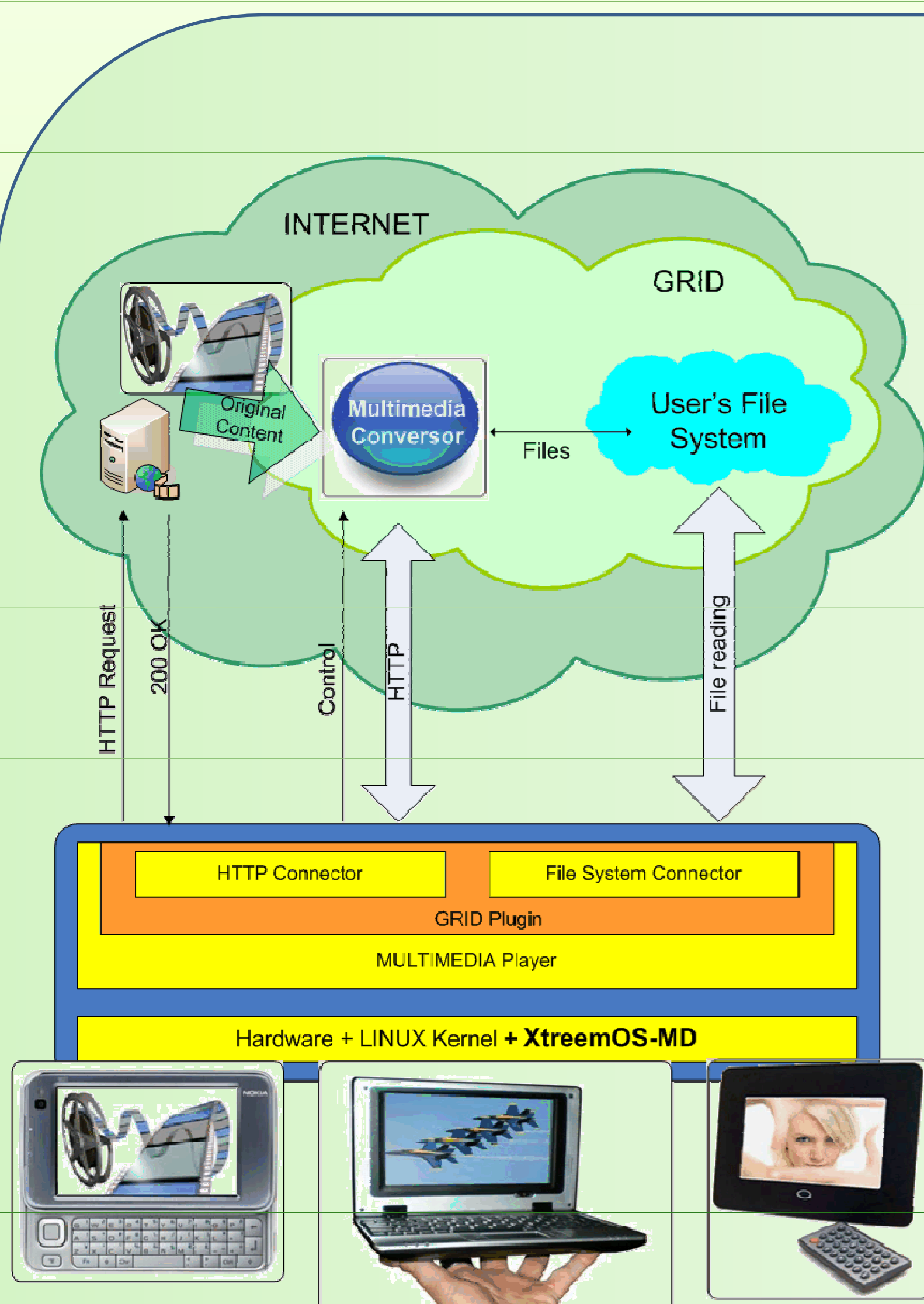
- △ Foundation layer (F-layer)
 - ✓ **Mobility support**, apart from the VO support
- △ Grid services layer (G-layer): including the main XtreamOS services:
 - **Security**
 - ✓ **CDAProxy** module: solve interface and certificate generation limitations
 - ✓ **Modular SSO**: runs out-of-the-box (no need to adapt the applications)
 - **AEM**: remote task management: launch and manage jobs in the Grid
 - **XtreamFS**: distributed file system: transparent access to remote user's volume

Additional modules:

- △ Context awareness: provide context info (remaining battery, location, etc.)
- △ Resource Sharing: to share MD resources
 - ✓ **Data sharing**: on demand file sharing from the MD
 - ✓ **I/O device sharing**: to share the GPS (or camera, micro, etc.)
 - ✓ **Network sharing**: to share the Internet access (3G)

APPLICATIONS

GridPlayer



Screen resolution and codec limitations

Some videos can't be directly played

Transcoding needed: time, computation and storage consuming process

GridPlayer, on top of XtreamOS-MD, allows playing any kind of video file by exploiting remote execution and storage Grid facilities

Transcoding job sent (transparently) to the Grid when video format not supported. Transcoded video stored & played from Grid user's volume

ADVANTAGES

- ✓ No codec/resolution limitation
- ✓ No need to locally transcode the video, saving time, battery and storage space
- ✓ Transparent user operation
- ✓ No need to transfer the video while stored on Internet/Grid

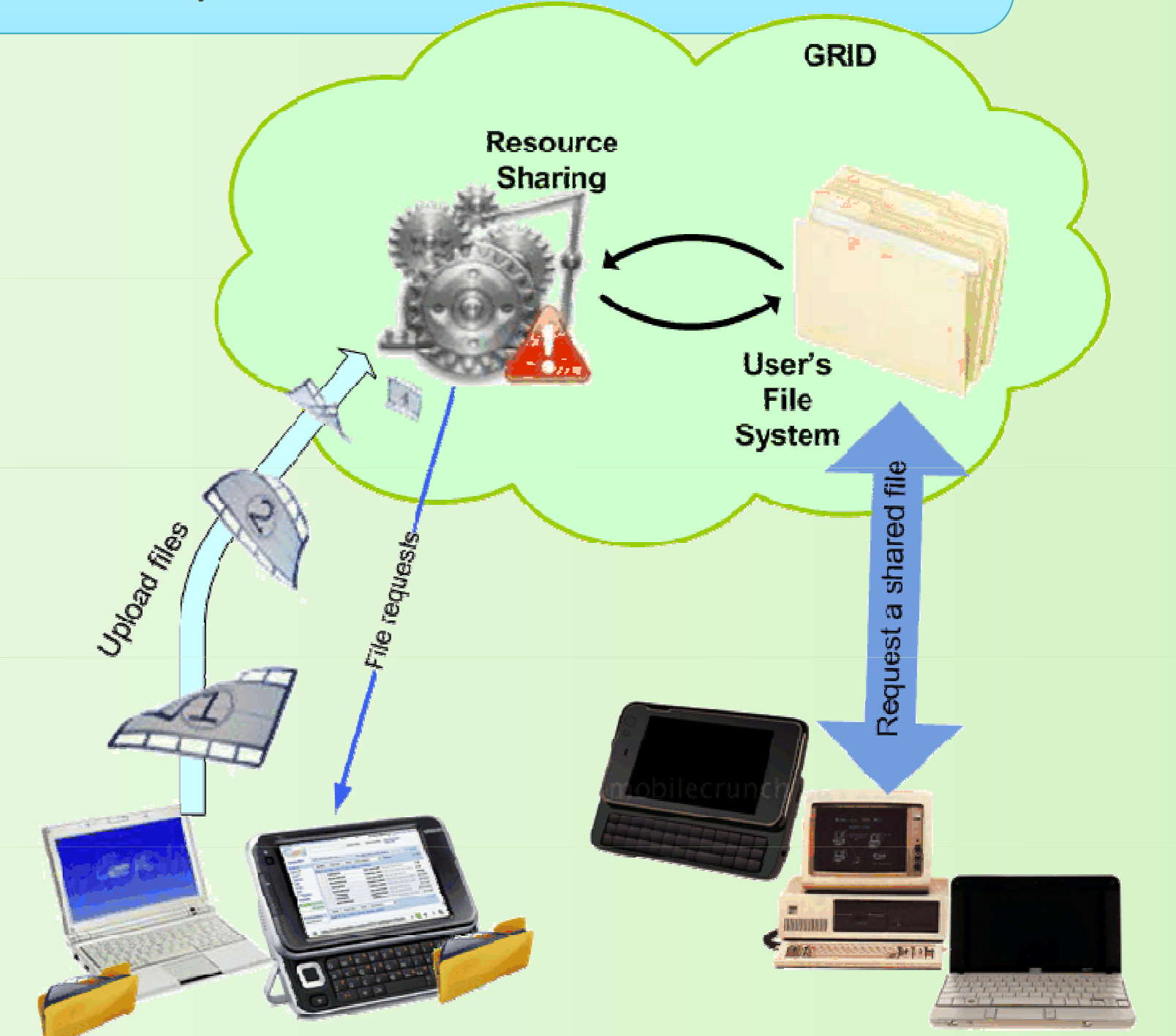
On-demand file sharing

MD particularities, affecting file sharing

- ❖ Battery consumption
- ❖ Network interface (3G, WiFi) -> it could be not-free
- ❖ Network stability

On-demand file sharing using XtreamOS-MD, it's possible to share / upload files only when other Grid users request them

The process is done just once per file, as the file is replicated into the Grid file system



ADVANTAGES

- ✓ Mobile devices become "special" Grid resource nodes
 - ✓ This solution works over NAT
- As the files are uploaded just when requested:
- ✓ We save battery
 - ✓ Sharing is possible even if not connected every time
 - ✓ Uploading can be limited if not using a free network access