

XtreemOS

*Enabling Linux
for the Grid*



XTREEMOS-MD: GRID COMPUTING FROM MOBILE DEVICES



Information Society
Technologies

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- **Introduction**
 - What? Why? How?
- **XtreamOS-MD basics**
 - Architecture
 - Foundation layer
 - Services Layer
 - Performance
- **XtreamOS-MD applications**
 - Job Manager
 - Grid Player





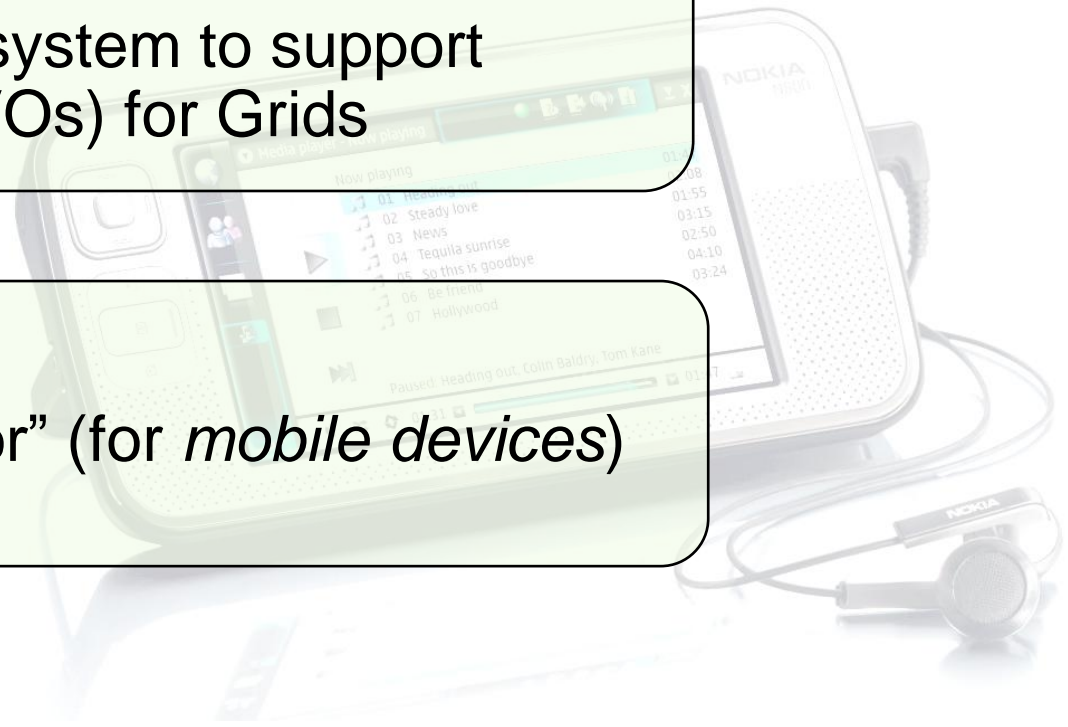
What?

XtreemOS

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

XtreemOS-MD

- XtreemOS “mobile flavor” (for *mobile devices*)





Why?

To make Grid easy for users

- Grid and Cloud computing are well known topics
- But... access to Grid from mobile devices is normally out of the scope (intrinsic limitations)

MAIN GOAL!

Transparent access to Grid facilities from **mobile devices**





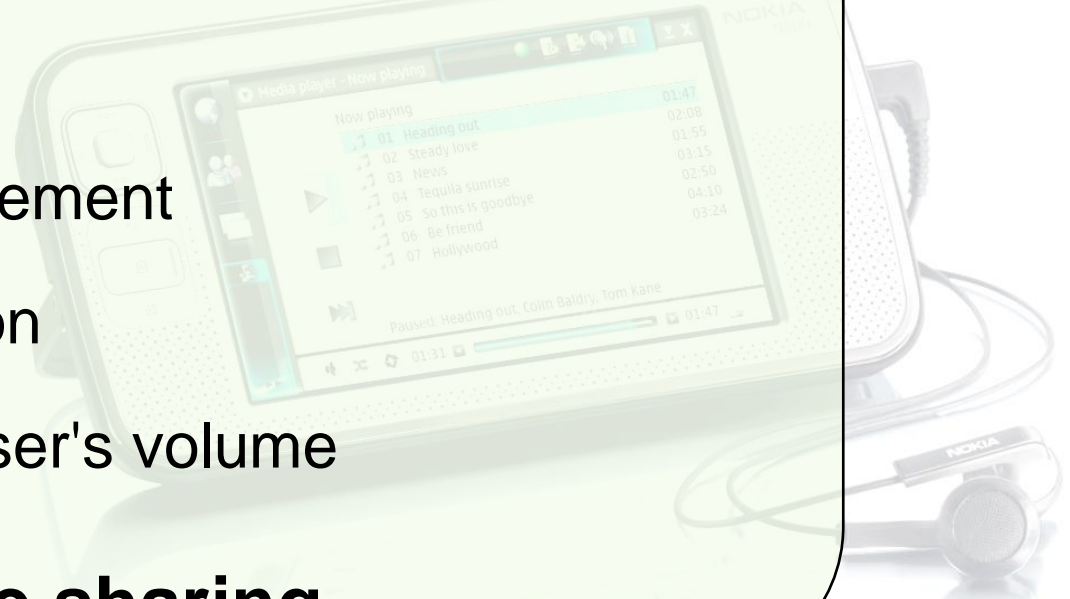
How?

XtreamOS-MD features

Integrated solution for mobile access to Grid computing

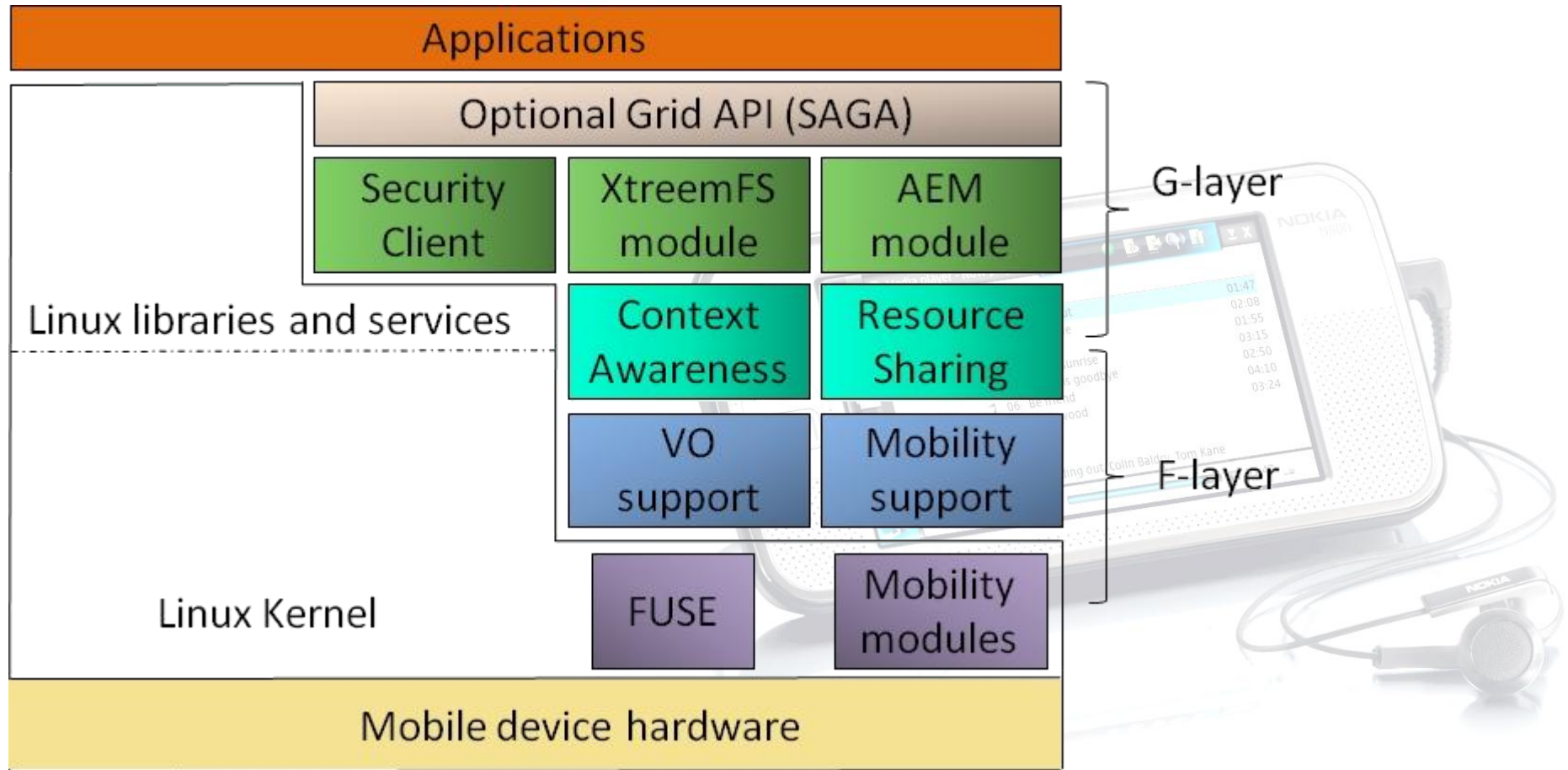
- VO support
- Graphical job management
- Flexible authentication
- Access to the Grid user's volume

... and **resource sharing**...





Architecture





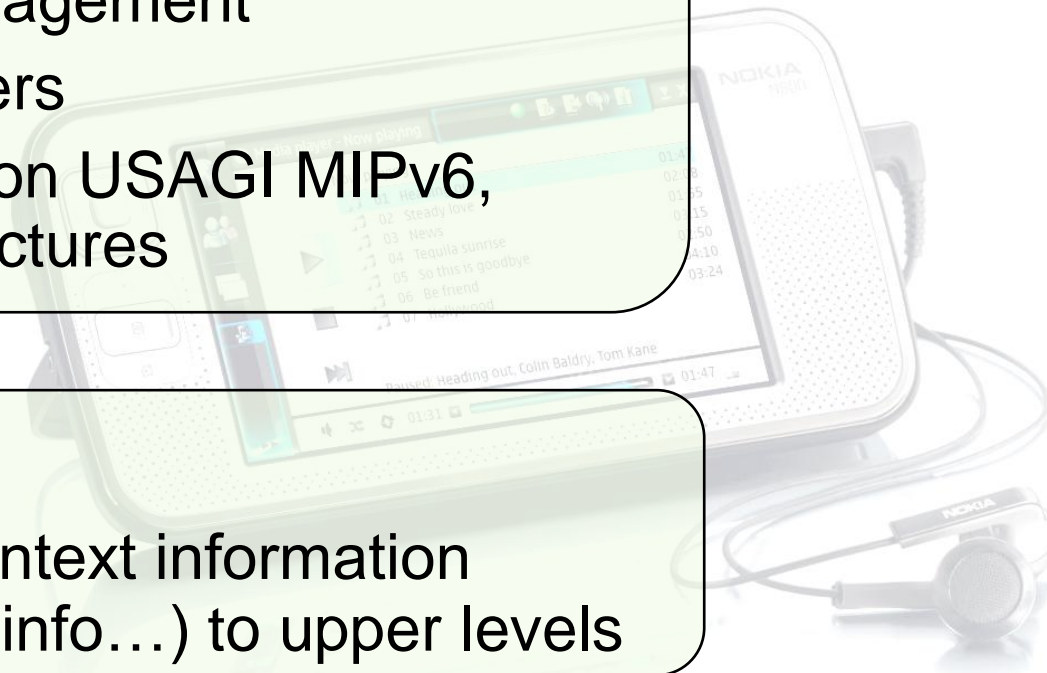
F-layer

VOs and mobility support

- Full support for VO management
- VO facilities for Grid users
- Mobility solution based on USAGI MIPv6, adapted to ARM architectures

Context awareness

Provides user's terminal context information (battery, position, **network** info...) to upper levels





Resource Sharing

Sharing mobile device resources...

- Limitations are there... (not too powerful)
- Other problems: reliability, etc. ... battery life!!!
- But there are still opportunities:

Data sharing

I/O Devices

Network access

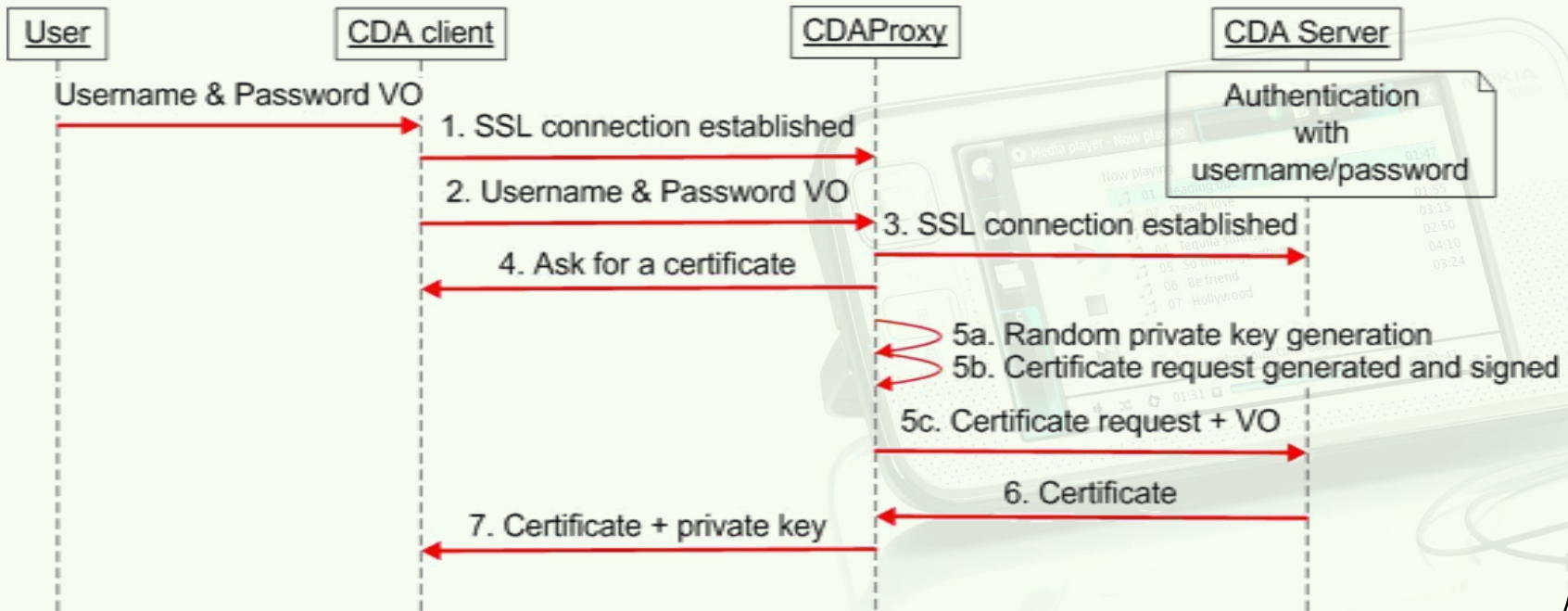
Sharing module offers: **publication** of resources (through SRDS system) and **access** to the resources





G-layer

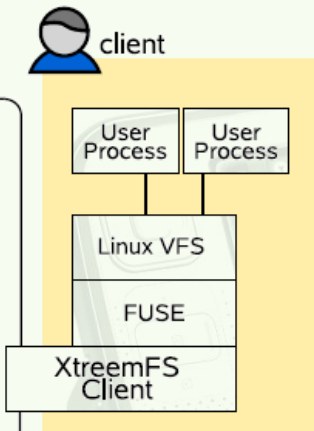
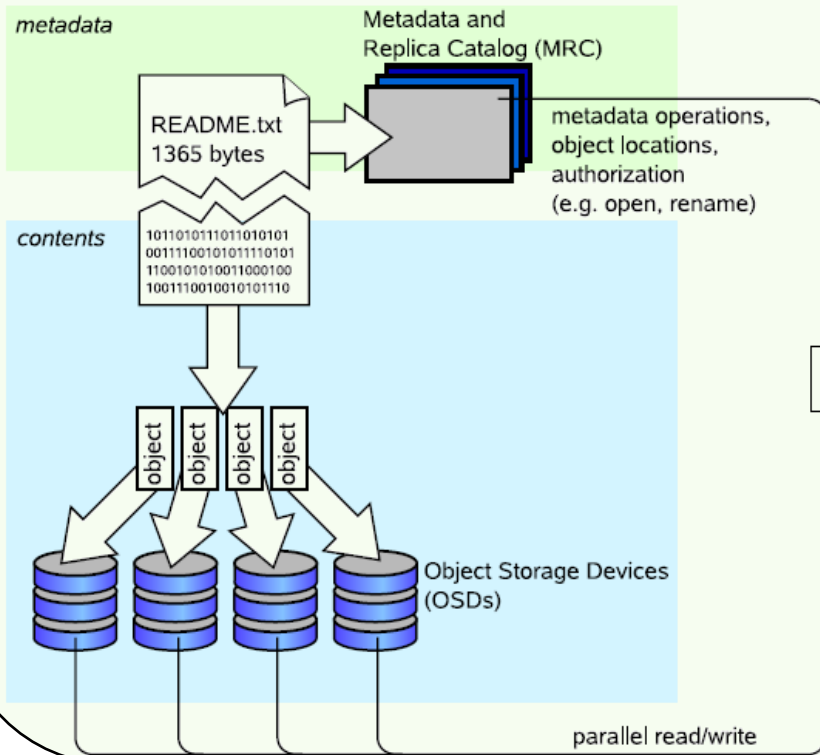
Security: CDA (and CDAProxy)





G-layer

XtreamFS: Grid file system



Transparent access to the user's volume (*automounting*)





G-layer

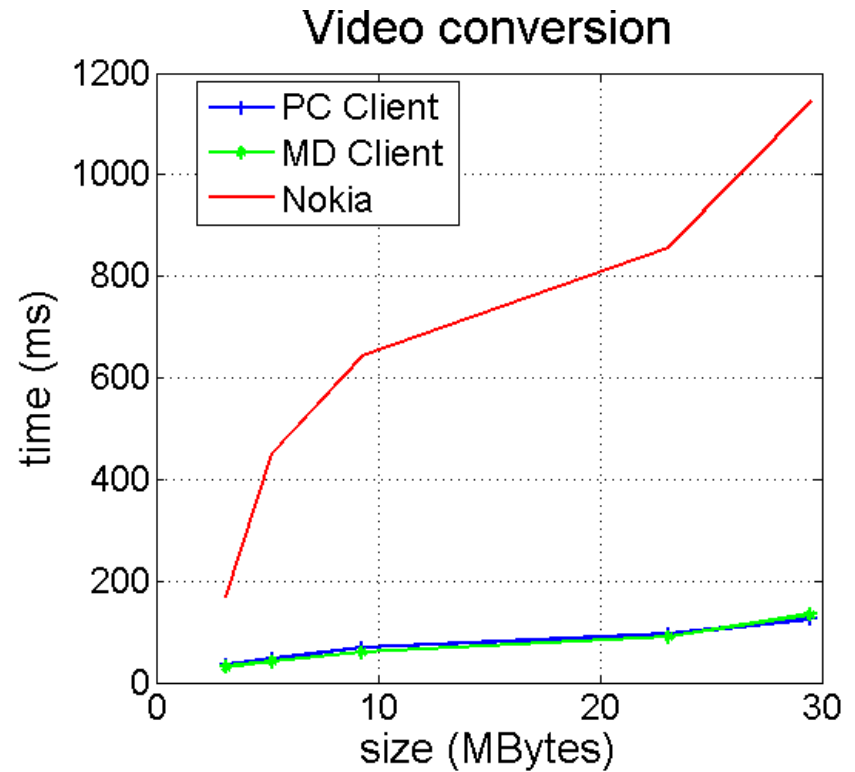
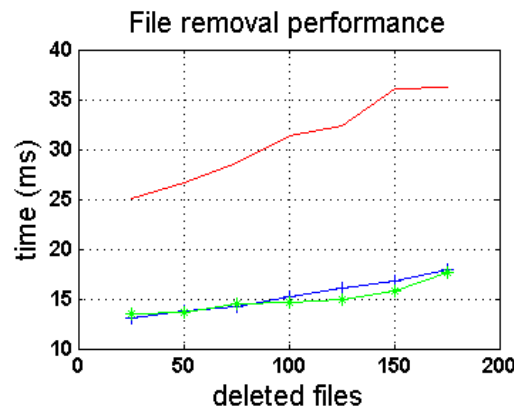
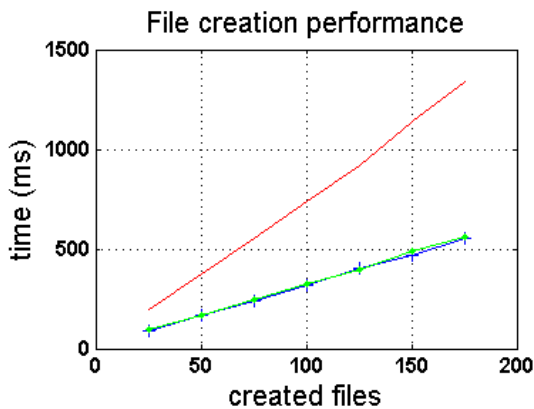
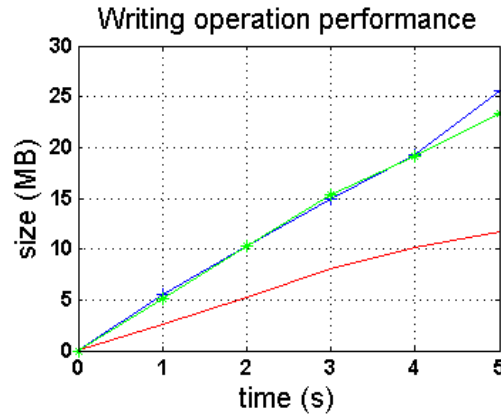
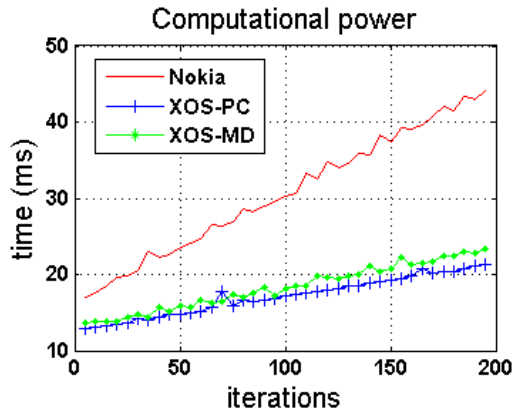
AEM: Job execution on the Grid

- **AEM: Application Execution Management**
 - Composed by several services running on a **XOSD**
 - Distributed architecture with core and resource nodes
 - XATICA is the C interface for MDs
 - Additionally can register MD resources (I/O devices) and not only “computing resources”





Performance





XtreamOS-MD Applications

JobMA

JobMA interface showing a "Job information" dialog box with the following details:

- Job ID: f5130bdf-31d2-400c-b46a-d6633f74e618
- Command: /usr/bin/cal
- Name: name
- Owner: TID
- Status: Created
- Sub. time: Thu Jun 11 18:15:04 2009
- Node: 1

The dialog also features a "Telefonica" logo and an "OK" button. In the background, a "New job created" notification is visible.

Load JSDL File... dialog box showing a file list:

File Name	Day
nat_support	viernes
openVPN	jueves
variosTest	23/03/09
xtreemfs	jueves
iptables_nat.ko	viernes
ipt_MASQUERA...	viernes
job.jsdl	jueves

The dialog includes a search bar, a "root" folder button, and "Añadir" and "Quitar" buttons. An "Abrir" button is at the bottom right.

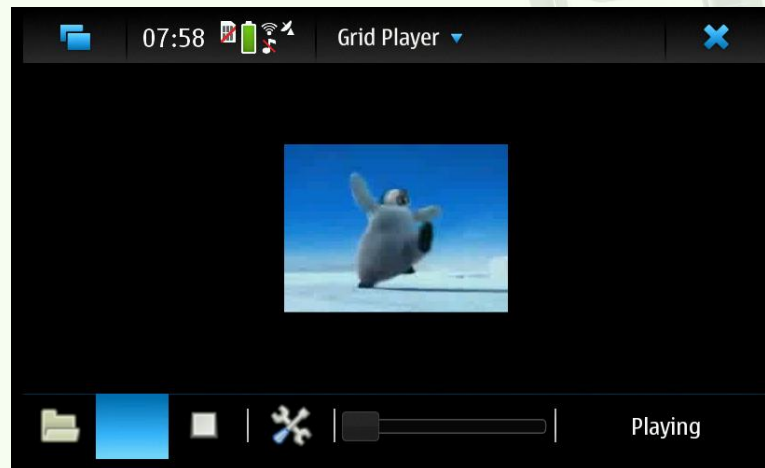




GridPlayer

GridPlayer: Multimedia player/converter

- MDs offer limited video capabilities
- Videos are converted when not supported
- The Grid makes the conversion!!

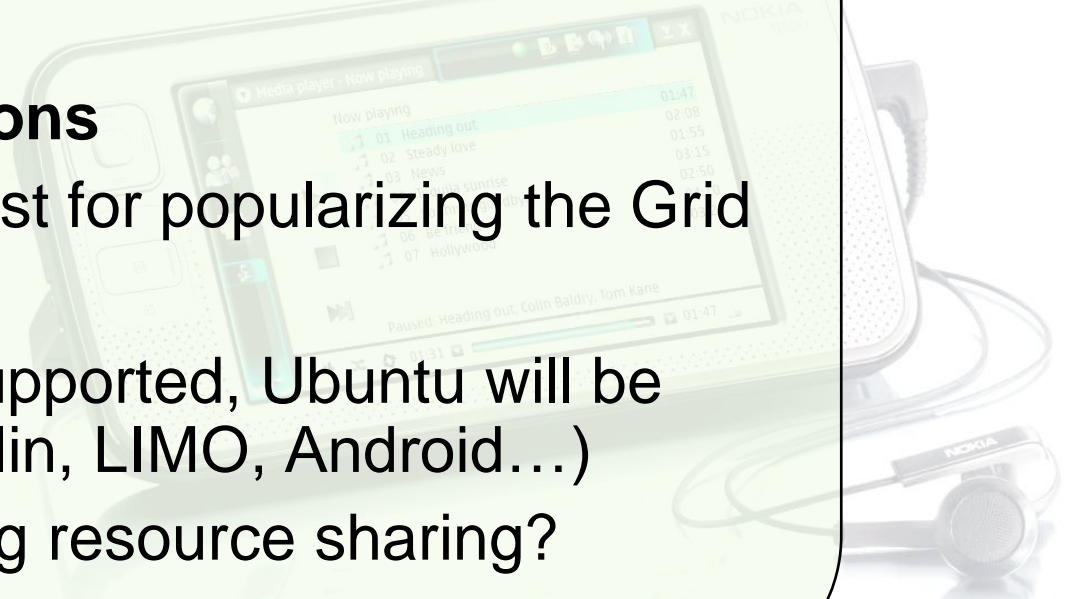




Future?

Conclusions and future works

- XtreemOS-MD: new way to enter in the **Mobile Grid Computing** arena
- Wide range of **applications**
- It could become a catalyst for popularizing the Grid
- Maemo 4 & Maemo 5 supported, Ubuntu will be (possible porting to Moblin, LIMO, Android...)
- New **use cases** involving resource sharing?
- Open source...





Your turn!

