MESA STATION
SOFTWARE INSTALLATION MANUAL
ENREGISTREMENT DES EVOLUTIONS/CHANGES RECORDS

<table>
<thead>
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<th>VERS.</th>
<th>DATE</th>
<th>§ : DESCRIPTION DES EVOLUTIONS</th>
<th>Author</th>
</tr>
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<td>23/11/2015</td>
<td>Document creation</td>
<td>P.Lazaridis</td>
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<th>Document Applicable / Reference</th>
<th>Issue</th>
<th>Description</th>
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<tr>
<td>AD-1</td>
<td>EuropeAid/135364/IH/SUP/Multi – Relaunch. c4f_annex1techspecilitechoffer_en.doc</td>
<td>18.11.2014</td>
<td>Customer requirements</td>
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ACRONYMS AND DEFINITIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFI</td>
<td>Customer Furnished Item</td>
</tr>
<tr>
<td>EIRP</td>
<td>Equivalent isotropically radiated power</td>
</tr>
<tr>
<td>LNB</td>
<td>Low Noise Block converter</td>
</tr>
<tr>
<td>NC</td>
<td>National Center</td>
</tr>
<tr>
<td>RIC</td>
<td>Regional Implementation Center</td>
</tr>
<tr>
<td>TPZF</td>
<td>Telespazio France</td>
</tr>
</tbody>
</table>
1. **SCOPE OF THIS DOCUMENT**

This document presents the software installation procedures to install a full MESA station.

It presents first, the overall station design of the system, then, the overview of the station architecture, the software installation, configuration and verification of this installation.
2. OVERALL STATION ARCHITECTURE

The following diagram presents an overview of the system.

![Diagram](image)

Figure 1: Overall view of the system

There are two types of stations which are involved in the system:
- MESA Stations aiming at acquiring, processing and analyzing environmental data
- PUMA 2015 Stations aiming at acquiring, processing and analyzing meteorological data

The data to process and analyze are acquired thanks to Eumetcast dissemination system. Eumetcast uses geostationary satellites to multicast data/products in DVB (Digital Video Broadcast) to a wide user community.

In addition of these stations, the installation proposes also the installation of a training centre which is presented in another document.
3. INSTALLATION PRINCIPLE

In order to support the system administrator for the MESA stations deployment, all applications are included in the MESA DVD Installation disk.

The installation principle is based on few steps to follow and which can be summarized as follows:

1. Insert the MESA DVD Installation disk and boot on the DVD reader
2. Select which application you wish to install
3. Update the system configuration if needed
4. Enjoy your app !!!

Figure 2: Installation principles

The MESA DVD installation disk proposes the following options:

<table>
<thead>
<tr>
<th>MESA</th>
<th>PUMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentOS 6.6 MESA FR PC1</td>
<td>CentOS 6.6 PUMA FR PC1</td>
</tr>
<tr>
<td>CentOS 6.6 MESA FR PC2</td>
<td>CentOS 6.6 PUMA FR PC2</td>
</tr>
<tr>
<td>CentOS 6.6 MESA FR PC3</td>
<td>CentOS 6.6 PUMA FR PC3</td>
</tr>
<tr>
<td>CentOS 6.6 MESA US PC1</td>
<td>CentOS 6.6 PUMA US PC1</td>
</tr>
<tr>
<td>CentOS 6.6 MESA US PC2</td>
<td>CentOS 6.6 PUMA US PC2</td>
</tr>
<tr>
<td>CentOS 6.6 MESA US PC3</td>
<td>CentOS 6.6 PUMA US PC3</td>
</tr>
</tbody>
</table>

Table 1: Installation disk options

The installation of the Training Centre is also included in this DVD but not accessible via this menu. The Training Centre installation procedure is described in another document.
According to the option, the main steps of an installation are:

**Figure 3: Main steps of a software installation**
4. STATION DEPLOYMENT OVERVIEW

This section presents the software installation procedure to follow in order to install a complete MESA station.

The following figure shows the hardware deployment of a mesa station:

![Diagram of MESA station layout]

**Figure 4 : MESA Full Station overview**

4.1 STATION EQUIPMENT

The PUMA indoor unit is composed of:

- 3 computers (Dell Optiplex 9020)
  - PC1, dedicated to the data acquisition
  - PC2, dedicated to data processing
  - PC3, dedicated to data analysis
  - including:
    - 1 Central Unit OptiPlex 9020 with a RAM of 8 Go
    - 2 Hard disk 1 To 7200 RPMs (RAID-1)
    - 1 Keyboard
    - 1 Mouse
    - 1 Graphical chipset (embedded in the mother board)
    - 1 Display Dell
• 2 Computers (PC1 and PC2) with:
  o 1 DVB-S/DVB-S2 TechnoTrend TT-Budget S2-4100 receiver card
• 1 USB dongle for the Eumetsat Tellicast (PC1 or PC2) licence
• 1 UPS APC Smart-UPS X 1500VA Rack/Tower LCD 230V with a Ethernet card and with 3 additional batteries for African countries
• 1 Gigabits Ethernet switch TP-Link TL-SG1008D – 8 ports
5. **PREREQUISITES**

Before any software installation, the following check list needs to be followed:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Check if RAID-1 is configured on the computer (see section 6)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>The UPS is <strong>configured</strong> and <strong>running</strong></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The computer where the installation has to be performed must be</td>
<td></td>
</tr>
<tr>
<td></td>
<td>compliant with the equipment defined in the section 4.1.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>The network (lan connection, switch) is ready and running</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>The satellite antenna is connected to PC1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>The MESA DVD Installation disk is ready</td>
<td></td>
</tr>
</tbody>
</table>

*Table 2: Prerequisites check list*
6. RAID-1 CONFIGURATION

All hardware and software provided by the project are already configured. But for a successful installation, you have to check some parts of your equipment before to start any software installation.

In order to facilitate the understanding of the benefits of the RAID-1, the following diagram presents a degraded case due to the sda disk:

<table>
<thead>
<tr>
<th>Application 1</th>
<th>Application 2</th>
<th>Application 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CentOS 6.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAID 1: md xxx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(sda)</td>
<td>(sdb)</td>
<td></td>
</tr>
</tbody>
</table>

The RAID-1 configuration of your computer allows data mirroring of your data from a disk (sda) to another disk (sdb).

If this disk (sda) fails for any reason, the disk controller see that sda is failed and the second disk (sdb) will be used for read and write operation.
Once the failed disk will be replaced, a synchronisation process called “rebuilding” will be automatically started by your system from the sbd disk to the sda disk.

At the ends of the rebuilding process both disk are available for read and write operations.

**Figure 5: RAID-1 use case**

### 6.1 HOW TO CHECK THE RAID-1 CONFIGURATION

At boot of your computer, the following information is displayed:

```plaintext
RAID Volumes:
ID Name Volume
0 RAID1(Mirror) 931.5GB Normal Bootable Yes

Physical Devices:
ID Device Model Serial #
0 ST1000DM003-1ER1 24Y80GP1
1 ST1000DM003-1ER1 24Y80892
```

**Figure 6: Checking of the RAID-1 configuration**
Check if the RAID volume is defined by verifying the following information:

<table>
<thead>
<tr>
<th>RAID Volume Name</th>
<th>Volume1</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAID Level</td>
<td>RAID1(Mirror)</td>
</tr>
<tr>
<td>Size</td>
<td>&gt;900 Gb</td>
</tr>
<tr>
<td>Status</td>
<td>Initialize or Normal</td>
</tr>
</tbody>
</table>
| Physical devices members | ID = 0 – Size > 900Gb – Member Disk (0)  
|                  | ID = 1 – Size > 900Gb – Member Disk (0) |

### 6.2 HOW TO CONFIGURE THE RAID-1 CONFIGURATION

In order to configure RAID-1 feature, when the screen of the Figure 6 appears, you have to press **CTRL+I** to enter in the RAID controller setup. The following screen appears and:

1. Choose the option 1 “Create RAID volume”

![RAID Configuration Screen](image)

2. Go to the RAID Level and choose the level “RAID1(Mirror)”
3. Then press “Enter” key until that system asks you to confirm your parameters.

4. Then, you have to choose the option “6 Exit” and confirm by “Y” to exit the RAID controller setup.
5. When the computer reboots, you should see the following screen:

The RAID-1 feature is now configured and ready to use!
7. SOFTWARE INSTALLATION

7.1 INSTALL THE APPLICATION

The software installation can be performed in any order (PC3, PC2, PC1) or (PC2, PC1, PC3), but we recommend to use the simple one PC1, PC2 and PC3.

To install the MESA station you must follow the steps described hereunder:

1. Check that prerequisites (see section 5) are verified (Please pay attention that UPS is configured and running);
2. Start the computer and insert the MESA DVD Installation disk in the CD-Rom reader;
3. Select the type of installation that you wish to install;

![Figure 7: Menu of the MESA & PUMA installations](image)

4. Select the verification disk option if you wish to check the media before to start the installation, or skip\(^1\) if you want to skip this step;
5. The installation process starts and install all required data regarding the operating system and applications;
6. Then, the system reboots and asks the user some information to configure the application.

\(^1\) We strongly recommend checking the installation media before any new installation.
Voila, generally, these steps describe above are enough to have a system operational and ready to acquire and process data. If you need to update the default network configuration, you should to proceed to an IP change operation. (See section 7.2)

7.2 **DEFAULT NETWORK CONFIGURATION**

The following values are set by defaults for the MESA station:

<table>
<thead>
<tr>
<th>Computer</th>
<th>Host IP Address</th>
<th>Hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC1</td>
<td>192.168.0.151</td>
<td>MESA-PC1,PC1</td>
</tr>
<tr>
<td>PC2</td>
<td>192.168.0.152</td>
<td>MESA-PC2,PC2</td>
</tr>
<tr>
<td>PC3</td>
<td>192.168.0.153</td>
<td>MESA-PC3,PC3</td>
</tr>
<tr>
<td>UPS</td>
<td>192.168.0.154</td>
<td>APC</td>
</tr>
</tbody>
</table>

*Table 3: Default network configuration table*

Subnet mask: 255.255.255.0

Gateway: No

If the station needs to be connected to a legacy network, you shall to update the network configuration via the "IP Change“ application available in the system menu. (See section 8).
8. NETWORK RECONFIGURATION

An application called “IP Change” available on PC3 for the system administrator (with root privileges) allows updating the network configuration of the stations.

The administrator can set, for each computer composing the station, the following information:
- Hostname(s)
- IP Address

The gateway and subnet mask values can be also updated but they are applied for all computers.

![IP Address's Update](image)

**Figure 8: Screen to change IP addresses for the MESA station**

It is worth to notice that the following hostnames cannot be changed or removed:

<table>
<thead>
<tr>
<th>Id</th>
<th>Hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC1</td>
<td>MESA-PC1,PC1</td>
</tr>
<tr>
<td>PC2</td>
<td>MESA-PC2,PC2</td>
</tr>
<tr>
<td>PC3</td>
<td>MESA-PC3,PC3</td>
</tr>
<tr>
<td>APC</td>
<td>APC</td>
</tr>
</tbody>
</table>
Table 4: MESA mandatory hostnames

You can add others hostname in “Equivalent name” column, if needed. Each hostname needs to be separated with a comma like the Figure 8.

8.1 HOW TO CHANGE NETWORK CONFIGURATION

From the system menu launch the “IP Change” application. At boot, it will check the computers which are running:

![Figure 9: Search of the active PCs](image)

![Figure 10: Access to the “IP Change” application](image)
Fill the new network information:

![IP Address's Update](image)

**Figure 11: Change the network parameters**

Add new computers (if needed):
Figure 12: Add new computers to the network configuration

Launch the configuration update by clicking on "RUN" button, and fill the root password and click on "OK" button:
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Figure 13: Application of the new network configuration

When finished, the following message appears:

Figure 14: Completion of the network update process
9. QUICK INSTALLATION VERIFICATION

9.1 SATELLITE RECEPTION

9.1.1 Hardware connection to the existing MESA station

The RF cable will be connected between the LNB (or RF filter if exists) output of the antenna to the Input of the DVB-S/DVB-S2 TechnoTrend TT-Budget S2-4100 card located in the Acquisition computer (PC1).

You might have to connect the RF signal through a splitter (if it has been requested) to the Processing computer (PC2).

The station is now ready to receive the satellite signal and process the data.

9.1.2 Quality of the received satellite signal on the tellicast utility

The Tellicast Multicast Distribution System Client allows verifying the EumetCast data flow. It is available from PC1 at the following URL: http://localhost:8100

![Figure 15: Tellicast Multicast Distribution System Client](image-url)

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Click on <Statistics> to open the TelliCast Statistics window

![TelliCast Statistics](image)

Figure 16: Tellicast Multicast Distribution System Client - Statistics

Click on <Active Channel> to display the active channels
**Figure 17: Tellicast Multicast Distribution System Client – Active channels**
The monitoring dashboard is reachable from PC1 at the following URL:
http://localhost:8000/mesa-monitoring.html

The figure below presents the monitoring display after the installation of the 3 PCs composing the MESA station:

![Monitoring dashboard for the MESA station](image)

*Figure 18: Monitoring dashboard for the MESA station*

Your monitoring dashboard after the software installation should be the same. It can be different for the UPS, which depends of its batteries’ load. In the figure above, the batteries load is full.
10. **FINAL CONFIGURATION**

This section presents the final configuration at the end of a standard install (without any change regarding the network IP addresses). The following figures present the applications installed on PC1, PC2 and PC3.

![Deployment view of the applications in station MESA](image)

*Figure 19: Deployment view of the applications in station MESA*

The following table presents the network settings for a standard installation:

<table>
<thead>
<tr>
<th>Computer</th>
<th>Host IP Address</th>
<th>Hostname</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC1</td>
<td>192.168.0.151</td>
<td>MESA-PC1, PC1</td>
</tr>
<tr>
<td>PC2</td>
<td>192.168.0.152</td>
<td>MESA-PC2, PC2</td>
</tr>
<tr>
<td>PC3</td>
<td>192.168.0.153</td>
<td>MESA-PC3, PC3</td>
</tr>
<tr>
<td>UPS</td>
<td>192.168.0.154</td>
<td>APC</td>
</tr>
<tr>
<td>Netmask</td>
<td>255.255.255.0</td>
<td></td>
</tr>
</tbody>
</table>

*Table 5: Network settings for a standard installation*
SUCR #1 STATIONS

FIN DE DOCUMENT
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