Europe Aid/132517/D/SER/Multi

Monitoring for Environment and Security in Africa (MESA)

CONTRACT NO. EDF 2013/315-947

eStation 2.0

Administration manual

Version 1.0

November 2015

Date: 30/11/2015
Ref: MESA/DOC/eStation/AdminManual

Abstract / Résumé
This document provides instructions for the management of the eStation 2.0 system on MESA computers.

	Name	Position
Prepared by	Marco Clerici	JRC-EC responsible for MESA
Contributions/Reviews by	Antoine Royer Jurriaan Van't Klooster	JRC-EC thematic Expert for MESA IT-GIS Specialist

	Details	Date
Version history	Draft 0.1	December 2014
	Draft 1.0	May 2015
	Draft 1.1	July 2015
	Version 1.0	November 2015

Contents

List of Tables and Figures

ACRONYMS and DEFINITIONS

AMESD	African Monitoring of Environment for Sustainable Development
ACMAD	African Centre of Meteorological Applications for Development
AGRHYMET	Centre Régional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle
AU	African Union
BDMS	Botswana Department of Meteorological Services
CICOS	Commission Internationale du Bassin Congo-Oubagui-Sangha
CWG	The MESA Continentalisation Working Group
EO	Earth Observation
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EUMETCast	EUMETSAT's primary dissemination mechanism for the near real-time delivery of satellite data and products
FTP	File Transfer Protocol
GIS	Geographical Information System
IOC	Indian Ocean Commission
JRC	Joint Research Centre of the European Commission
MESA	Monitoring for Environment and Security in Africa
MOI	Mauritius Oceanography Institute
REC	Regional Economic Communities
RIC	Regional Implementation Centre
TA	Technical Assistance
TAT	Technical Assistance Team
THEMA	Regional and Continental Thematic Actions

1. INTRODUCTION

1.1 SCOPE OF THE DOCUMENT

This document describes how to maintain the eStation 2.0 application, installed on the MESA computers, or on a different hardware. It is meant mainly for the IT Specialist taking care of the basic operations of configuring the system, performing diagnostic actions and recovering from faulty conditions are described. It also contains some additional insights in the eStation 2 (Chapter 4) for Advanced Users willing to further customize the processing performed on the system.

1.2 DOCUMENT ORGANIZATION

The present document is structured into the following chapters:

- Chapter 2: Access to the Station

It describes how to connect to the system, both from the local PC and from a remote computer that can access the eStation through a LAN.

- Chapter 3: System Maintenance

It describes the main operations to be performed for the system maintenance, including monitoring the disk space, perform diagnostic and recovery operations.

- Chapter 4: System Description

It describes the organization of the System in terms of directory structure, postgresql database structure. It is often used as a reference from other chapters of the document.

- Chapter 5: Trouble Shooting

It describes the most common errors/problems that can be found on the system and how to deal with them.

- Annex: MESA Station Administration and Maintenance Manual

  This document is generated by the Supply Contractor and represents a Reference Document (RD-3) for the current one. Therefore it is attached to the current document in order to facilitate the User (many references are done to RD-3).

1.1 APPLICABLE AND REFERENCE DOCUMENTS

Id	Title	Date	Reference
AD-1			
AD-2			
AD-3			
AD-4			

Table 1: Applicable documents

Id	Title	Date	Reference
RD-1	eStation 2.0 User Manual	October 2015	MESA/DOC/eStation/UserManual
RD-2	MESA Station SW Installation Manual	November 2015	TASF-MESA-MIM-10 (EN) TASF-MESA-MIM-13 (FR)
RD-3	MESA Station Administration and Maintenance Manual	November 2015	TASF-MESA-MAM-11

Table 2: Reference documents

2. ACCESS TO THE ESTATION 2.0

This section describes how to log to the MESA Station, which are the defined Users, and how to access the dataset from an external PC

2.1 LOGIN TO PC2 AND PC3

The following Users are defined on the AMESD/MESA computers for eStation 2:

Name	Password	Role	Comments
adminuser	**mesadmin**	Manages the installation, the upgrades and ensure maintenance of the system	He/she is expected to be an IT System Administrator. He/she has administrative rights on the machine[1]
analyst	**mesa2015**	Thematic Expert using the system to perform environment monitoring.	He/she is expected to be an Environmental Analyst.

Table 3: eStation2 Users

When the computer is switched on, a login form is presented (see Figure 1); the User can log as 'adminuser' (for maintenance and configuration) or as 'Thematic User' (for normal usage of the eStation).

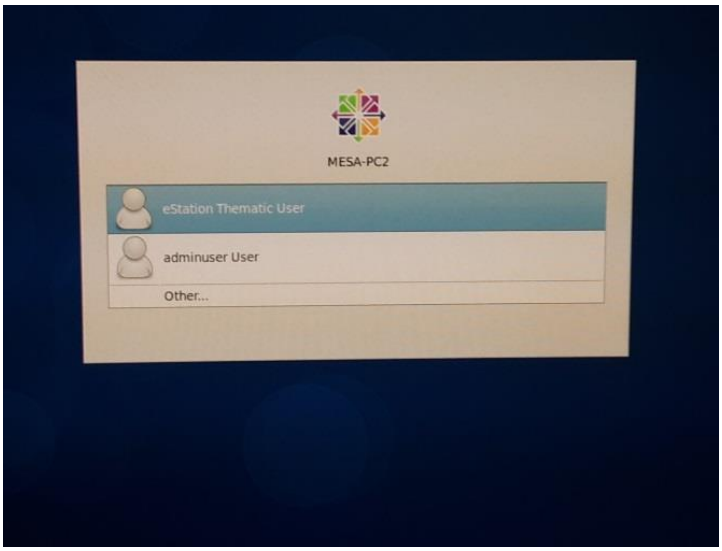


Figure 1: Login Users

[1] In the Linux terminology, the ***adminuser*** has 'root' rights and can execute 'sudo' commands.

The user is requested for the ‘password’ (see **Table 3**) to be entered, as represented in Figure 2.

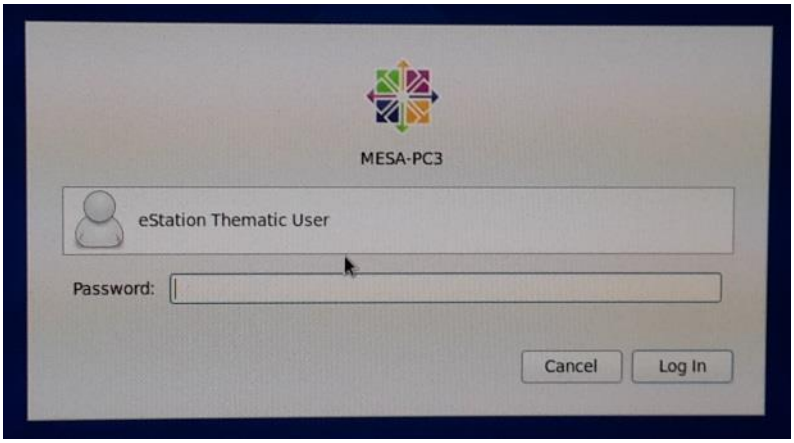


Figure 2: Login Password

Please note that according to the language of the installation, the keyboard is also assigned as ‘QWERTY’ or ‘AZERTY’. It might happen that the password is not accepted because the keyboard you are using does not correspond to the Language settings. In this case, change the ‘Language’ by clicking on the menu at the bottom line of the monitor (see Figure 3).

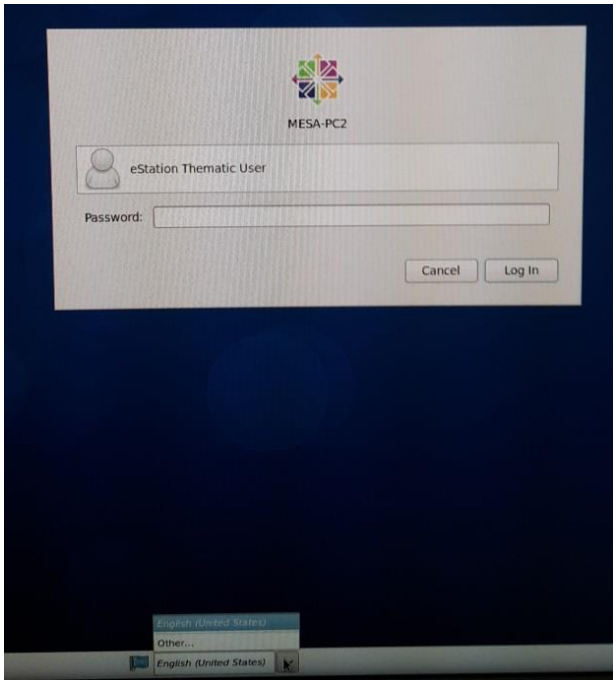


Figure 3: Change language at login

2.2 REMOTE ACCESS TO THE ESTATION

The eStation 2.0 is meant to be connected to a LAN in the beneficiary Institution, in order to allow the access to its datasets and its web-client interface from other computers. The configuration of the IP addresses in order to connect to a LAN is done in the MESA Station SW Installation Manual (RD-2) in paragraph 8.1.

In alternative, a desktop or laptop can be added to the MESA LAN, by branching it to the provided switch. In paragraph 2.2.1 we describe how this operation can be done on Windows 7 machines. This operation varies according to the OS, and might require the assistance of your System Administrator.

Once the external PC and the MESA computers (PC1, PC2 and PC3) are on the same network, it is possible to access the eStation datasets (see2.2.2) and the eStation GUI (see 2.2.3) from the external computer.

2.2.1 Connecting a Windows PC to the MESA LAN (optional)

If a Windows computer is connected to the switch of the MESA Station, the PC network configuration has to be modified in order to 'manually' assign an IP (v4) in the same 'Subnet' as the other three computers. In Figure 4 an example of configuration (for Windows 7) is shown, and an IP equal to 192.168.0.8 is assigned to the machine.

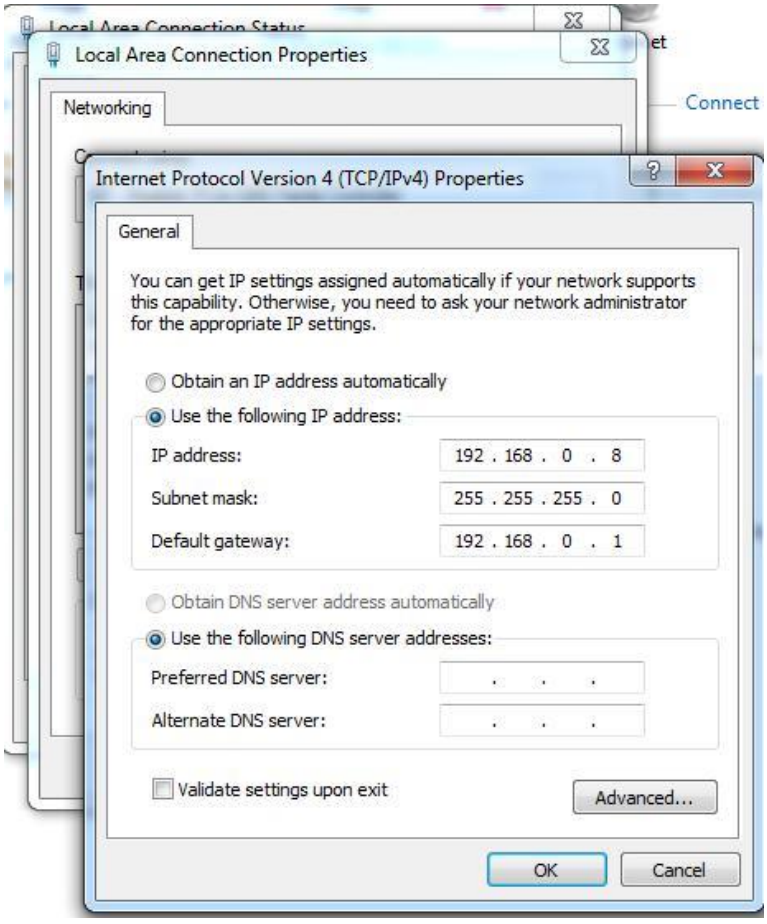


Figure 4: Network configuration in Windows 7

The above configuration allows having the additional computer on the same network as MESA PCs, which can therefore be accessed through their IP address. In order to access by using the hostname (e.g. MESA-PC2), the 'hosts' file in directory 'Windows\System32\drivers\etc\' has to be edited to define the correspondence between IPs and hostnames. After this operation, the PC has normally to be rebooted.

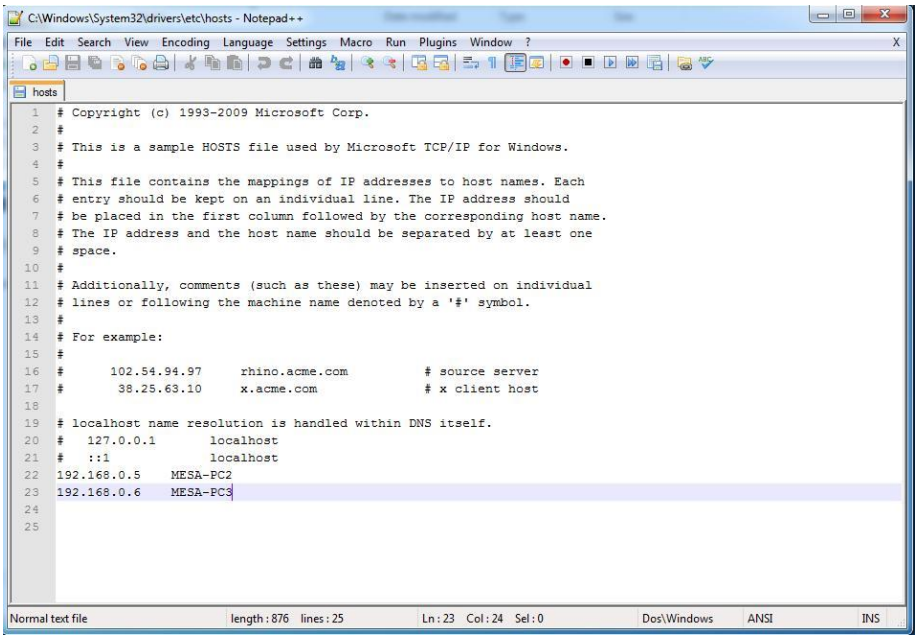


Figure 5: Modify the hosts file in Windows 7

2.2.2 **Access the eStation dataset via ftp.**

Once the eStation PCs are accessible on a LAN, you can use an ftp client to browse the eStation directories; in the following we use – as an example – the Filezilla tool (see Figure 6).

For the connection, you have to enter the following parameters:

Host: either the machine IP or the hostname[2]

Username: 'adminuser' or 'analyst'

Password: 'mesadmin' or 'mesa2015'

Port: 22[3]

Note that in the example of Figure 6 the IP 192.168.0.5 is indicated, and that has to be changed according to the real IP of the machine (normally, 192.168.0.152 for PC2 and 192.168.0.153 for PC3).

[2] The hostname will work, ONLY if configured on the local machine – see 2.2.1.

[3] For sftp connections, you can either indicate the host preceded by the stfp:// string, or port=22

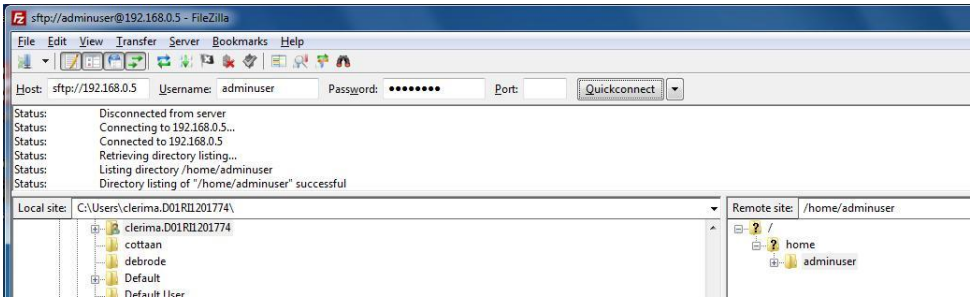


Figure 6: Filezilla to access eStation data

At the first connection to the machine, the system will raise the message of 'Unknown host key' (see Figure 7): click on OK.

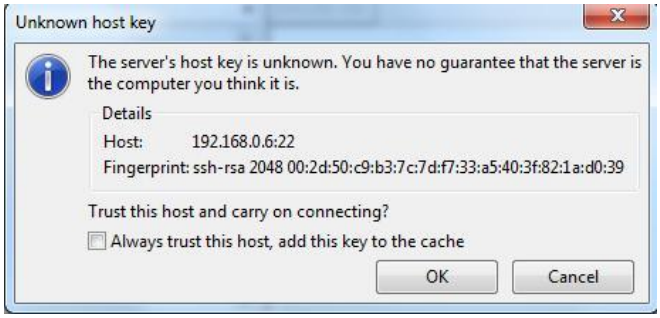


Figure 7: Confirm host key message

At this point, you will see in Filezilla the right panel, the eStation-PC2 filesystem, and the home directory of the User you have indicated for the connection. You can navigate to a different directory (e.g. /data/processing/) and copy locally the desired files.

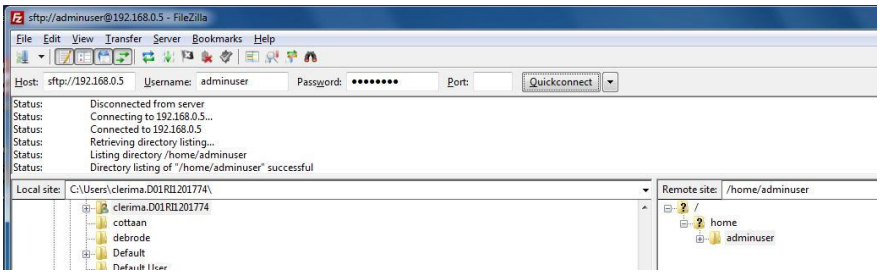


Figure 8: eStation accessed in Filezilla

2.2.3 **Access the eStation GUI from a browser.**

In order to see the eStation graphical interface from the Windows PC, it is enough to open a browser (Internet Explorer in our example) and enter the machine IP or hostname[2].

The result of the connection is shown in Figure 9: you can navigate through the different tabs (Acquisition, Processing and so on) and perform the same actions as when you are operating directly on the machine. An option is also to open in the browser two different tabs, for having access on PC2 and PC3 at the same time.

This remote operation option is indeed powerful and risky at the same time, as you can remotely stop the services (Acquisition and Processing) and de-activate the server data processing: we

therefore recommend to be especially careful, especially when remotely accessing the computer performing the processing (PC2, in Nominal Mode).

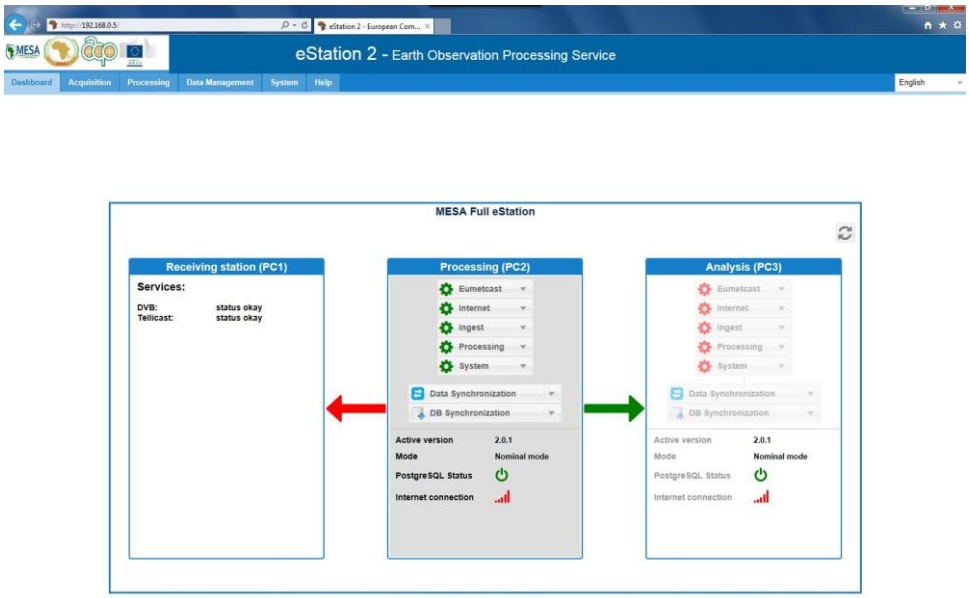


Figure 9: eStation GUI from a remote PC.

2.2.4 **Connection by remote shell (ssh)**

Both PCs are equipped with the **ssh** protocol (part of CentOS). Therefore, any host connected to the same network as the eStation will be able to remotely access it, to open a 'terminal' session and to type commands, as if the user was physically connected to the console.

Note that a software client, such as PuTTY (directly and freely downloadable from the internet) is required. Also, if there is a firewall between your host and the eStation the ssh connection will probably not work. In such case ask assistance to your system administrator.

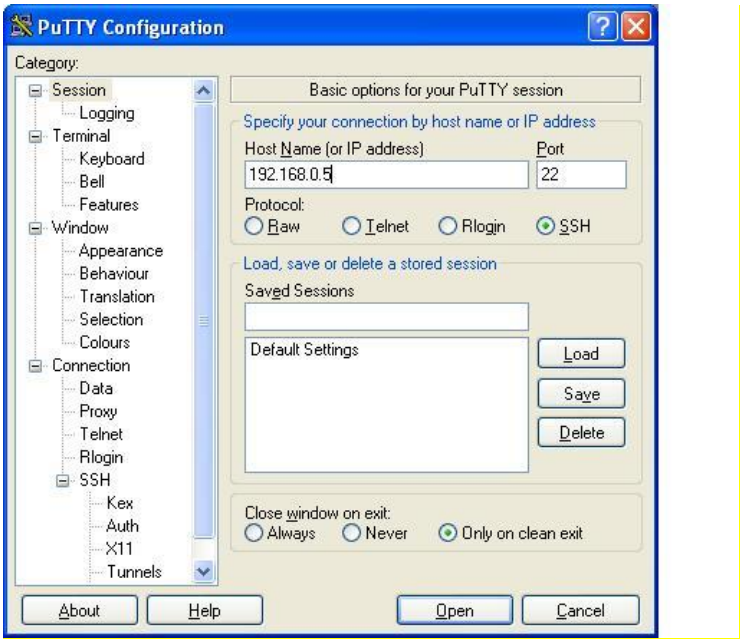


Figure 10: Example of PuTTY connection screen

In PuTTY – see *Figure 10* - you have to enter the same parameters as for the ftp connection, i.e. the IP of the machine (*which should correspond to the real one – do not consider the 192.168.0.5 that is only for example*) and the port 22. Again, a message notifying the 'new host key' might be displayed, and as to be acknowledged (type 'YES' – see *Figure 11*).

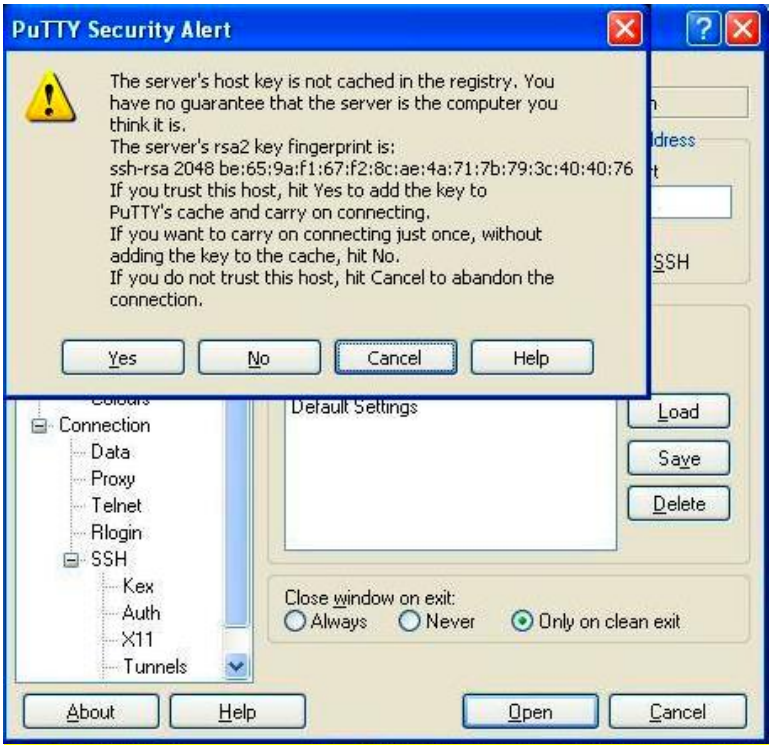


Figure 11: PuTTY first connection

Afterwards, the Username and password are requested, before opening the 'terminal' session on the machine.

3. eSTATION MAINTENANCE

This section describes the main operations to perform for the system maintenance, including monitoring the disk space, perform diagnostic and recovery operations.

3.1 MONITORING THE STATUS OF THE SYSTEM

3.1.1 Monitoring the status of the disk

The MESA eStation 2.0 is installed on DELL Optiflex 9020 machine equipped with two 1 Tb disks, in RAID1 redundant configuration.

The User can check this configuration in several ways, according to the status of functionality of the system, and his convenience.

Check the disk status by using CentOS tools

CentOS makes available a 'Disk Analyser' tool from the Applications -> System Tools menu (see Figure 12).

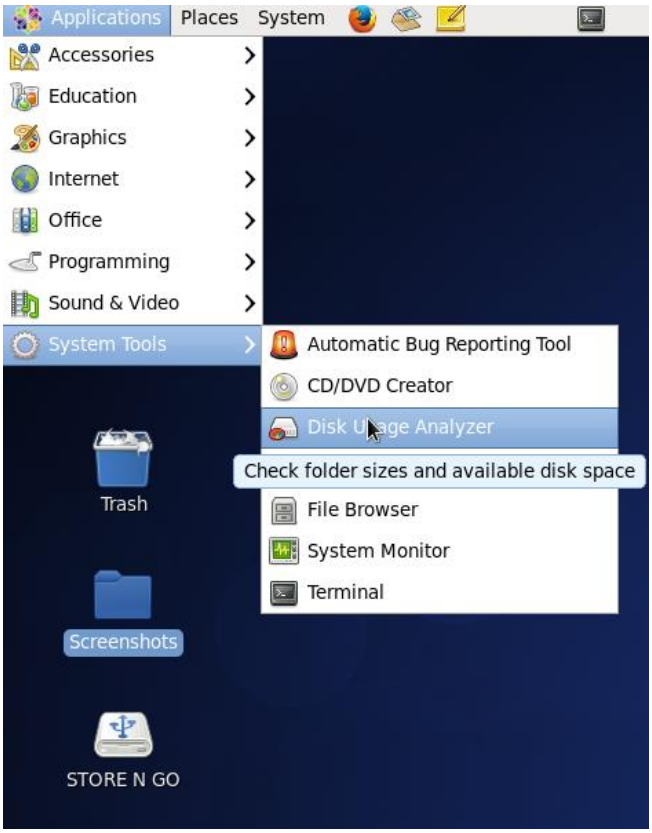


Figure 12: Disk Analyser Tool

Once started, it visualizes the total filesystem capacity and the Usage (see Figure 13) and allows additional operations like the scanning a specific directory, to see the total size it occupies in the filesystem.

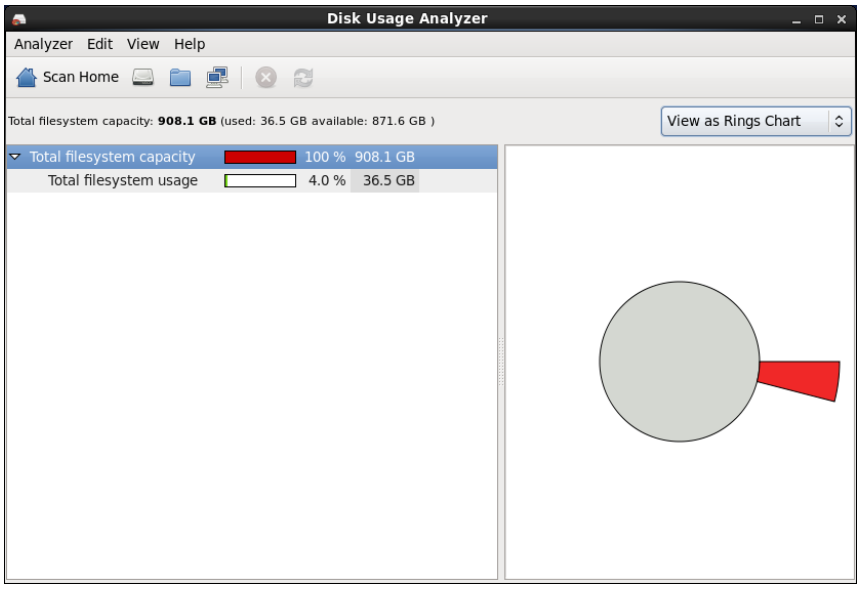


Figure 13: Disk Analyser View

Check the status of RAID1 disk

The MESA computers host two HDs of 1 Tb in RAID1 configuration. The checking and administration of the RAID 1 is described in MESA Station Administration and Maintenance Manual (RD-3) in paragraph 7.3.

3.1.2 **Monitoring the status of the System**

The CentOS installation offers a 'System Monitor' Utility that can be accessed from the main Menu (Applications -> System Tools -> System Monitor) as displayed in Figure 14.

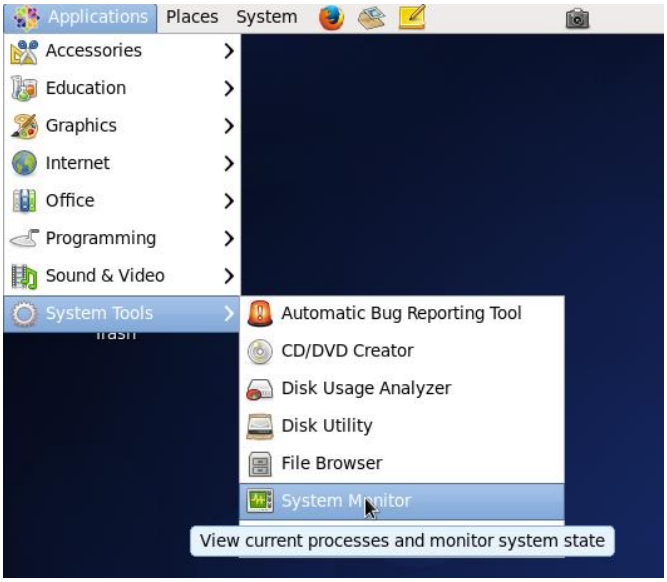


Figure 14: System Monitor utility

The application is composed by 4 tabs, starting from the 'System' one, which displays the name of the computer ('hostname', which is MESA-PC3 in case of Figure 15).

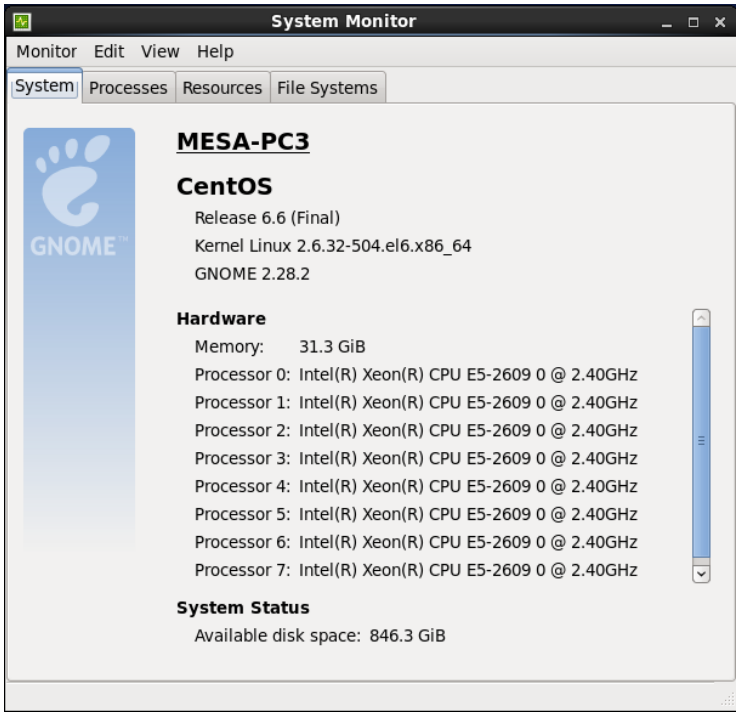


Figure 15: Monitor Menu - System Description

The most relevant tab is 'Resources' (see Figure 16), where the status of usage of CPUs, including a short history of usage, is displayed, together with the history of memory use and 'Swap' operations

and the Network History, which reports on the amount of data exchanged on the LAN, both in reception and uploading.

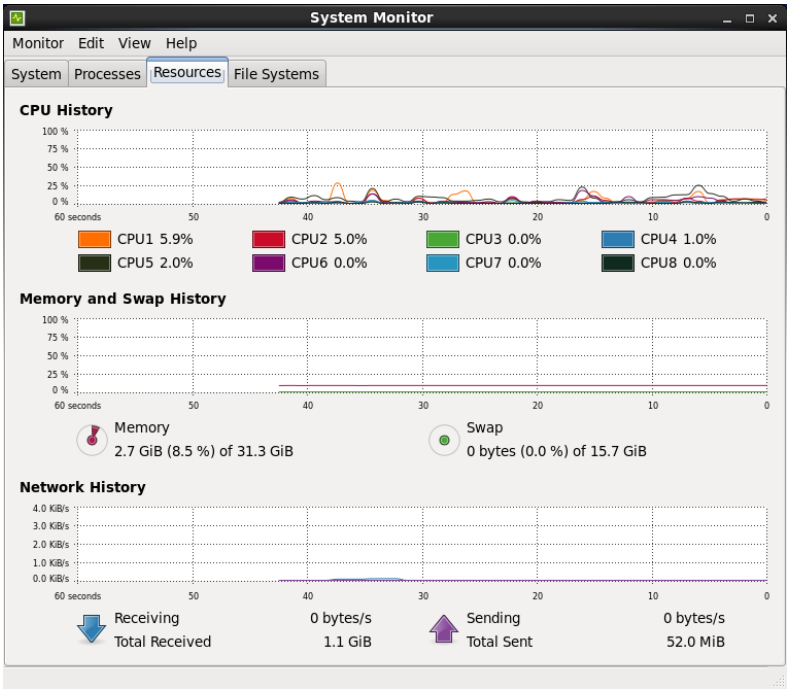


Figure 16: Monitoring System Resources

Another relevant tab is the 'Processes' one, where the list of active processes, their status, their usage of computer resources (%CPU and Memory) is displayed, alike in the Windows 'Task Manager'.

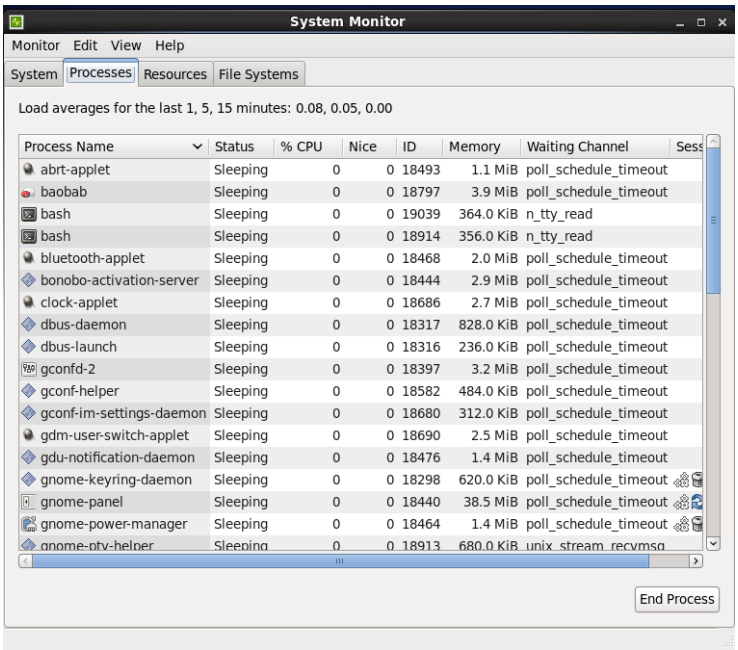


Figure 17: System Processes

3.1.3 **Checking the Log files**

All eStation2 logfiles are created in the /eStation2/log directory, and they are not touched by the upgrade to a newest version of the system. We have implemented for all python modules a logfile named according to the position of the .py file, and its name; e.g. the *apps.acquisition.ingestion.log* is created by the module *ingestion*.py, located under the eStation 2.0 base directory, in *./apps/acquisition* directory (i.e. the file /var/www/eStation2/apps/acquisition/ingestion.py).

The log mechanism generates and keeps 4 versioned files for each of python module: the latest is named with the suffix .log (e.g. apps.acquisition.ingestion.log), while an additional suffix from .1 to .3 is added to the older ones (.3 is the oldest).

Note that the log files generated by the Services, or related to a specific acquisition or processing trigger, can be accessed in an easier and more direct way through the GUI (see User Manual Chapter 3); the access to the logfile directory is therefore suggested when the GUI is not working, or when the User would like to see the full list of logfile, including the older ones ('.log.1' to '.log.3')

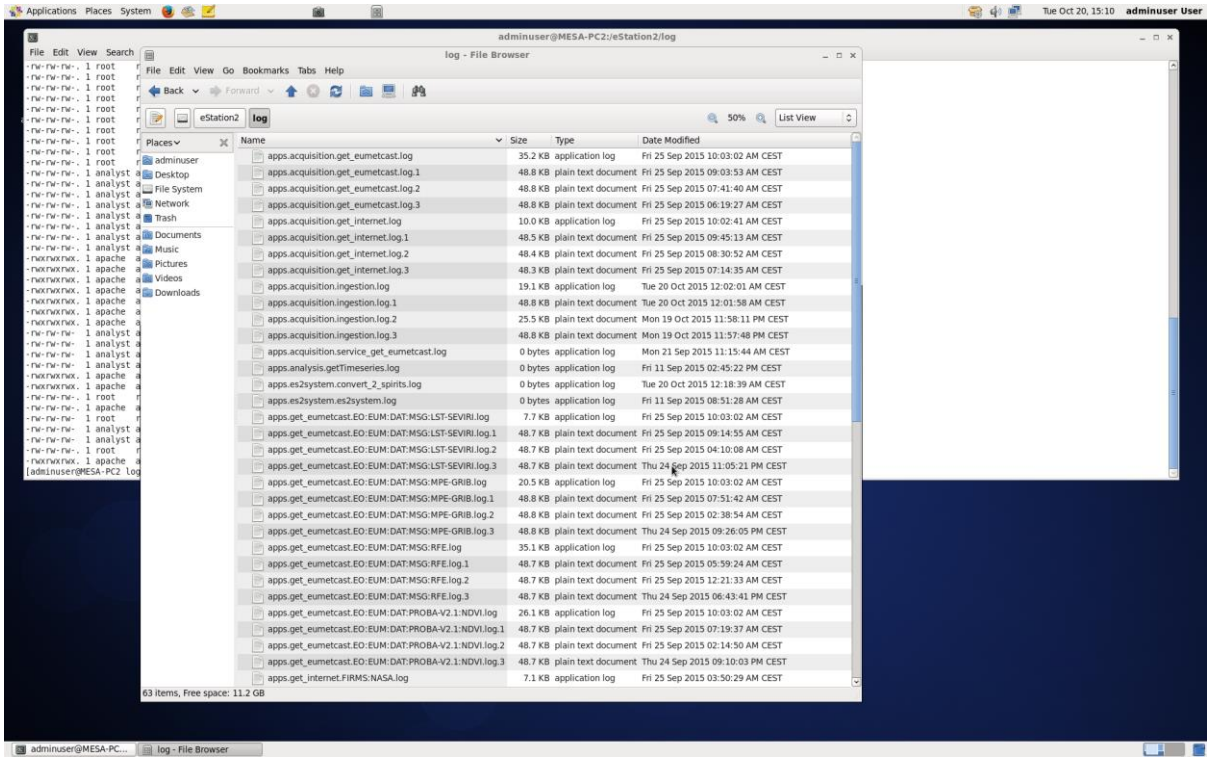


Figure 18: Logfiles of eStation 2.0

3.2 IMPORTING DATASETS

As described in the User Manual in paragraph 2.4.9, after installation of the eStation the local disk has to be populated with raster file generate by JRC. These archives are made available on an external medium (usually an USB external disk) that as to be connected to the PC2.

Therefore, as first operation you have to be logged in as ‘adminuser’ and connect the external disk; at this point, normally the disk is automatically recognized, mounted, and will appear on the ‘Desktop’ of the User (see Figure 19). In our example, the disk is labelled ‘MESA-2’ and you see this name on the desktop. In particular, we have copied the archives in the ‘Archives2.0’ directory.

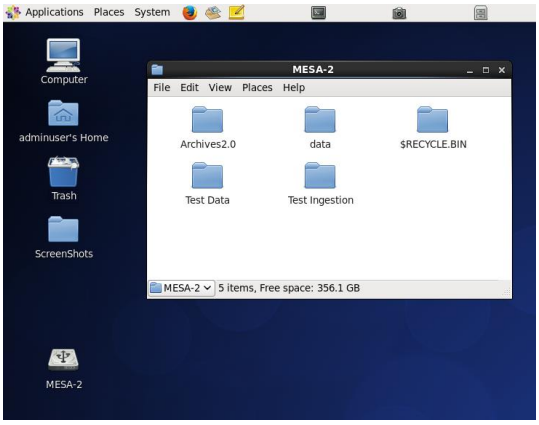


Figure 19: Archives disk connected.

As a consequence, the files are visible in the filesystem under:

/media/MESA-2/Archives2.0

You have to enter this location in the ‘System’ tab, as ‘Archive directory’ and push the ‘SAVE’ button to have the eStation record this variable (see Figure 20).

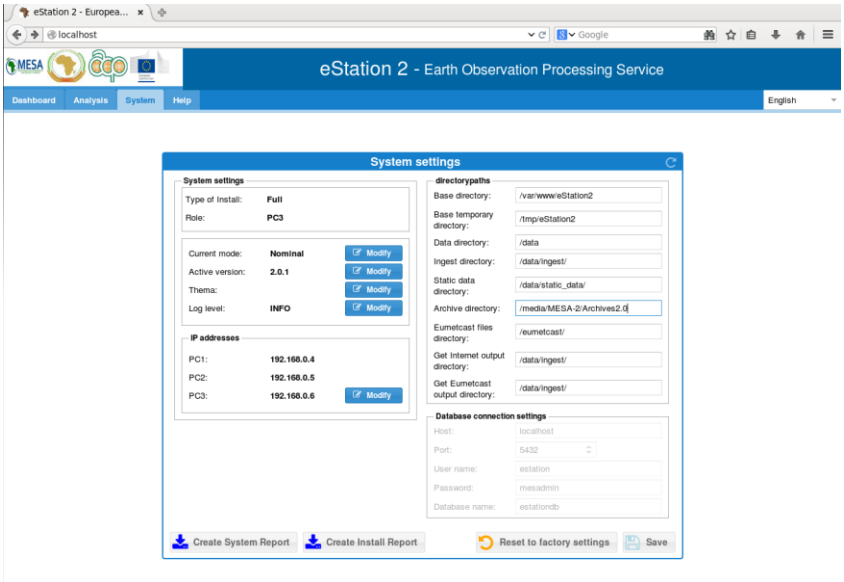


Figure 20: Update location of the Historical Archives.

Now you have to launch the python routine to execute the ingestion; open a terminal and change your current directory to: */var/www/eStation/apps/tools* (see Figure 21)

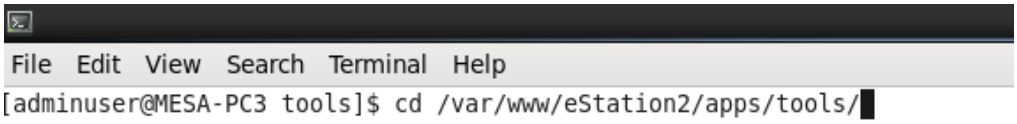


Figure 21: Change dir for Ingestion

Enter the command: *python ingest_historical_archives.py* (see Figure 22)

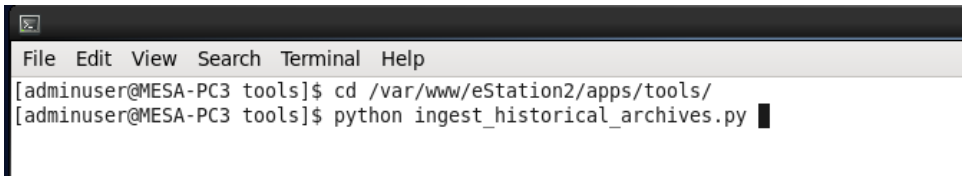


Figure 22: Start the ingestion

The ingest routine starts scanning the defined directory, and does a local copy, optionally with reprojection to the local ROI, of all subproducts that are relevant for the Thema defined. It is therefore mandatory to execute this operation after having properly set the THEMA (see paragraph 3.9 of User Manual).

The routine reports the images it is processing (see Figure 23). The duration of the process varies according to the number of files to be treated, and goes from few minutes to an hour, or more.

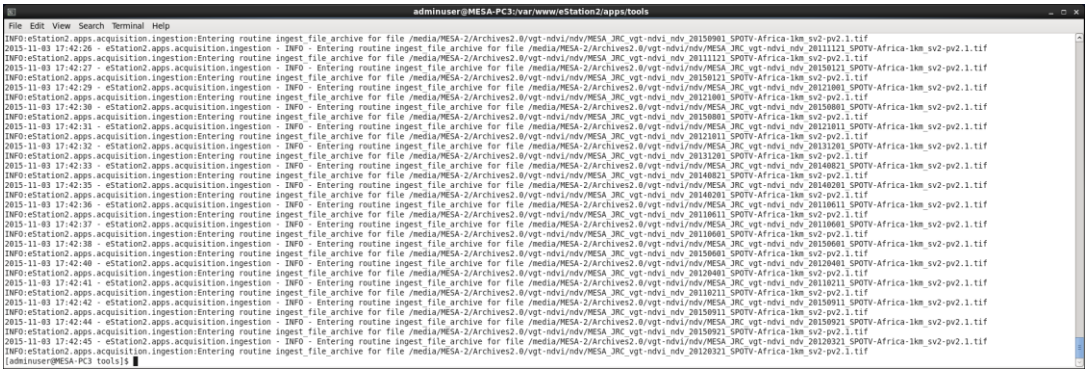


Figure 23: Historical Archives ingestion finished

3.3 PERFORMING VERSIONS UPGRADES

The three packages composing the eStation application (see 4.1.5) are originally installed on the MESA station in version 2.0.1. During the MESA project, the application will be upgrade to newer version (starting from 2.1.0) and the packages disseminated through EUMETCast.

The MESA station implement an automatic mechanism the upgrade the full installation, which is described in the MESA Station Administration and Maintenance Manual (RD-3) in paragraph 5.3

Once the eStation application is upgraded to a newer version, this is automatically considered for operation. If the User intends to switch between versions (not recommended) he should access the System tab of the eStation 2.0 GUI, as described in the User Manual (RD-1) in paragraph 3.9.

3.4 RECOVERY MODE (FAILOVER/FAILBACK)

The Recovery Mode is managed on the MESA station through a general mechanism for managing the 3 PCs implemented by the Supply Contractor (TPZF/TAS). Please refer to the MESA Station Administration and Maintenance Manual (RD-3) paragraph 6.6 (Failover) and 6.7 (Failback).

3.5 MANAGING THE POSTGRESQL DATABASE

The current section describes how to check the postgresql server is running, how access the 'estationdb' database, and how to restore a previous copy of the database in case of corruption.

3.5.1 Check the status of the postgresql server

The postgresql 9.3 server is installed on eStation 2.0, and its status can be checked from the terminal by typing the command:

/etc/init.d/postgresql-9.3 status

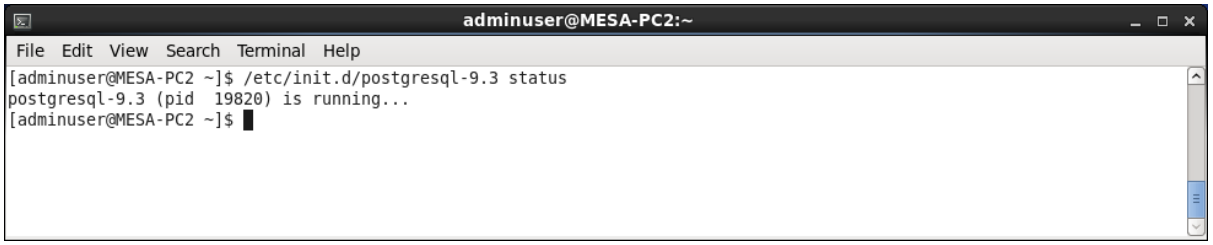


Figure 24: Check postgresql status

The expected result is represented in Figure 24: '*postgresql-9.3 (pid NNNNN) is running... '*

To stop the server, a similar command is executed (see Figure 25): note that 'sudo' should precede the command, as root rights are required.

sudo /etc/init.d/postgresql-9.3 stop

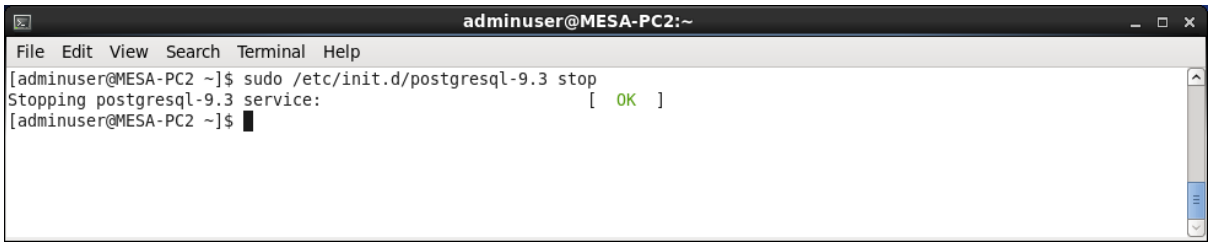


Figure 25: Stop postgresql

Similarly, for starting (see Figure 26) or restarting the server, the following commands have to be typed:

sudo /etc/init.d/postgresql-9.3 start

sudo /etc/init.d/postgresql-9.3 restart

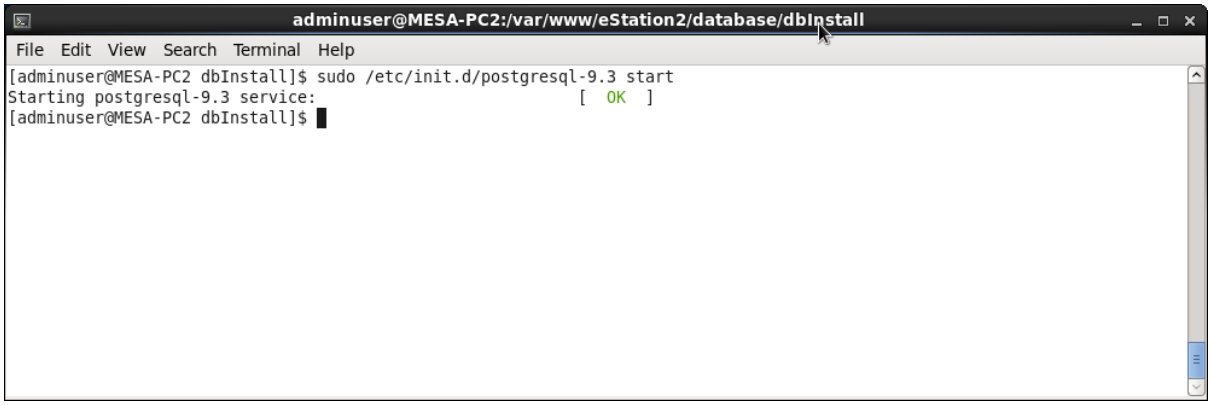


Figure 26: Start postgresql

3.5.2 Visualize the database tables (pgAdminIII)

On the eStation 2.0 the pgAdmin3 tool is installed for accessing the database, verifying its contents and modifying it (only for Advanced Users). To run the tool, go to the Applications -> Programming -> pgAdminIII entry of the CentOS menu (see Figure 27).

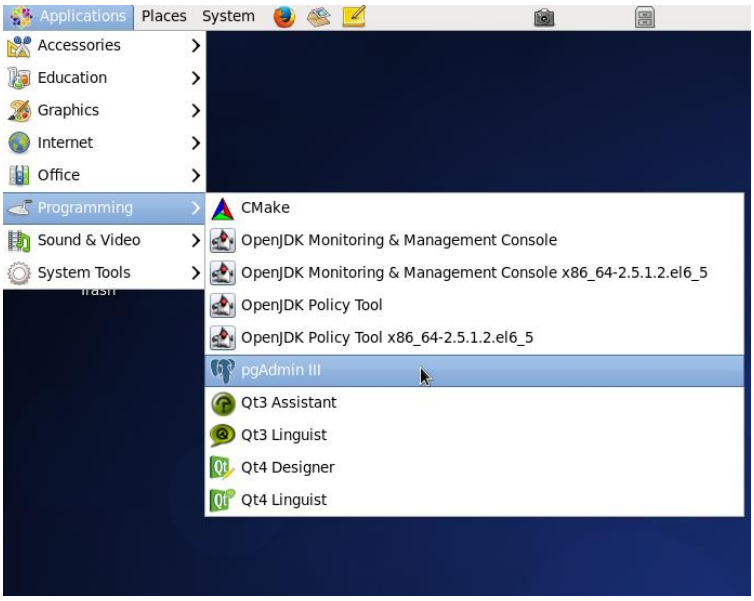
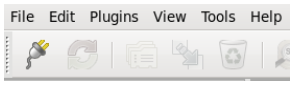


Figure 27: Launch pgAdmin III

At the first run, the connection to the estationdb has to be established. Click on the 'plug' icon displayed just under the 'File' menu entry (top-left corner):



A form will open (see Figure 28) for entering the variable for the connection.

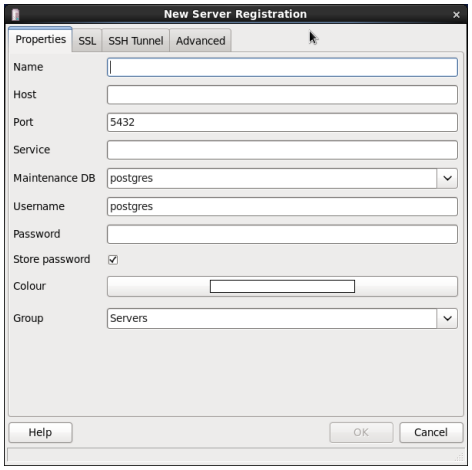


Figure 28: new server in pgAdminIII

The variables to be used are shown in Figure 29, and repeated here below:

Name:	estationdb	(recommended)
Host:	localhost	
Maintenance DB:	estationdb	
Username:	adminuser	(recommended – also estation accepted)
Password:	mesadmin	

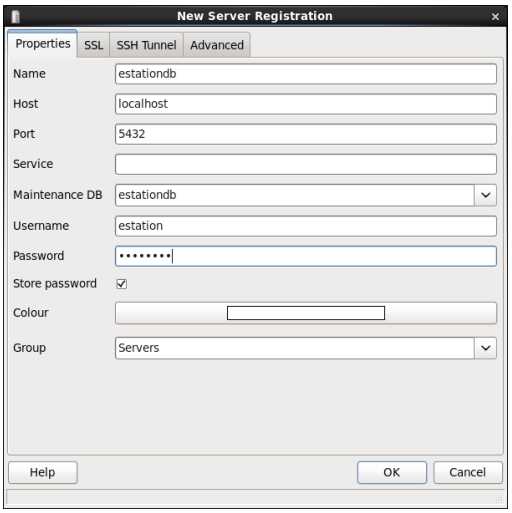


Figure 29: estationdb server

When all variables are entered, you can click on the 'OK' button, and a message proposing to store the typed password is displayed (see Figure 30). Click on 'OK'.

Figure 30: pgAdminIII - save password

At this point, the connection with the local estationdb is established, and you will be presented the interface displayed in Figure 31.

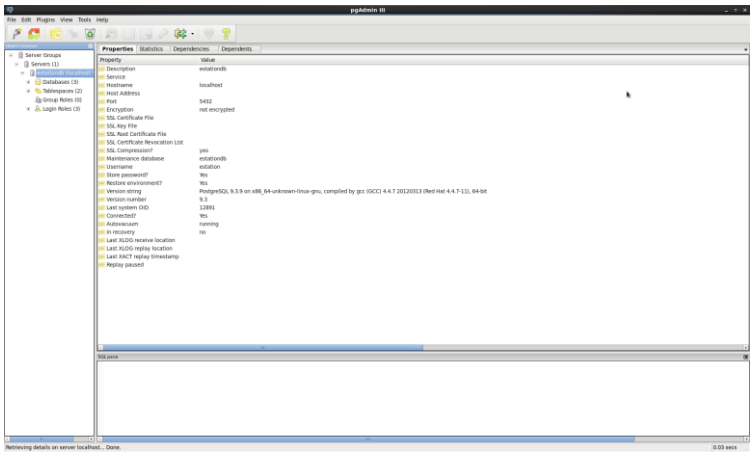


Figure 31: estationdb overview in pgAdminIII

You can expand the list of servers by clicking on the '+' symbol to its left, and see the 'estationdb' database. Then you can access its schemas and tables by navigating the tree in the left control panel (see Figure 32).

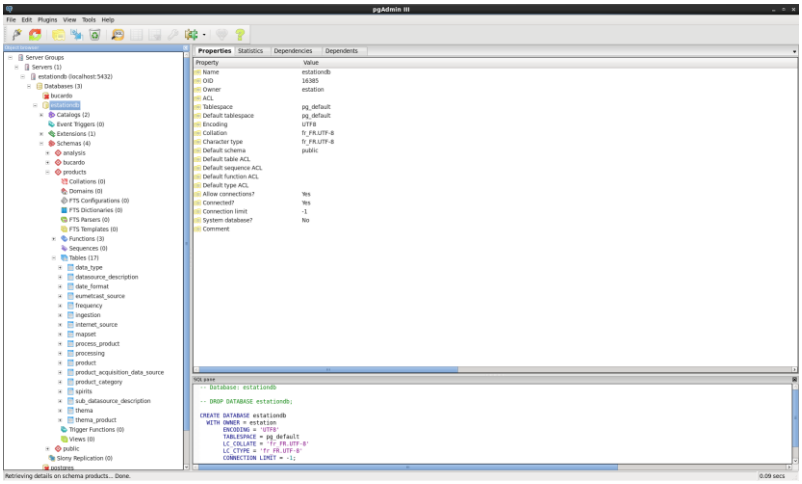


Figure 32: estationdb tables

Note that at the first launch of pgAdminIII the notification of missing server instrumentation (see Figure 33) might be displayed. Just click the 'OK' button.

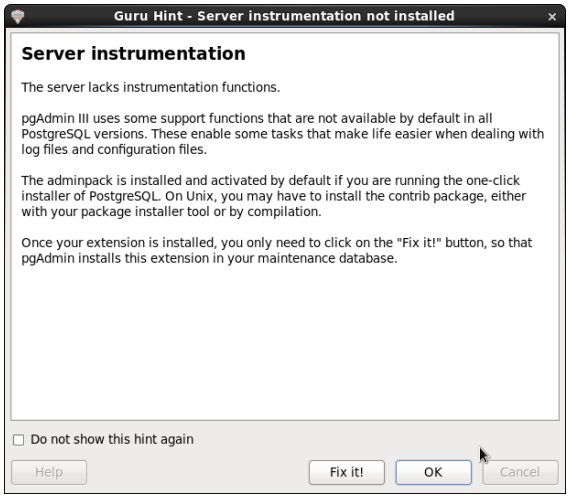


Figure 33: server instrumentation message

3.5.3 Restore a previous copy of the database

The estationdb is dumped every day on the local disk, so that it is possible to restore it in case it is corrupted, e.g., for issues on the HD. This issue was very frequent on AMESD stations, mainly due to the high number of disk failures.

How database is dumped

The system service executes a task that saves – every day at midnight – a local copy of both 'analysis' and 'products' schema of the database.

The dump is executed in the directory /eStation2/db_dump/

A 'rotation' mechanism is implemented in order to keep only some of the saved dumps, and namely:

a) for previous months: the file of first day of the month
b) for the current month: the file of first day of the month and the latest two days.

This mechanism limits the disk occupancy and facilitates the management of the dumps in the directory, ensuring that the most recent files are made available, but also some older files. An example of the list of dumps is shown in Figure 34. The files are named with the following convention:

estationdb_<schema>_<date_of_the_dump>-<time_of_the_dump>.sql

```
[adminuser@MESA-PC2 dbInstall]$ ll /eStation2/db_dump
total 23420
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2014-10-20-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2014-11-20-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2014-12-20-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-01-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-02-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-03-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-04-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-05-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-06-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-07-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-08-31-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-09-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-10-01-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-10-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-10-22-17:54:38.sql
-rwxr-xr-x 1 analyst estation  326973 Oct 26 22:07 estationdb_analysis_2015-10-26-22:05:06.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2014-10-20-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2014-11-20-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2014-12-20-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-01-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-02-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-03-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-04-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-05-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-06-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-07-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-08-31-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-09-21-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-10-01-17:54:38.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-10-26-22:00:56.sql
-rwxr-xr-x 1 analyst estation 1248714 Oct 26 22:08 estationdb_products_2015-10-26-22:05:06.sql
```

Figure 34: list of dumps of estation DB

When to restore the database

Considering the database synchronization that exists between PC2 and PC3, the need to re-install the database from a previous dump is *a rather rare action to be performed*. In case of a major fault of one of the computer, and re-installation of the full application, the Recovery mode procedure described in paragraph 3.4 takes care of replicating the database from the other PC, and no database restore from previous dump is necessary.

Therefore, this action has to be applied only in one of the following cases:

a) The estationdb has been corrupted on both computers.
b) The estationdb has been corrupted on one computer that is in Recovery mode, i.e. the other computer is not available.
c) There is any reason for which some important information previously generated in the database has been deleted on both computers.

How to restore the database

A specific script exists for dropping the contents of a schema (if the schema exists), recreating the schema and populating it with the selected dump. As displayed in Figure 35, the script is named 'db_restore.sh' and located in directory /var/www/eStation2/database/dbInstall.

```
[adminuser@MESA-PC2 dbInstall]$ cd /var/www/eStation2/database/dbInstall/
[adminuser@MESA-PC2 dbInstall]$ ll
total 1644
-rwxr-xr-x 1 adminuser estation     904 Oct 23 21:16 dbdrop.sh
-rwxr-xr-x 1 adminuser estation    1513 Oct 23 21:16 dbinstall.sh
-rwxr-xr-x 1 adminuser estation    1627 Oct 23 21:16 dbrestore.sh
-rwxr-xr-x 1 adminuser estation 1420282 Oct 23 21:16 products_dump_data_only.sql
-rwxr-xr-x 1 adminuser estation  120508 Oct 23 21:16 products_dump_structure_only.sql
-rwxr-xr-x 1 adminuser estation  125573 Oct 23 21:16 products_full_dump.backup
[adminuser@MESA-PC2 dbInstall]$
```

Figure 35: dbrestore.sh script

Therefore the User should open a terminal, and change directory by typing:

cd /var/www/eStation2/database/dbInstall

Then, once the User has identified the date-time of the dump to restore (2015-10-06-22:05 in our example) enter the command:

sudo ./dbrestore.sh <date-time of dump>

as shown in Figure 36.

```
[adminuser@MESA-PC2 dbInstall]$ sudo ./dbrestore.sh 2015-10-26-22:05
```

Figure 36: dbrestore script execution

The script is executed, for both 'analysis' and 'products' schema, and the series of insert statements reported on the terminal, as shown in Figure 37.

```
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 23091 1
INSERT 23092 1
INSERT 23093 1
INSERT 23094 1
INSERT 23095 1
[adminuser@MESA-PC2 dbInstall]$
```

Figure 37: dbrestore script result

3.6 DIAGNOSTIC TOOLS AND USER SUPPORT

3.6.1 System Report

The eStation 2.0 implements a mechanism for creating an archive containing some core information on the status of the application, and namely:

- All the eStation 2 log file
- The list of products acquired by Get EumetCast and Get Internet
- The local settings
- The status of services on the system
- The postgresql database configuration
- The apache configuration
- The rsync configuration

This report can be created as indicated in the User Guide (RD-1) in paragraph 3.9.1. In particular, when you click on 'Create System Report' a form is presented as in Figure 38.

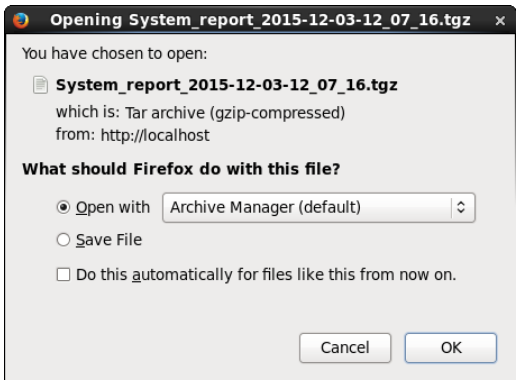


Figure 38: Creation of System Report

You can either decide to open the archive that is going to be created (only for tests) or to save it, which is the normal procedure. Click therefore on the 'Save File' option, as displayed in the next figure.

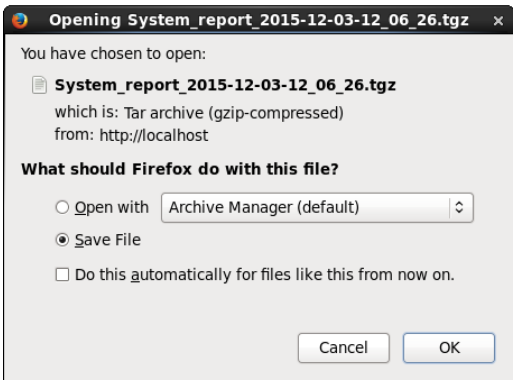


Figure 39: Save System Report

As a consequence, the archive file is saved on the local machine under the Download directory in the user home (see Figure 40).

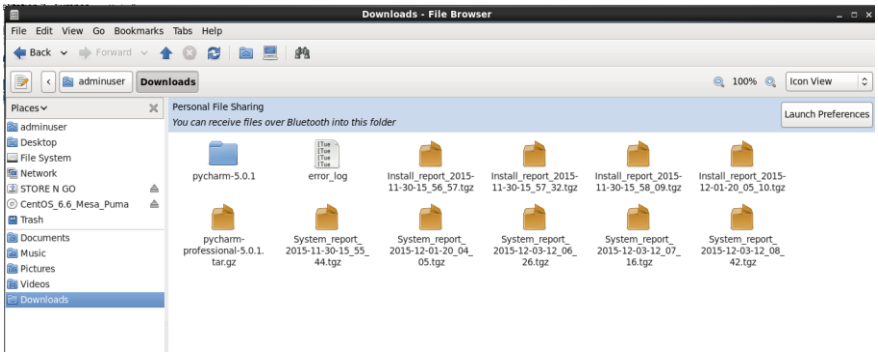


Figure 40: Location of the System Report

The file can then by send to the User Support.

3.6.2 **Install Report**

The eStation 2.0 implements a mechanism for creating an archive containing core information on all CentOS packages installed on the PC. Namely:

- The list of the CentOS packages, but the eStation ones.
- The list of eStation installed packages
- The list of the installed python module.

This report can be created as indicated in the User Guide (RD-1) in paragraph 3.9.1. In particular, when you click on 'Create Install Report' a form is presented as in Figure 41.

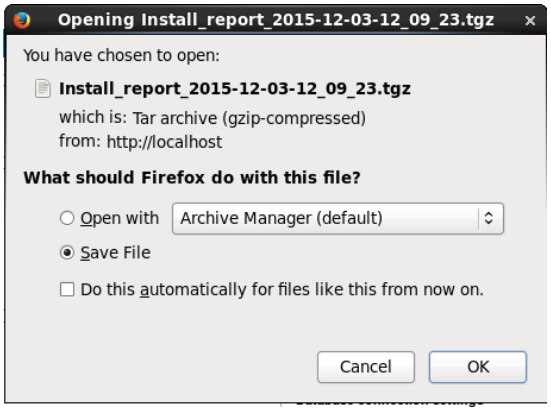


Figure 41: Create Install Report

The same options as in the creation of the System Report applies (see above paragraph). Please select the 'Save File' option and the report will be generated in the 'Download' directory.

3.6.3 **Tuleap for User Support**

The user Support mechanism in place under the SuCr#1 is described in the MESA Station Administration and Maintenance Manual (RD-3) in section 2.

4. System Description

This section describes the eStation 2.0 application filesystem and postgresql database, and the naming conventions adopted for both the directories hosting the GTIFF eStation files, and the files themselves. Furthermore, the mechanisms implemented for synchronizing both data and database between PC2 and PC3 are presented.

4.1.1 Directory Structure

The eStation 2.0 is integrated into CentOS 6.6 and make use of the Linux predefined directories and their management: e.g. the /tmp directory is used for writing temporary data that are automatically cleaned at each reboot of the machine.

In addition to the standard Linux directories, some dedicated ones are created specifically for the eStation 2.0 application. These directories and their usage are described in the following paragraphs.

Base directory of the eStation 2.0 software

The eStation software (mainly python and JavaScript files) is installed in a directory tree that is created and populated at the installation of the PC. This base directory is defined by default as:

ESTATION2_BASE_DIR_SYSTEM = /var/www/eStation2/

This directory is actually a symbolic link to a version-depending directory, which is created at the initial installation, and at the following upgrades, with the convention below:

/var/www/eStation2-V.V.V-Rel/

The initial system will be therefore under:

/var/www/eStation2-2.0.1-1/

Release independent data and settings

Some data and User's settings will be stored under a directory which is independent from the software release, so that they are not impacted by the software upgrade. This directory is identified by the variable <ESTATION2_LOCAL_DIR> and defined as below:

ESTATION2_LOCAL_DIR=/eStation2/

Under this base directory, the following subdirectories exist:

/eStation2/settings: contains user settings and configuration of the system.
/eStation2/get lists: list of files acquired by the 'get' services (Get EUMETCast and Get internet)
/eStation2/log: all log files of the eStation 2.0 application
/eStation2/requests: 'request' file created for completing the local datasets
/eStation2/docs: documentation of the eStation 2.0 (from eStation-Docs package)
/eStation2/layers: static layers for the application (from eStation-Layers package)

Temporary/working directories

Another category of data is represented by the temporary files that are generated by the runtime application in the background, and that need to be cleaned at each reboot. An example is represented by the working directories used for intermediate processing steps. The base directory for these files is:

ESTATION2_TEMP_DIR=/tmp/eStation2/

And subdirectories are:

/tmp/eStation2/services: pid files of the running services
/tmp/eStation2/processing: lock files of the individual processing chains
/tmp/eStation2/ingested_files: working directory for the ingestion service, where we keep trace of the files successfully processed, and to be deleted at the end of the ingestion loop.

Data Directories

The EO datasets retrieved and processed on the eStation2 are stored in predefined directories, under the base path:

ESTATION2_BASE_DIR_DATA=/data/

whose subdirectories are:

/data/ingest/: native data ready for ingestion
/data/ingest.wrong/: native that raised an error in the ingestion process[4]
/data/processing/: ingested and derived products
/data/Spirits/: this is an 'optional' directory where same selected datasets are stored in 'SPIRITS' format.

Please note that, unlike the three previous categories that should not be changed by the User in normal circumstances, these 'Data' directories can be freely changed to process/visualize data that are stored on a different file system, e.g. an external disk connected to the machine.

[4] These files are created here not to be continuously processed by the ingestion loop, and are available for User investigation.

4.1.2 **Configuration files of eStation 2.0**

The configuration of eStation 2.0 application is done through two set of variables, the 'System settings' and 'Factory and User Settings'.

System Settings

These are the main settings of the eStation, which describes the type of installation, the role of the computer, the activated version and so on.

These settings are store in the following file:

/eStation2/settings/system_settings.ini

Please note that this file must not be manually modified: rather, it is updated while operating on the eStation 2.0 GUI. The System Settings are listed in

log_general_level	Severity Level of logging mechanism	DEBUG INFO WARNING ERROR FATAL
get_eumetcast_output_dir	Target Directory of Get Eumetcast	/data/ingest/
get_internet_output_dir	Target Directory of Get Internet	/data/ingest/

Table 4.

Variable	Role	Possible values
type_installation	Define the type of Installation	'Full'
role	Define the role of the PC	PC2 or PC3
mode	Define the current mode of the PC	Nominal, Recovery or Maintenance
active_version	Define the currently activated eStation 2.0 version	2.0.1 (or next releases, e.g. 2.1.0)
data_sync	Define if the data synchronization toward the other PC is activated	true or false
db_sync	Define if the DB synchronization toward the other PC is activated	true or false
thema	Define the Thema the eStation is associated to (i.e. name of the RIC)	ACMAD AGRHYMET BDMS CICOS ICPAC MOI UoG
ingest_archive_eum	Define if the historical archives disseminated through EUMETCast have to be processed (normally always TRUE)	true or false

log_general_level	Severity Level of logging mechanism	DEBUG INFO WARNING ERROR FATAL
get_eumetcast_output_dir	Target Directory of Get Eumetcast	/data/ingest/
get_internet_output_dir	Target Directory of Get Internet	/data/ingest/

Table 4: System Settings

Factory and User Settings

These settings define the working environment of the eStation (directories and file naming), some working parameters (e.g. the sleep time of the Services) and the parameters for accessing the database. All these parameters are defined in the file:

/var/www/eStation2/config/factory_settings.ini

The full list of factory settings is reported as Annex at the end of paragraph. Only a part of these variables (see

log_general_level	Severity Level of logging mechanism	DEBUG INFO WARNING ERROR FATAL
get_eumetcast_output_dir	Target Directory of Get Eumetcast	/data/ingest/
get_internet_output_dir	Target Directory of Get Internet	/data/ingest/

Table 5) are meant to be modified by the Users, and are therefore duplicated in the file:

/eStation2/settings/user_settings.ini

As for the system settings, the User should not modify directly the configuration file, rather operate on the System user interface.

Variable	Role	Possible values
base_dir	Define the base directory of installation	/var/www/
base_tmp_dir	Define the base directory for temp directories	/tmp/eStation2
data_dir	Define the base directory for data	/data/
ingest_dir	Define the directory hosting data to be ingested	/data/ingest/
processing_dir	Define the directory hosting data ingested or derived	/data/processing/
eumetcast_files_dir	Define input directory of get EumetCast	/eumetcast/
static_data_dir	Define the directory hosting the static	/eStation2/layers/

	layers.	
archive_dir	Define the directory hosting the historical datasets (to be modified by the User before import)	/media/MESA-2/Archives/
host	eStation DB host	localhost
port	eStation DB port	5432
dbuser	eStation DB owner	estation
dbpass	Password of eStation DB owner	mesadmin
dbname	Name of eStation DB	estationdb
default_language	Default language	EN, FR
log_general_level	Severity Level of logging mechanism	DEBUG INFO WARNING ERROR FATAL
get_eumetcast_output_dir	Target Directory of Get Eumetcast	/data/ingest/
get_internet_output_dir	Target Directory of Get Internet	/data/ingest/

Table 5: User settings

The system reads first the factory settings, and then overwrites the parameters that are also defined, as no empty fields, in the user settings.

```
[FACTORY_SETTINGS]
www_root_dir = /var/www
proj4_lib_dir = /usr/share/proj
postgresql_executable = /etc/init.d/postgresql-9.3
webserver_root =

base_dir = %(www_root_dir)s/eStation2
base_tmp_dir = /tmp/eStation2
base_local_dir = /eStation2
data_dir = /data
ingest_dir = /data/ingest/
ingest_error_dir = /data/ingest.wrong/
get_internet_output_dir=%(ingest_dir)s
get_eumetcast_output_dir=%(ingest_dir)s
static_data_dir = %(data_dir)s/static_data/
archive_dir = %(data_dir)s/archives/
eumetcast_files_dir = /eumetcast/
host = localhost
port = 5432
dbuser = estation
dbpass = mesadmin
dbname = estationdb
apps_dir = %(base_dir)s/apps
config_dir = %(base_dir)s/config/
settings_dir = %(base_local_dir)s/settings/
processing_dir = %(data_dir)s/processing/
log_dir = %(base_local_dir)s/log/
log_general_level=info
template_mapfile = %(apps_dir)s/analysis/MAP_main.map
es2_sw_version = 2.0.0
processed_list_base_dir = %(base_local_dir)s/get_lists
processed_list_eum_dir = %(processed_list_base_dir)s/get_eumetcast
processed_list_int_dir = %(processed_list_base_dir)s/get_internet
get_eumetcast_processed_list_prefix = %(processed_list_eum_dir)s/get_eum_processed_list_
get_internet_processed_list_prefix = %(processed_list_int_dir)s/get_internet_processed_list_
poll_frequency = 5
pid_file_dir = %(base_tmp_dir)s/services
get_internet_pid_filename = %(pid_file_dir)s/get-internet.pid
get_eumetcast_pid_filename = %(pid_file_dir)s/get-eumetcast.pid
ingestion_pid_filename = %(pid_file_dir)s/ingest.pid
processing_pid_filename = %(pid_file_dir)s/processing.pid
system_pid_filename = %(pid_file_dir)s/system.pid
processing_tasks_dir = %(base_tmp_dir)s/processing/
gdal_dir = /usr/bin
gdal_merge = %(gdal_dir)s/gdal_merge.py
gdal_polygonize = %(gdal_dir)s/gdal_polygonize.py
gdal_translate= %(gdal_dir)s/gdal_translate
acq_service_dir=%(base_dir)s/apps/acquisition
proc_service_dir=%(base_dir)s/apps/processing
status_system_dir=%(base_dir)s/apps/es2system
status_system_pickle=%(status_system_dir)s/system_status.pkl
```

```
schema_products = products
schema_analysis = analysis
schema_data = data
default_language = eng
system_delay_data_sync_min=10
system_sleep_time_sec=10
system_time_db_dump_hhmm=00:00
prefix_eumetcast_files=MESA_JRC_
db_dump_dir=%(base_local_dir)s/db_dump
get_eumetcast_sleep_time_sec=60
get_internet_sleep_time_sec=60
processing_sleep_time_sec=10
estation2_layers_dir = %(www_root_dir)s/eStation2_Layers
requests_dir = %(base_local_dir)s/requests/
docs_dir = %(base_local_dir)s/docs/
db_dump_exec = /usr/pgsql-9.3/bin/pg_dump
spirits_output_dir = /data/Spirits/
ftp_eumetcast_url= ftp://h05-ftp.jrc.it/eumetcast/
ftp_eumetcast_userpwd= narmauser:narma11
system_time_spirits_conv= 00:10
```

4.1.3 File and directory naming conventions

Both eStation 2.0 dataset files (i.e. the ingested and derived products) and the directory trees where they are stored obey to strict naming rules, so that the data location is depending on very few key elements. These elements are namely the product, version, subproduct and mapset and their meaning is described in Section 2 of the User Manual, and briefly repeated hereafter:

Product: the product identification code (indicated as <product>)

Version: the version of the dataset, corresponding to the algorithm (indicated as <version>)

Subproduct: the specific dataset that belong to a product (indicated as <subproduct>)

Mapset: the geo-reference and boundary box of the file (indicated as <mapset>)

Directory naming

All files are stored under a base directory, which is by default **/data/processing/**; under this root, the files are organized per product and version, as below:

<product>/<version>/ (e.g. tamsat-rfe/2.0/)

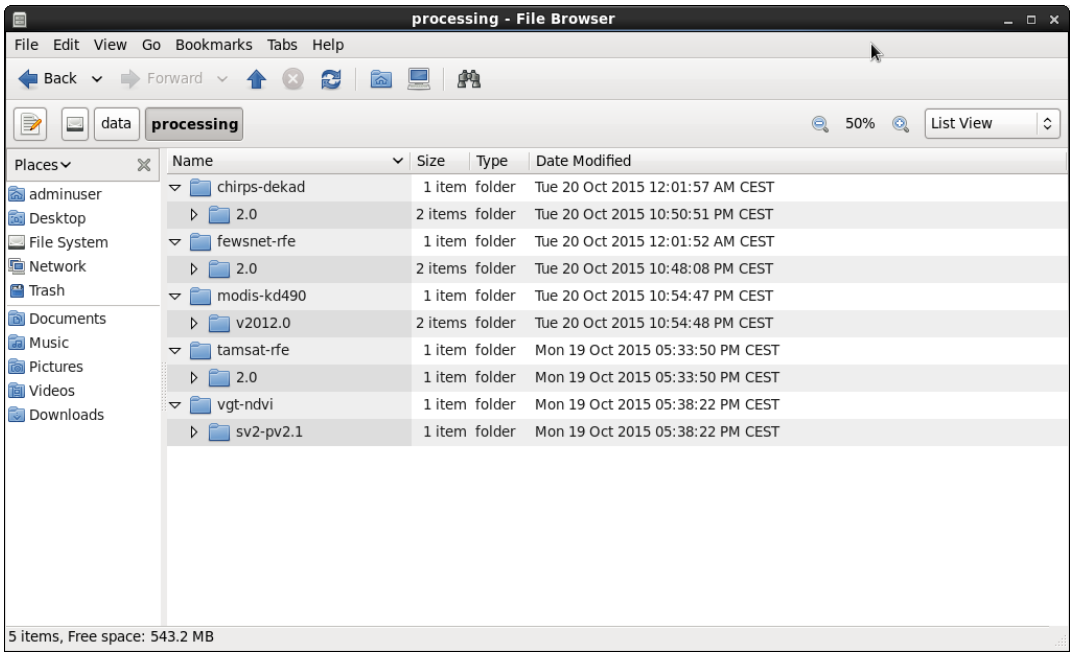


Figure 42: data directory structure - 1

At this level, a folder called 'archive' exists for hosting the files in original format; besides that, a folder for the mapsets (one or more) of the ingested and processed files exists (see Figure 43).

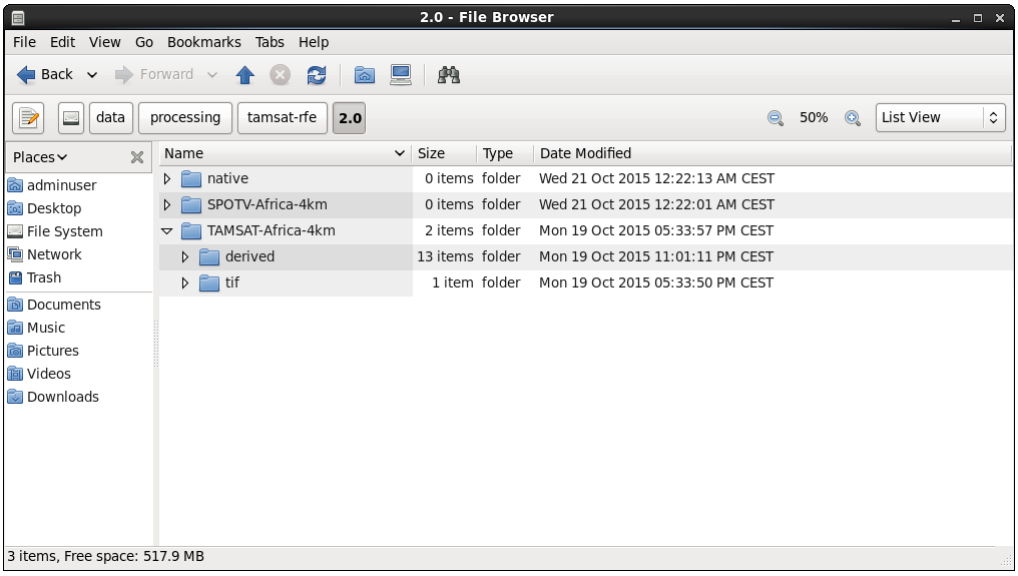


Figure 43: data directory structure – 2

Under each 'mapset' folder, the ingested files are located in the '/tif' subdirectory, while the processed ones in the 'derived' subdirectory. The 'tif/' and 'derived/' folders contains eventually a subdirectory named after the subproduct code (see Figure 44).

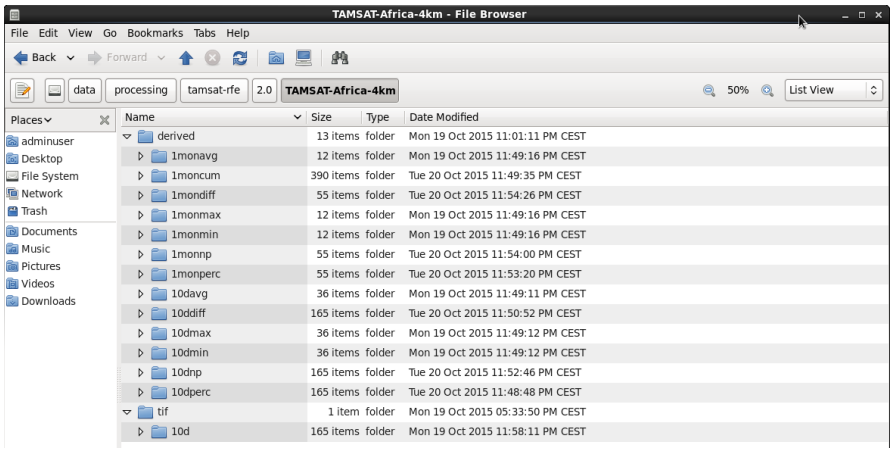


Figure 44: data directory structure - 3

Some examples of directories for ingested and derived files are listed here below:

e.g.: /data/processing/vgt-ndvi/spot-v1/WGS84_Africa_1km/tif/ndv

For derived products:

mapset/derived/subproductcode/

e.g.: /data/processing/vgt-ndvi/spot-v1/WGS84_Africa_1km/derived/10dmax

File Naming

The filename of the geotiff files contains all fields described in the previous section, namely: <product>, <version>, <mapset> and <subproduct>; in addition, the date of the product is located at the beginning of the filename, for ease the file sorting within the directory (see Figure 45). The full filename results therefore from the composition of these elements, in the following order:

<date>_<productcode>_<subproductcode>_<mapset>_<version>.tif

e.g.: 20150101_vgt-ndvi_ndv_WGS84-Africa-1km_spot-v1.tif

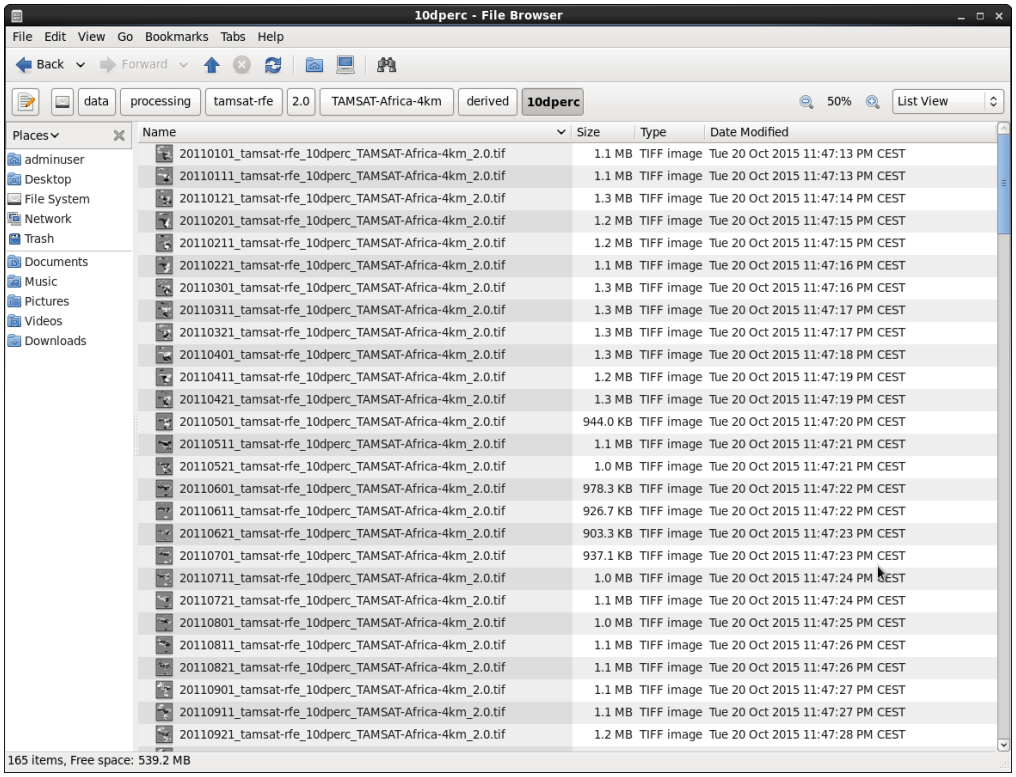


Figure 45: Example of eStation 2.0 file naming

Note that the 'separator' between the various field is the *'underscore' char ('_'), which therefore cannot be used* in any of the product, subproduct, mapset and version definition.

File metadata

All standard eStation 2.0 files contain a well-defined set of GTIFF tags that contain the metadata associated to each image. These metadata describes all information the User need to interpreter the image and to identify how is has been generated.

Table 6: List of eStation 2.0 images metadata.

Tag Name	*Definition*	*Comment*
eStation2_category	Product Category	*It is used in the GUI to group the products together (e.g. 'Vegetation', 'Rainfall', Fire')*
eStation2_conversion	*Equation to convert from DN to*	*It is a fixed field:*

	physical value	Phys = DN * scaling_factor + scaling_offset
eStation2_date	*Date of the subproduct*	*It refers to the acquisition date of the image (e.g. 20150101)*
eStation2_date_format	*Format of the date*	*It can be YYYYMMDD (date) or YYYYMMDDHHMM (datetime)*
eStation2_defined_by	*Who has defined the subproduct*	*It can be 'JRC' or the User*
eStation2_descr_name	*A descriptive name of the subproduct*	*It is slightly more descriptive than the product code, and is used in the GUI*
eStation2_description	*Longer description*	*Long description used in the GUI*
eStation2_es2_version	*Version of the eStation 2.0*	*It starts with 2.0.0 and will evolve with the updates (2.1.0 and so on)*
eStation2_frequency	*Frequency of the subproduct.*	*How often the subproduct is generated (e.g. 'every dekad')*
eStation2_input_files	*The list of files used for deriving the subproduct.*	*This list contains the files in 'native' format for the ingested subproduct, or a list of eStation 2.0 files for the derived ones.*
eStation2_mac_address	*The unique HW identifier of the computer where the subproduct has been generated.*	*It allows to recognize if the file has been computed on the local machine, or imported from another one. It is relevant only for traceability/diagnostic.*
eStation2_mapset	*The subproduct mapset.*	*Mapset, as defined in the User Manual, in Chapter 2.4.5.*
eStation2_nodata	*The numeric value used to code 'nodata'*	*See also User Manual 2.4.8*
eStation2_product	*Name of the 'product'*	*See User Manual 2.4.1 for definition of 'products'*
eStation2_product_version	*Version of the 'product'*	*See User Manual 2.4.2 for definition of 'version'*
eStation2_provider	*Data provider*	*Who has initially generated the EO product (e.g. Copernicus)*
eStation2_scaling_factor	*Scaling factor to be applied for conversion to physical value.*	*See also User Manaul 2.4.8 and the conversion equation above.*
eStation2_scaling_offset	*Scaling offset to be applied for conversion to physical value (it is normally 0.0).*	*See also User Manaul 2.4.8 and the conversion equation above.*
eStation2_subdir	*Subdirectory of the image*	*It is where the image is stored under the /data/processing root dir.*
eStation2_subProduct	*Name of the 'subproduct'*	*See User Manual 2.4.3 for definition of subproduct*

As an example, the set of metadata for the 'vgt-ndvi' product, ingested ndv subproduct of date 201501 eStation2_category=vegetation

eStation2_comp_time=2015-03-03 15:12:42
eStation2_conversion=Phys = DN * scaling_factor + scaling_offset
eStation2_date=20150101
eStation2_date_format=YYYYMMDD
eStation2_defined_by=JRC
eStation2_descr_name=Normalized Difference Vegetation Index

eStation2_description=The NDVI can be used to measure and monitor plant growth, vegetation cover, and biomass production. It is a dimensionless variable. The values vary between -1 and 1. Increasing positive NDVI values indicate increasing amounts of green vegetation. Moderate values represent shrub and grassland (0.2 to 0.3), while high values indicate temperate and tropical rainforests (0.6 to 0.8). NDVI values near zero and decreasing negative values indicate non-vegetated features such as barren surfaces (rock and soil) and water, snow, ice, and clouds.
eStation2_es2_version=2.0.0
eStation2_frequency=e1dekad
eStation2_input_files=/data/ingest/g2_BIOPAR_NDVI_201501010000_AFRI_PROBAV_V2_1.ZIP;
eStation2_mac_address=6c:ae:8b:52:77:d2
eStation2_mapset=SPOTV-Africa-1km
eStation2_nodata=-32768
eStation2_product=vgt-ndvi
eStation2_product_version=proba-v2.1
eStation2_provider=VITO/Copernicus
eStation2_scaling_factor=0.001
eStation2_scaling_offset=0.0
eStation2_subdir=vgt-ndvi/proba-v2.1/SPOTV-Africa-1km/tif/ndv/
eStation2_subProduct=ndv01 is represented below:

4.1.4 **PCs synchronization**

Data synchronization

The data synchronization between PC2 and PC3 is part of a more general mechanism of data sync implemented by the Supply #1 Contractor (TPZF/TAS) as described in the MESA Station Administration Manual (RD-3) in paragraph 6.5.

In particular, the directory hosting the EO datasets ingested and derived on the eStation (normally /data/processing/)is synchronized from PC2 to PC3 every 30 minutes.

DB synchronization

The eStation database contains two schema dedicated to the User operation: the 'products' and the 'analysis' schema. The 'products' schema (see paragraph 4.1.6) is composed by 17 tables hosting all information related to the products definition, the datasource definitions, the data processing services (get, ingest and processing). An additional table, called 'spirits', is dedicated to the conversion of the datasets to 'SPIRITS' format (optional).

The 'analysis' schema (see paragraph 4.1.6) is composed by 7 tables that defines the legends, their association with the products, the languages (including the translation table 'i18n') and the timeseries draw properties.

What it is

The rational for having two separate schemas is that, in Nominal mode, the User modifies the 'products' schema only on PC2, and 'analysis' schema only on PC3. Therefore, in the standard condition, there is only need to 'push' the changes of 'products' from PC2 -> PC3 and the changes of 'analysis' from PC3 -> PC2.
The database synchronization is performed by the 'Bucardo' tool, which is an asynchronous master-master replication system for PostgreSQL (see https://bucardo.org/wiki/Bucardo). Bucardo is installed together with the eStation 2.0 application at the MESA install, and configured in the 'Post Installation' phase (add reference).

How it is configured

Bucardo is a service running in the background, and is completely independent from the eStation2 services. Its status can be checked by entering in a terminal the command:

bucardo status

The expected result is shown in Figure 46: note that the indication of the PID of bucardo MCP is the actual proof that bucardo is running, and not only configured. The full list of the bucardo objects created is displayed by entering the command:

bucardo list all

which reports the current setup of the machine (see Figure 47).

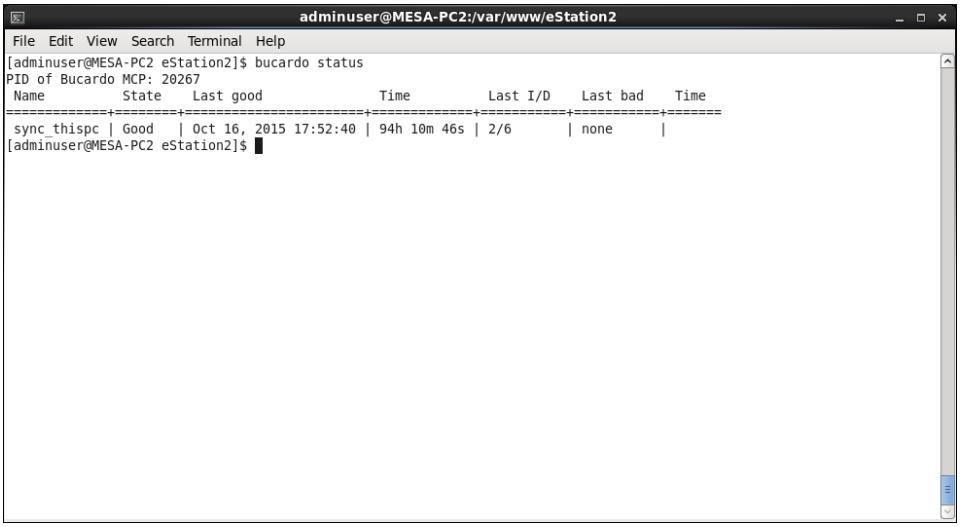


Figure 46: bucardo from the command line

The key feature of bucardo we exploit on the eStation is the 'sync' object. Namely, a 'sync' with the same name ('sync_thispc') but different definition exists on PC2 and PC3.

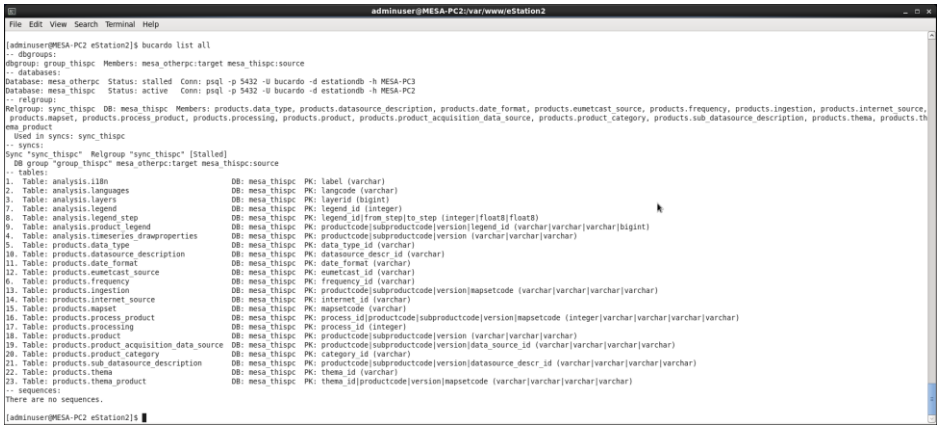


Figure 47: all bucardo objects

On PC2 the 'sync' copies 'products' table from the local database to the one of the other PC, while on PC3 the 'analysis' table is synchronized.
In order to monitor the execution of the sync, the user can type in a terminal:

bucardo status sync_thispc

which returns the latest successful execution of the sync, the current start (Good), the number of tables involved in the sync and a number of ancillary information on the 'sync' definition, including the 'Autokick'[5] attribute, which is set by default.

[5] This attribute causes the sync to be executed automatically once a field of one of the involved tables is modified in the 'source' database.

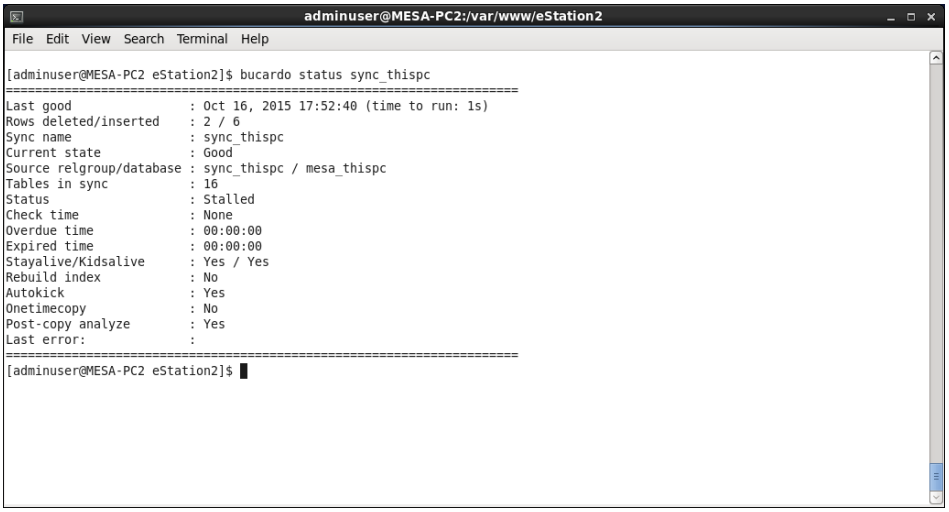


Figure 48: status of bucardo sync

How it works

Bucardo is an asynchronous replication system for postgresql, allowing multi-master and multi-slave operations; it is free and open source software released under the BSD licence[6].

On the eStation it is installed directly from the DVD on PC2 and PC3, and configured at the first run of the machines, when both PC2 and PC3 are up and running and they 'see' each other.

A dedicated 'bucardo' database is created on both machines, where the configuration is stored; in addition, a 'bucardo' schema is added to the 'estationdb' database, where all changed to each table are recorded, in order to trigger the synchronization actions from one OC to the other.

[6] See https://bucardo.org/wiki/Bucardo

4.1.5 **Description of the eStation .rpm**

The eStation application is composed by 3 .rpm packages that are installed during the initial installation and upgraded through EUMETCast dissemination. Beside the main 'eStation-Apps' package, two minor packages are distributed, containing the static layers for visualization and the multilanguage documentation.

Package name	Purpose	Pre/post installation actions	Target Directories
eStation-Apps	eStation 2.0 code (python,.js)	• Configure the machine (users, db, directories) • Symbolic links	/var/www/eStation2-2.X.X
eStation-Layers	eStation 2.0 static layers (e.g. Administrative regions .shp)	None	/eStation2/layers
eStation-Docs	Documentation (.pdf)	Symbolic links	/ eStation2/docs

4.1.6 **Database Description**

As anticipated in paragraph 3.5.3, the estation database is composed by two main schemas: 'products' and 'analysis'.

Products schema

The 'products' schema contains 17 tables whose definition and relationships are represented in Figure 49[7].

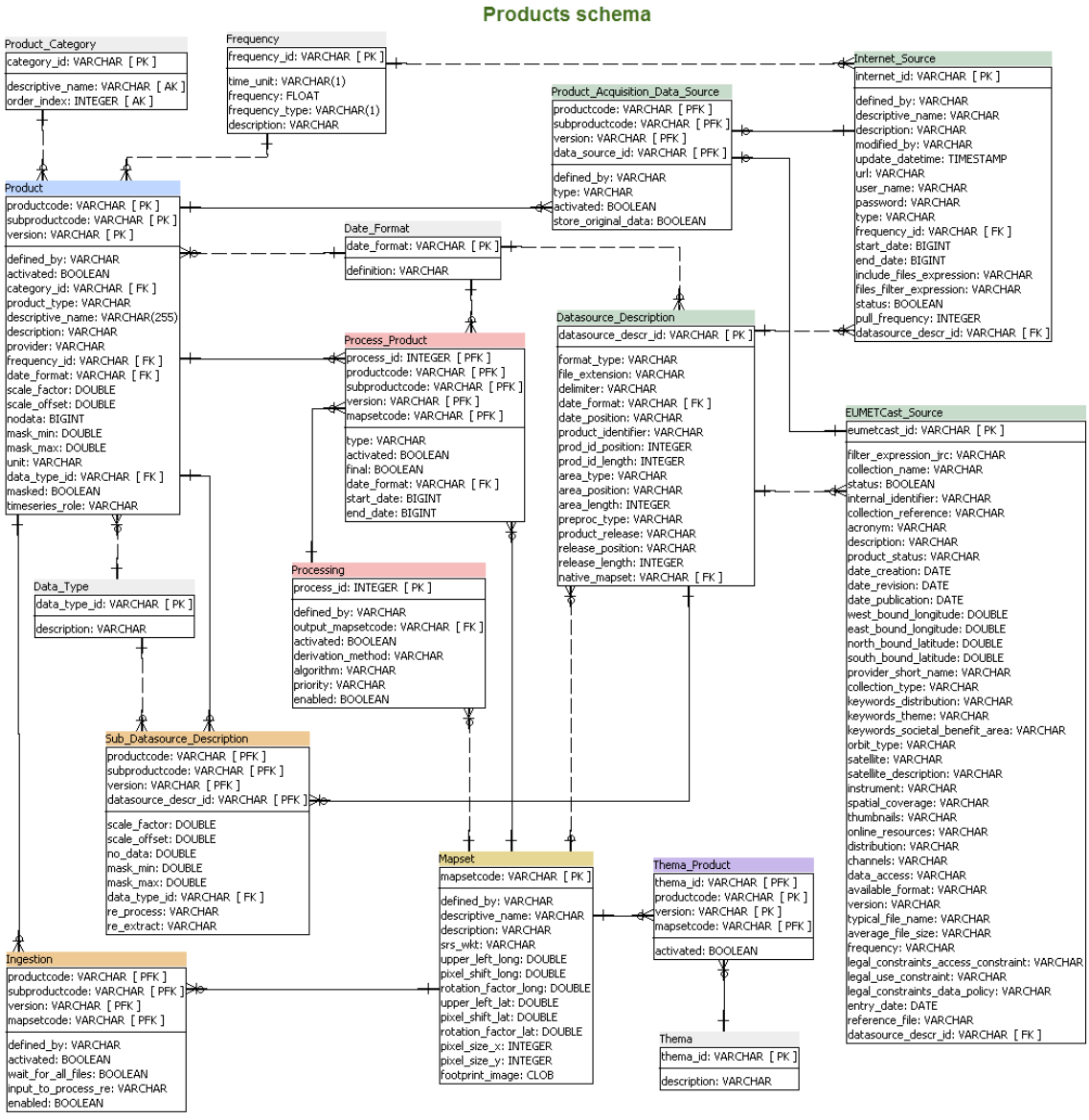


Figure 49: 'products' schema

The tables are arbitrarily grouped in categories in the following description, only for facilitating the explanation.

[7] With the exception of the 'spirits' table, which is represented separately in Figure 50.

Definition's Tables

These tables describe objects that are used by the eStation 2.0 data processing server, namely:

data_type : the type of data contained in raster files (Byte, Int16, and so on)

date_format: the various formats of the date and date-time fields of the EO products (YYYYMMDD for daily products identified by a field like 20150101)

frequency: describes the frequency or periodicity of the EO products (e.g. 'every 1 month' or '2 per day).

product_category: the thematic category of the EO products: 'rainfall', 'fire', vegetation indicators and so on.

Products, sources and mapset tables

The following tables define the 'core' objects of the eStation, i.e. the EO products, the sources they are retrieved from, and the 'mapset' object.

product: defines all the EO products and subproducts treated by the eStation system (see User Manual xxxx). For each product – that is always defined together with its version – a 'native' subproduct exists, one or more 'ingested' product and, optionally, 'derived' products.

datasource_description: describes a source of EO dataset, either from the EUMETCast dissemination or an ftp/http server (every record is associated to a record in the 'eumetcast_source' or 'internet_source'). Main role of the table is defined the filenaming of the 'native' (i.e. incoming) files.

eumetcast_source: defines the datasets disseminated by EUMETCast.

internet_source: defines EO products made available on the internet, on ftp or http sites. It describes the type, url, credentials and directory structure of the site.

sub_data_source_description: defines the contents of the 'native' products, i.e. of the incoming files in original format (HDF, netcdf, MSG). In particular, describes the layers to be extracted from the files in terms of nodata, values scaling, range, type of data, and so on.

mapset: defines a geo-referenced region and its projection (see User Manual …)

thema: the list of the MESA Thema, which correspond to the list of the Regional or Continental Implementation Centres.

thema_product: establish the associations between the products and Themas, i.e. which products are relevant for one Thema.

Service definition Tables

The following tables are used to define and control the get, ingest and processing services of the eStation.

product_acquisition_data_source: establishes associations between the sources and the products, i.e. which are the sources (at least one) a products is retrieved from. It controls the get Services.

ingestion: defines which 'ingested' subproducts have to be extracted for each mapset. It controls the ingestion Service.

processing: defines a number of processing chains, i.e. which algorithms have to be applied for which chain. It is complemented by the processing_products table. It controls the processing Service.

processing_products: defined which subproducts are used, as input and output, for each processing chain declared in 'processing' table.

Additional Tables

spirits: this table is presented separately, as it is an optional one, which configures the conversion of datasets from the eStation 2.0 format to the SPIRITS one.

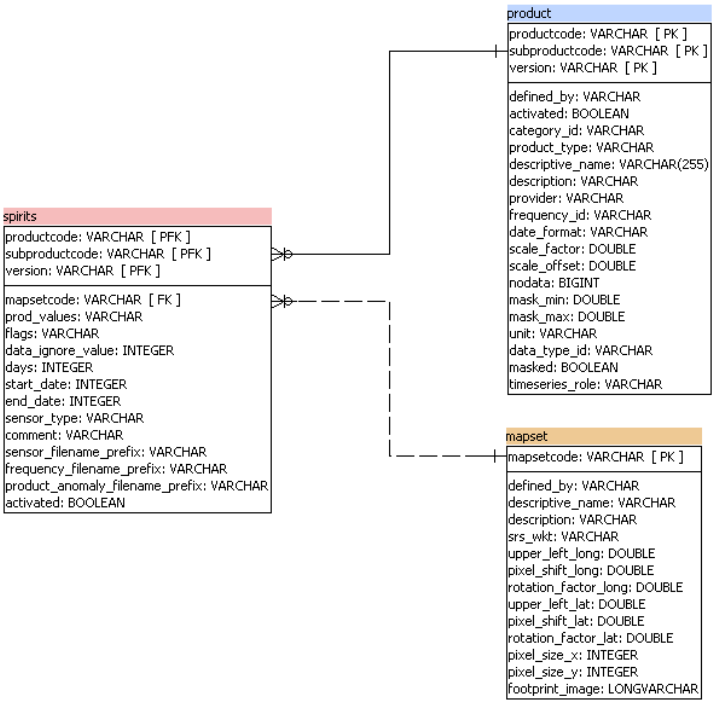


Figure 50: spirits table

Analysis schema

The ‘analysis’ schema contains 7 tables, and is associated to the product table of ‘products’ schema. Its role is mainly to host all parameters used in the visualization (Analysis tab).

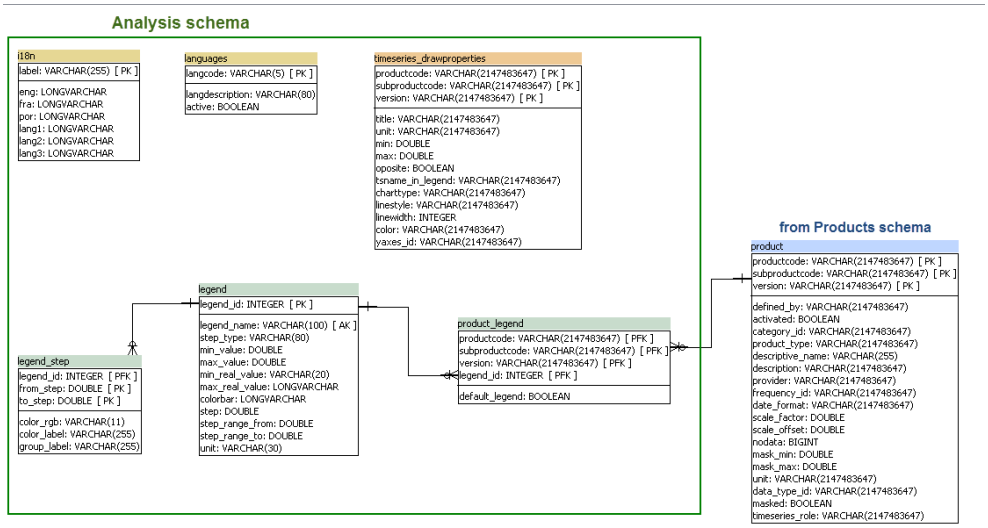


Figure 51: 'analysis' schema

i18n: contains all language definitions, i.e. how to translate all labels and texts of the GUI in various languages.

languages: lists the languages supported by the system and defined in i18n

legend: defines ‘legends’ or ‘color palettes’, i.e. which values are assigned to given ranges of the products. It is used for rendering the EO products in Analysis.

legend_step: define all ranges of a legend, i.e. associate each interval/range to a color.

product_legend: associates the products to the legends.

5. TROUBLESHOOTING

This section describes the most common issues/errors in the system, and how to deal with them.

5.1 THE eSTATION 2.0 WEB INTERFACE IS NOT DISPLAYED

If the eStation GUI is not displayed in the Firefox browser (e.g. an 'Internal Error' message is represented), the administrator has to:

- Check if apache is running: control the status of services as described in the RD-3 document in paragraph 6.1.
  If the apache service is not running, start as indicated in RD-3 document in paragraph 6.2.

- Check the apache logfile: open a terminal and type the command:

  tail /usr/local/src/tas/eStation_wsgi_srv/error.log