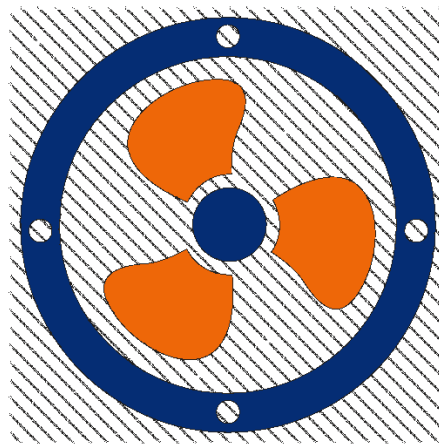




Data Exchange Component (DEC - 2020)
Software User Manual



October 23, 2020

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1 Acronyms

Table 1.1: Acronyms

Acronym	Text
ADG	Auxiliary Data Gathering
ADP	Auxiliary Data Provider
COTS	Commercial Off The Shelf
CPU	Central Processing Unit
DEC	Data Exchange Component
ECDC	European Centre for Disease Prevention and Control
FAQ	Frequently Asked Questions
FTP	File Transfer Protocol
FTPES	File Transfer Protocol Explicit TLS/SSL
FTPS	File Transfer Protocol SSL
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
I/F	Interface
IaaS	Infrastructure as a Service
ICD	Interface Control Document
IERS	International Earth Rotation Service
IGS	International GPS Service
ILRS	International Laser Ranging Service
JSON	Javascript Object Notation
NOAA	National Oceanic and Atmospheric Administration
OS	Operative System
RPF	Reference Planning Facility
RVM	Ruby Version Manager
SFTP	Secure File Transfer Protocol
SMTP	Simple Mail Transfer Protocol
SQL	Structured Query Language
SSH	Secure Shell
SSL	Secure Socket Layer
SW	Software
TAI	Temps Atomique International
TCP	Transfer Control Protocol
TLS	Transport Layer Security
URL	Universal Resource Locator



UTC	Universal Time Coordinated
WebDAV	Web Distributed Authoring & Versioning
XML	Extensible Markup Language

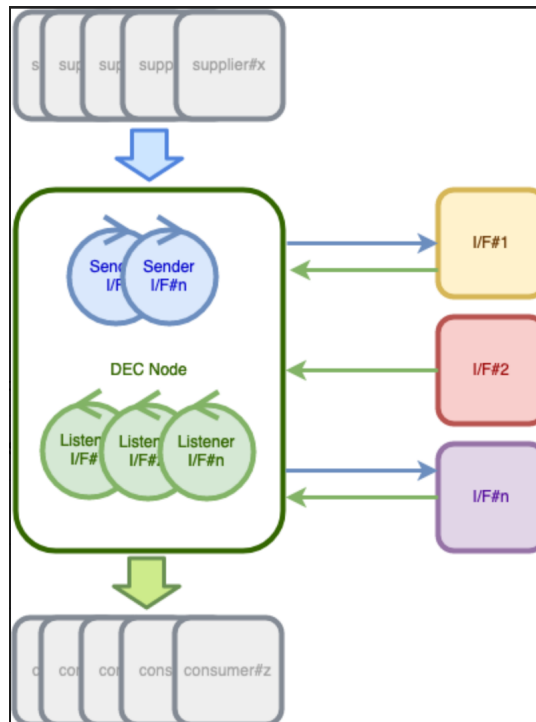
2 Introduction

2.1 Purpose & Scope

The Data Exchange Component (DEC) is a SW component to gather, transform, circulate, and archive files autonomously among different *interfaces* and *consumers*.

The scope of DEC SW usually lies on the different ICD defined for communication and exchange of data (generally *files*). As such, it relies on different COTS to delegate the implementation of various network protocols supported.

The DEC SW offers a command line interface to *pull* and *push* files towards the different configured interfaces.





2.2 Definitions

This section addresses a high level overview for the main design drivers that allows DEC to interface efficiently for the configured exchanges:

- *Circulation* : this term generally refers to any exchange of files either for retrieval upon *pull* from or for distribution upon *push* to any configured interface.
- *Dissemination* : this term refers to the file-system local distribution into the Inray(s) of the files previously downloaded from a given interface as part of a *pull* circulation.
- *Download* : this term is used to refer to the actual retrieval of file from a given interface during a *pull* iteration.
- *Inray* : the final destination directory for downloaded files upon complete dissemination according to the rules.
- *Pull* : this term refers to the circulation operation for filtering and listing up to the actual download of files from a given interface according to the configured rules.
- *Push* : this term refers to the circulation operation to upload the available file(s) in some interface.
- *Rule* : this generic term refers to the configuration items for *pull* files, *disseminate* them, and *push* them.

2.3 Main Features

This section enumerates a high level overview for the main features that allows DEC to interface efficiently for the configured exchanges:

- *Automation* : the ability to perform unattended autonomous circulation operations
- *Flexibility* : the ability to *pull* & *push* files from configurable interfaces and configurable circulation rules
- *Robustness* : this is to perform “atomic” operations during file circulation ; the state for each operation is always known being network errors tolerant
- *Performance* : parallelisation of the circulation to fruit the available network bandwidth, support of file compression mechanisms to reduce the footprint of transfers and local disseminations for which duplication of files by *cp* or *mv* can be avoided by usage of *hardlinks*
- *Resiliency* : to *autonomously* recover from network errors, downtime and eventual glitches and resume operations during every iteration.
- *Zero-copy* : to avoid new copies in the file system during *dissemination* circulations.
- *Comprehensive Traceability* : complete deterministic and unambiguous traceability using codes within the log file of every operation.



2.4 Download DEC SW

This section contains the link to download the DEC SW installer *gemfile dec-stable.gem* with the unit tests configuration. It is necessary to be logged-in with your DEIMOS *gmail* account to *authorise* the download. Do not hesitate in requesting tailored installation packages according to your needs.

3 Install

3.1 Install Environment

This section covers the install of *Ruby* interpreter and the *gem* dependencies needed by DEC SW. It is recommended that the *Ruby* interpreter is done locally for the Linux user who shall execute the DEC SW.

3.1.1 Install Ruby

The *Ruby* interpreter can be obtained and installed in many different ways ; this manual describes how to install it local to the user which shall execute the DEC SW.

The install is based on RVM, which is a command-line tool which allows you to easily install, manage, and work with multiple ruby environments from interpreters to sets of gems.

```
$> \curl -sSL https://get.rvm.io | bash -s stable --ruby
```

Alternatively to the latest ruby stable installation, the following command installs a specific version of ruby interpreter ; the version specified below corresponds to the one used for the unit tests and it is required as a mandatory precondition at installation time according to the gem file definition.

```
$> rvm install ruby-2.6.5
```

3.2 Install DEC

In order to install DEC SW and the gems required, execute the following command in the shell at the directory in which the DEC gem file is placed:

```
$> gem install dec_stable.gem
```

3.3 Uninstall DEC

In order to uninstall DEC SW, execute the following command in the shell:

```
$> gem uninstall dec.gem
```

Remove executables:

decValidateConfig, decCheckConfig, decCheckSent, decConfigInterface2DB, decDeliverFiles, decGetFi



in addition to the gem? [Yn]

Press 'Y' key to remove the executables as well

3.4 COTS Required

This section enumerates the COTS which are used by DEC SW for exchange of file by some network protocol implementation, or file transformations associated to those exchanges.

This manual, which currently address component level information, does not address how to provision these COTS ; they can be obtained naturally with most OS distribution, downloaded with its native package manager, or manually installed. However it is noted that DEC containerized execution environments definition (IaaS) which already resolve every SW COTS dependencies out of the box are available, please do not hesitate in requesting information.

3.4.1 Databases

This section enumerates the different databases which can be used by DEC SW. Only *sqlite3* is *mandatory* to allow the execution of the entire set of *unit tests*. Below the different databases that have used at some deployment. It is recalled that it is possible to execute the DEC SW without any database by usage of flag *"-nodb"*.

- *sqlite3* : is an in-process library that implements a self-contained, serverless, zero-configuration, transactional SQL database engine
- *PostgreSQL* : object-relational database system with a strong reputation for reliability, feature robustness, and performance
- *MySQL* : a high performance, scalable database management system

3.4.2 Network Tools

This section enumerates the network tools which can be used by DEC SW.

- *ncftp* : application programs implementing the File Transfer Protocol (FTP)
- *sftp* : application programs implementing the Secure File Transfer Protocol (SFTP)
- *curl* : command line tool and library for transferring data with URLs (WebDAV)

3.4.3 File Compression Tools

This section enumerates the file compression tools which can be used by DEC SW.

- *7-zip* : is a file archiver with a high compression ratio ; name of the package can be *"p7zip"*
- *zip / unzip* : provide free, portable, high-quality versions of the *Zip* and *UnZip* compressor-archiver utilities
- *gzip* : The *gzip* reduces the size of the named files using Lempel–Ziv coding (LZ77)
- *compress* : The *compress* utility reduces the size of the named files by using adaptive Lempel–Ziv coding algorithm



3.4.4 File Transformation Tools

This section enumerates the file transformation tools which can be used by DEC SW.

- *xmllint* : is a command line XML parser which is part of the *libxml2* and *libxml2-utils* packages.

3.5 Installation Verification

3.5.1 Verification with Unit Tests

This section describes how to execute the *unit tests*, which have been designed to be transparent and harmless in front of the potential different execution environments (i.e. development, integration, production), being their execution a simple and effective manner to verify the correct installation of the DEC SW.

The prerequisites to be able to successfully execute the *unit tests* are :

- an OS user *dectest*
- SFTP server running on *localhost* allowing login to *dectest* using the SSH keys
- FTP server running on *localhost* allowing login to *dectest* using the *password decctest*

```
$> decUnitTests
```

The results of the unit test should show no failures neither errors ; the execution time in a 2.66 GHz Intel Core 2 Duo is about 10 minutes approximately.

```
.
Finished in 590.39725 seconds.
-----
17 tests, 112 assertions, 0 failures, 0 errors, 0 pendings, 0 omissions, 0 notifications
100% passed
-----
0.03 tests/s, 0.19 assertions/s
```

3.5.2 Verification with Operational Interface

This section describes how to verify the correct installation of DEC SW by execution of a test with the IERS *operational* service, for which Internet connectivity is required for the FTP protocol. Note that it is not possible to ensure the connectivity availability by such service and sometimes test may fail by reply of *530 connect failed: Address already in use. No response from server*.

```
$> decUnitTests_IERS
```

```
.
Finished in 54.38868 seconds.
```



```
2 tests, 25 assertions, 0 failures, 0 errors, 0 pendings, 0 omissions, 0 notifications
100% passed
```

```
0.02 tests/s, 0.33 assertions/s
```

In case of deployment without any database, the tests can be restricted to the ones which make usage of the `"-nodb"` execution option:

```
$> decUnitTests_IERS -n test_decGetFromInterface_NODB
```

```
.
Finished in 54.38868 seconds.
```

```
1 tests, 18 assertions, 0 failures, 0 errors, 0 pendings, 0 omissions, 0 notifications
100% passed
```

```
0.02 tests/s, 0.23 assertions/s
```

4 Configuration

4.1 General

This section covers the general configuration of a DEC node which is defined in *dec_config.xml*.

4.1.1 Workflow

This section overviews the configuration items associated to the file-system directories used to prepare the circulations, temporal working directory or the directory in which DEC reports are placed.

- *SourceDir* : this is the directory from which the files are fetched to be circulated in *push* mode towards the configured interfaces according to the defined rules
- *GlobalOutbox* : this directory is owned by the DEC and it is a transient place to filter-out files which do not meet any circulation rule
- *ReportDir* : this directory is where the synthetic reports generated by DEC are placed upon circulation operations
- *TempDir* : this is the temporal working directory used by DEC

4.1.2 Inventory

This section describes the configuration items associated to the *Inventory* to record every performed circulation and to allow filtering of previously pulled files.

```
<Inventory>
  <Database_Adapter>sqlite3</Database_Adapter>
  <Database_Name>/tmp/dec_inventory</Database_Name>
  <Database_User>root</Database_User>
  <Database_Password>2mysql</Database_Password>
</Inventory>
```

The configuration items associated are the following below:

- *Database_Adapter* : this is the database used for recording the operations *unless* execution is performed with the *-nodb* execution flag is used ; values can be "*postgresql*", "*sqlite3*", etc driven by your database of choice



- *Database_Name* : this is a database name in which the circulation operations are recorded
- *Database_User* : this is the database user name
- *Database_Password* : this is the database user password

```
<Workflow>
  <SourceDir>/tmp/dec_delivery_root</SourceDir>
  <GlobalOutbox>/tmp/dec/outbox</GlobalOutbox>
  <ReportDir>/tmp/dec/in_basket_if_localhost_notsecure</ReportDir>
  <TempDir>/tmp/dec/tmp</TempDir>
</Workflow>
```

4.1.3 Circulation Reports

This section describes how to configure the DEC SW to generate the *circulation reports* containing information of the files pulled, pushed or which are available published by a given interface.

- *RetrievedFiles* : this report enumerates the files *pulled* from a given interface during a polling loop
- *DeliveredFiles* : this report enumerates the files *pushed* from a given interface during a polling loop
- *UnknownFiles* : this report enumerates the files available at the DownloadDir from a given interface which did not meet any rule of the *DownloadRules* during a polling loop iteration
- *EmergencyDeliveryFiles* : this report is specific of the RPF tailoring

The generated circulation reports are placed in directory location defined by the full path specified in the *ReportDir* configuration item:

```
<ReportDir>/dec/dec_reports</ReportDir>
```

4.1.3.1 Pulled Files

The DEC SW can generate a report enumerating the files which have been *pulled* from a given interface during a polling loop. The name of this *circulation report* is "*RetrievedFiles*". Below there are the associated configuration items:

```
<Report Name="RetrievedFiles">
  <Enabled>true</Enabled>
  <Desc>List of Files Retrieved</Desc>
  <FileClass>OPER</FileClass>
  <FileType>DEC_R_PULL</FileType>
</Report>
```

4.1.3.2 Unknown Files

The DEC SW can generate a report enumerating the files which did not match any filtering rule for their retrieval from a given interface during a polling loop. The name of this *circulation report* is "*UnknownFiles*". Below there are the associated configuration items:



```

<Report Name="UnknownFiles">
  <Enabled>true</Enabled>
  <Desc>List of unknown Files present</Desc>
  <FileClass>OPER</FileClass>
  <FileType>DECUNKNOWN</FileType>
</Report>
  
```

4.2 Interfaces

This section covers the *interfaces* configuration of a DEC node. The configuration of every interface is defined in the file *dec_interfaces.xml*.

- *TXRXParams* : configuration items regarding adjustments for the *pull* and *push* circulations
- *Enabled4Receiving* : *boolean* flag for the activation of the circulations in *push* mode
- *ImmediateRetries* : number of retries to be applied to recover eventual *upload* failures when *pushing* a file
- *LoopRetries* : number of loops to be applied to recover eventual *upload* failures when *pushing* a file
- *LoopDelay* : delay in *seconds* between two consecutive loops (if needed) for push
- *PollingInterval* : delay in *seconds* in between consecutive iterations for *pull* circulations
- *PollingSize* : maximum number of files to be *pulled* during an iteration
- *ParallelDownload* : number of simultaneous file downloads for pull circulations

4.2.1 TXRXParams

The *TXRXParams* configuration item defines the parameters which rule the circulation in pull and push mode.

- *Enabled4Sending* : *boolean* flag for the activation of the circulations in *pull* mode
- *Enabled4Receiving* : *boolean* flag for the activation of the circulations in *push* mode
- *ImmediateRetries* : number of retries to be applied to recover eventual *upload* failures when *pushing* a file
- *LoopRetries* : number of loops to be applied to recover eventual *upload* failures when *pushing* a file
- *LoopDelay* : delay in *seconds* between two consecutive loops (if needed) for push
- *PollingInterval* : delay in *seconds* in between consecutive iterations for *pull* circulations
- *PollingSize* : maximum number of files to be *pulled* during an iteration
- *ParallelDownload* : number of simultaneous file downloads for pull circulations



4.2.2 Server

The *Server* configuration item defines the parameters which rule the network protocol of choice selected to rule the file circulations either in *pull* and *push* mode.

- *Protocol* : unit tests are covering today "*FTP*", "*SFTP*", "*WEBDAV*" - http and http(s) -, and "*LOCAL*" ; if configuration item is set to "*LOCAL*" then network configuration items such as *Hostname*, *Port*, *User* and *Pass* are not used
- *Hostname* : hostname of the interface
- *Port* : TCP port
- *User* : registered user for the server at the *Hostname* & *Protocol* server
- *Pass* : password for authentication ; in case of secure *SecureFlag* set to true, the SSH keys associated to the system user are used instead
- *RegisterContentFlag* : *boolean* flag to activate tracking of the files available for *pulling* without effective download
- *RetrieveContentFlag* : *boolean* flag to activate the download of the files available for *pull* circulation
- *SecureFlag* : *boolean* flag to activate *encrypted* SSH communications
- *CompressFlag* : *boolean* flag to activate *compression* of the *encrypted* SSH communications
- *DeleteFlag* : *boolean* flag to delete the file upon successful circulation
- *PassiveFlag* : *boolean* flag to activate *compression* of the *encrypted* SSH communications
- *CleanUpFreq* : defined in seconds used by the clean-up daemon if enabled to clean-up previously circulated files in *push* mode

4.2.3 DeliverByMailTo

List of email *Address* configuration items used to *push* files using SMTP.

4.2.4 Notify

The *Notify* configuration item serves to activate the generation and delivery of an email receipt carrying the name of the files which have been *pushed* towards a given *Interface*.

- *SendNotification* : *boolean* flag to activate the
- *To* : list of email *Address* configuration items which will receive the notification

```
<Notify>
  <SendNotification>true</SendNotification>
<To>
  <Address>mario.bros@gmail.com</Address>
  <Address>mario.draghi@deimos-space.com</Address>
```



```

        <Address>mario.cipollini@esa.int</Address>
</To>
</Notify>

```

4.2.5 Events

The *Events* configuration item host the activation and shell command associated to the event when circulating towards the interface.

```

<Events>
<Event Name="OnReceiveNewFilesOK"           executeCmd="echo :-)"/>
<Event Name="OnReceiveError"                 executeCmd="echo :-(("/>
<Event Name="NewFile2Intray"                  executeCmd="echo %F"/>
</Events>

```

Below the possible *Event Name* values which can be configured:

- *OnSendOK* : it is raised upon a successful loop to push
- *OnSendNewFilesOK* : it is raised upon a successful *push* loop of file(s)
- *OnSendERROR* : it is raised if any file failed the *push* circulation
- *OnReceiveOK* : it is raised upon a successful loop for pull
- *OnReceiveNewFilesOK* : it is raised upon a successful *pull* loop of file(s)
- *OnReceiveNewFile* : it is raised every new file *pulled*
- *OnReceiveERROR* : it is raised if any *pull* of file has failed
- *OnTrackOK* : it is raised upon a successful loop to check availability pull
- *NewFile2Intray* : it is raised upon every new file locally disseminated after pulling it ; %f specifies the *filename* disseminated ; %F specifies the *full path filename* disseminated ; %d specifies the directory name in which the file has been disseminated

4.3 Pull circulations

The mechanism to *select*, *download* and locally *disseminate* files to a DEC node is referred to *pull mode*.

The configuration of the pull circulation rules is defined in *dec.incoming_files.xml*.

4.3.1 Interface pick-up points

The *Interface* configuration item defines the interfaces pick-up point(s) from which the exposed files are polled.

- *Name* : this is the configuration item *identifier* which is used to identify a given interface and refer to it in other sections of the configuration
- *LocalInbox* : this is the *local* directory in which files are initially placed upon successful download ; if no dissemination rule is applied, this directory becomes the final destination



- *DownloadDirs* : a list of *Directory* configuration items to define the *remote* directories of this interface from which the files will be pulled ; the attribute *DepthSearch* defines the directory sub-levels which are polled.
- *Switches* : *pull* configuration items to modulate the operations with respect the published files by the interface.

```
<ListInterfaces xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

<Interface>
  <Name>LOCALHOST_SECURE</Name>
  <LocalInbox>/tmp/in_basket_if_localhost_secure</LocalInbox>
  <DownloadDirs>
    <Directory DepthSearch="0">/download1</Directory>
    <Directory DepthSearch="0">/download2</Directory>
  </DownloadDirs>
  <Switches>
    <DeleteDownloaded>true</DeleteDownloaded>
    <DeleteDuplicated>true</DeleteDuplicated>
    <DeleteUnknown>false</DeleteUnknown>
    <LogDuplicated>true</LogDuplicated>
    <LogUnknown>true</LogUnknown>
  </Switches>
</Interface>

<Interface>
  <Name>IERS</Name>
  <LocalInbox>/tmp/dec/if_iers_in_basket</LocalInbox>
  <DownloadDirs>
    <Directory DepthSearch="0">ser7</Directory>
  </DownloadDirs>
  <Switches>
    <DeleteDownloaded>false</DeleteDownloaded>
    <DeleteDuplicated>false</DeleteDuplicated>
    <DeleteUnknown>false</DeleteUnknown>
    <LogDuplicated>false</LogDuplicated>
    <LogUnknown>false</LogUnknown>
  </Switches>
</Interface>

</ListInterfaces>
```

4.3.1.1 Pull Switches

This sections describes the different pull switches which are defined interface-wise when retrieving files from it.

- *DeleteDownloaded* : file pulled are removed upon successful retrieval ; this option is usually disabled when fetching files from shared public interfaces.



- *DeleteDuplicated* : *duplicated* files found during a pull iteration are removed from the interface without retrieval ; this option is usually disabled when fetching files from shared public interfaces.
- *DeleteUnknown* : *unknown* files which do not meet any *download rule* are removed from the interface without retrieval ; this option is usually disabled when fetching files from shared public interfaces.
- *LogDuplicated* : *duplicated* files found from the interface during a pull iteration are logged as *[DEC_301]* warnings without retrieval ; this option is usually disabled when fetching files from shared public interfaces.
- *LogUnknown* : *unknown* files from the interface which do not meet any *download rule* are logged as *[DEC_320]* warnings ; this option is usually disabled when fetching files from shared public interfaces.

4.3.2 Download rules

This configuration item defines the filters to select the files to be pulled from the interface pick-up point(s).

- *File Type* attribute : it defines the file to be pulled, allowing the definition of wildcards
- *Description* : free text to capture a human friendly definition of the interface
- *FromList* : a list of *Interface* identifiers from which the file will be pulled

```
<DownloadRules xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

```
<File Type="tai-utc*">
  <Description>TAI UTC correlation</Description>
  <FromList>
    <Interface>IERS</Interface>
    <Interface>LOCALHOST_NOT_SECURE</Interface>
  </FromList>
</File>
```

```
<File Type="finals.a*">
  <Description>TAI UTC correlation consolidated</Description>
  <FromList>
    <Interface>IERS</Interface>
    <Interface>LOCALHOST_NOT_SECURE</Interface>
  </FromList>
</File>
```

```
<File Type="S2?_*">
  <Description>Sentinel-2 Ground Segment</Description>
  <FromList>
    <Interface>LOCALHOST_SECURE</Interface>
    <Interface>LOCALHOST_NOT_SECURE</Interface>
  </FromList>
```

</File>

</DownloadRules>

4.3.3 Dissemination rules

This configuration item defines the local Intrays and the dissemination rules to be applied upon successful pull of files.

Firstly it is defined the *ListIntrays* *Intray* configuration items:

- *Name* : this is the Inray *identifier* which is used to identify the final location the files pulled are placed
- *Directory* : this is the *local* directory associated to the in-tray
- *Execute* : this *optional* configuration item defines a command to be executed upon every file disseminated into the Inray as an *event*

<ListIntrays>

<Intray>

<Name>S2ALL</Name>

<Directory>/local_dissemination/S2ALL</Directory>

</Intray>

<Intray>

<Name>S2A</Name>

<Directory>/local/S2A</Directory>

<Compress>7z</Compress>

</Intray>

<Intray>

<Name>S2B</Name>

<Directory>/local/S2B</Directory>

</Intray>

<Intray>

<Name>GPS</Name>

<Directory>/local/GPS</Directory>

</Intray>

</ListIntrays>

Then the rules for local dissemination of the pulled files into the in-tray(s) are defined. Only the first rule which matches the file name or wildcard defined in the *File Type* attribute is applied ; as such it is recommended to sort the rules ranking from the more restrictive ones.

- *Name* : this is the inray *identifier* which is used to identify the final location the files pulled are placed
- *HardLink* : this is a *boolean* flag to hardlink in the file-system a pulled file in case of definition of different in-trays for multiple dissemination into



- *ToList* : this is the list of *Intray* identifiers configuration item the defined *File Type* is disseminated into

```
<ListFilesDisseminated>

<File Type="tai-utc*">
    <HardLink>False</HardLink>
    <ToList>
        <Intray>GPS</Intray>
    </ToList>
</File>

<File Type="finals*">
    <HardLink>>false</HardLink>
    <ToList>
        <Intray>GPS</Intray>
    </ToList>
</File>

<File Type="S2A_*.*">
    <HardLink>>true</HardLink>
    <ToList>
        <Intray>S2A</Intray>
        <Intray>S2ALL</Intray>
    </ToList>
</File>

<File Type="S2B_*.*">
    <HardLink>>true</HardLink>
    <ToList>
        <Intray>S2B</Intray>
        <Intray>S2ALL</Intray>
    </ToList>
</File>

<File Type="S2_*.*">
    <HardLink>False</HardLink>
    <ToList>
        <Intray>S2ALL</Intray>
    </ToList>
</File>

</ListFilesDisseminated>
```

4.4 Push circulations

The mechanism to fetch and upload files from a DEC node is referred to *push mode*.
This needs to be written



4.4.1 Interface pick-up point

TBW

4.4.2 Upload rules

TBW

4.4.3 Push Circulations

This section describes the specific environment variables used by DEC SW for *push circulations*.

- `DEC_DELIVERY_ROOT` : this is the source directory of the files to be *pushed*

4.5 Database

This section describes how to initialise the database configuration for DEC driven by some environment variable settings described below. It is however recalled that it is possible to execute the DEC *without* a database by usage of the flag `"-nodb"` which precludes some features such as control flow, throughput computation however allowing essential file data circulations.

4.5.1 Creation

This section describes how to initialise the database by creation of the tables and index used by DEC SW.

In order to create the database, execute the following command in the shell:

```
$> decManageDB --create-tables
```

In order to remove the database, execute the following command in the shell:

```
$> decManageDB --drop-tables
```

4.5.2 Configuration of Interfaces

This section describes how to configure within the database the interface identifiers defined in the configuration file `dec_interfaces.xml` :

```
$> decConfigInterfaceDB --process EXTERNAL
```

It is also possible to register the interface identifiers according to its name definition in `dec_interfaces.xml`:

```
<Interface Name="IERS">
```

The following command can be used to register an interface identifier in the database:

```
$> decConfigInterfaceDB --add IERS
```

4.5.3 Pushed Files

TBW

4.6 Environment Variables

The execution of DEC SW can be parameterized through the usage of environment variables which are loaded from the shell. Usage of these environment variables is considered *deprecated* since all the associated configuration items they refer to are covered within the configuration files.

The eventual definition and availability of the environment variable referred in this section would override the configuration parameters defined in the configuration files, therefore they are documented to mainly avoid their usage.

4.6.1 Database Variables

This section describes the environment variables used by DEC SW to define the database settings.

- *DEC_DB_ADAPTER* : this is the database used for recording the operations unless execution is performed with the *-nodb* execution flag is used ; values can be "*postgresql*", "*sqlite3*", etc driven by your database of choice
- *DEC_DATABASE_NAME* : this is a database name in which the circulation operations and file availability tracking are recorded
- *DEC_DATABASE_USER* : this is the database user name
- *DEC_DATABASE_PASSWORD* : this is the database user password

4.6.2 General Variables

This section describes the environment variables used by DEC SW to define the database settings.

- *DEC_CONFIG* : this is the directory in which the DEC config files are present
- *DEC_TMP* : this is the directory used for temporal / transient operation prior final availability in the data sinks
- *HOSTNAME* : this environment variable defines the current hostname which is used for mail authentication purposes

4.6.3 File Transfer for RPF

This section describes the specific environment variables used by DEC SW acting as File Transfer for the RPF. The configuration items associated are not covered by the DEC configuration files, therefore their definition is mandatory for the RPF execution environment.

- *FTPROOT* : this is the directory which is used to place the files which will be *pushed* as part of each ROP delivery
- *RPF_ARCHIVE_ROOT* : this is RPF archive root directory from which the files to be transferred are gathered
- *RPFBIN* : this is RPF binary directory in which the RPF tools invoked by the File-Transfer are placed (i.e. *put_report.bin*, *removeSchema.bin*, *write2Log.bin*)

4.7 Configuration Verification

This section describes how to verify the DEC configuration settled according to the previous sections.

To validate the XML files of the DEC configuration, there is an associated a DEC command line tool called *decValidateConfig* which verifies the syntax and semantics associated to configuration items.

Execute the following command in the shell to verify the configuration:

```
$> decValidateConfig --all
```

4.7.1 Check Interfaces

In order to check the entire configuration defined and the connectivity to the different configured interfaces execute the following command:

```
$> decCheckConfig --all
```

If your DEC deployment and configuration does not record the operations into the database (cf. execution with "*-nodb*" flag), alternatively execute the following command in the shell to verify the configuration:

```
$> decCheckConfig --all --nodb
```

5 Reference Log Messages

5.1 Information Messages

5.1.1 Scope

The information messages by DEC SW are meant in general for tracing the nominal performed circulations allowing consumers to monitor them.

5.1.2 Index of Messages

- [DEC_005] I/F "interface": Polling Started
- [DEC_050] I/F "interface": Polling Completed / No file(s) available for pull
- [DEC_060] I/F "interface": Polling Completed / New file(s) available for pull
- [DEC_105] I/F "interface": "filename" is available
- [DEC_110] I/F "interface": Downloaded "filename" with size "num_bytes" bytes
- [DEC_115] Disseminated "filename" into "directory" Intraday
- [DEC_116] Compressed "filename" in "method" at "directory" Intraday
- [DEC_120] I/F "interface": Deleting unknown file "filename" available
- [DEC_125] I/F "interface": Deleting duplicated file "filename" previously received
- [DEC_126] I/F "interface": Deleted downloaded file "filename"
- [DEC_130] I/F "interface": event "name" triggered
- [DEC_131] I/F "interface": event NewFile2Intraday triggered
- [DEC_210] I/F "interface": File "filename" sent using "protocol"
- [DEC_211] File retrieved from SourceDir to the GlobalOutbox (prior its *push* circulation)
- [DEC_212] TBW
- [DEC_213] TBW
- [DEC_214] TBW



5.1.3 [DEC_005] Interface Polling Start

This message time tags the start of the polling operation to *pull* files from a given interface. The time to poll and filter the file to be pulled depends on the number of files published, the different rules configured for download or / and verification with the database of previous downloads ; measurements can be done with this message and its conclusion which is flagged by [DEC_050] or [DEC_060] message.

5.1.4 [DEC_050] Interface Polling Complete / No File(s) Available

This message is logged upon completion filtering the files published in the download interface and verification of eventual duplications in the database without any *new* file meeting the download rules. It can be used to measure the time required to perform the filtering operations.

5.1.5 [DEC_060] Interface Polling Complete / New File(s) Available

This message is logged upon completion filtering the files published in the download interface and verification of eventual duplications in the database reporting there are some *new* files for download. It can be used to measure the time required to perform the filtering operations.

5.1.6 [DEC_100] Interface Pull Iteration Completed

TBW.

5.1.7 [DEC_105] File Available

The file referenced in the message met any of the filtering rules defined in the configuration *dec_incoming_files.xml* and it is therefore available for download from the interface. This message is logged only when the *-list* mode is used, otherwise the files matching the rules are directly downloaded and logged accordingly.

5.1.8 [DEC_110] File Downloaded

The file referenced in the message has been downloaded from the interface and placed into the *LocalInbox* associated to such interface. If the same file is available again at the same interface, the DEC will detect a file duplication condition.

5.1.9 [DEC_115] File Disseminated

The file referenced in the message met any of the and it has been moved from *LocalInbox* into the Inray(s) matching the first *dissemination rule*.

5.1.10 [DEC_116] File Compressed

The file referenced in the message has been compressed according to the *dissemination rule Compress* optional configuration item of the *Inray* entity.



5.1.11 [DEC_120] Unknown File Deleted

According to the configuration item *DeleteUnknownFiles* defined in *dec-config.xml* configuration, a file available in the *pull* interface, which did not match any filtering rule defined in the configuration *dec-incoming_files.xml* has been deleted from the *DownloadDirs* Directory of such interface it was present.

5.1.12 [DEC_125] Duplicated File Deleted

According to the configuration item *DeleteDuplicatedFiles* defined in *dec-config.xml* configuration, a file available in the *pull* interface, which has been previously downloaded successfully such interface is considered duplicated and it is removed directly in download directory without downloading it.

5.1.13 [DEC_126] Downloaded File Deleted

According to the configuration item *DeleteDownloaded* defined in *dec-incoming_files.xml* for every interface, the file which has been successfully *pulled* is deleted subsequently.

5.1.14 [DEC_130] Event Triggered

The message traces some event which has been triggered for a given interface according to the configuration items defined in Events.

5.1.14.1 Event newfile2inray

This event is triggered upon successful polling completion (cf. DEC_060) which drove dissemination of some files (cf. DEC_115).

```
[DEC_130] LEAP I/F : event newfile2inray => auxConverter -f /S3/Leap_Second.dat
```

5.1.14.2 Event onreceivenewfilesok

This event is triggered upon successful polling completion (cf. DEC_060) which drove download of some files (cf. DEC_110).

```
[DEC_130] LEAP I/F : event onreceivenewfilesok triggered => echo %f RECEIVED
```

5.1.15 [DEC_131] Dissemination Command Execution

The message traces some event which has been triggered for a given interface according to the configuration item *"Execution"* defined in the *dissemination rules*.

5.1.16 [DEC_144] Pull Statistics

This message is generated by decStats to supply some statistics regarding the file *pull* operations during the last "n" hours.

The internal of log messages is a JSON string referring to:

- **filename** : the name of the file pushed
- **size** : size of the file in Bytes



- **protocol** : protocol the file was pushed
- **date** : date of the circulation

5.1.17 [DEC_200] Push iteration to Interface completed successfully

This message traces the successful push circulation completion.

5.1.18 [DEC_203] Request to Push File to Interface started

This message traces the start of a given file push circulation towards an interface.

5.1.19 [DEC_205] Push Retry to Interface waiting LoopDelay

Push loop which has failed any circulation (cf. DEC_710) is waiting *LoopDelay* seconds to retry.

5.1.20 [DEC_206] Push Immediate Retry to Re-sending File to Interface waiting LoopDelay

Push loop which has failed any circulation (cf. DEC_710) is waiting *LoopDelay* seconds to retry.

5.1.21 [DEC_210] File Pushed to Interface

The file referenced in the message has been uploaded to the interface placed into its *UploadDir*.

5.1.22 [DEC_211] Push Setup / File at GlobalOutbox

File has been placed in the GlobalOutbox for push circulations.

5.1.23 [DEC_212] Push Setup / File at Removed from SourceDir

TBW.

5.1.24 [DEC_213] Push Setup / File at Interface LocalOutbox

TBW.

5.1.25 [DEC_214] Push Setup / File Compressed at Interface LocalOutbox

TBW.

5.1.26 [DEC_235] Report Generation DeliveredFiles to Interface

TBW.

5.1.27 [DEC_240] Push Email Notification to Interface

TBW / decNotify2Interface.



5.1.28 [DEC_241] Push Error Email Notification to Interface

TBW / decNotify2Interface.

5.1.29 [DEC_244] Push Statistics

This message is generated by decStats to supply some statistics regarding the file *push* operations during the last "n" hours.

The internal of the log message is a JSON string referring to:

- **filename** : the name of the file pushed
- **size** : size of the file in Bytes
- **protocol** : protocol the file was pushed
- **date** : date of the circulation

```
{"filename":"tai-utc.dat","size":61,"interface":"LOCAL","protocol":"FTP;","date":"2020-04-15 17:03:19 UTC"}  
{"filename":"mario.jpg","size":32478,"interface":"LOCAL","protocol":"FTP;","date":"2020-04-15 17:03:19 UTC"}
```




5.2 Warning Messages

5.2.1 Scope

The warning messages by DEC SW are meant in general for tracing not nominal situations which might eventually require some intervention.

5.2.2 Index of Messages

- [DEC_301] Detected duplicated file "filename" already received from "interface" I/F
- [DEC_320] Detected unknown file "filename" available at "interface" I/F
- [DEC_330] "filename" is stuck in "temporal" directory
- [DEC_331] "filename" is stuck in LocalInbox directory
- [DEC_401] "filename" was previously sent
- [DEC_555] "filename" was previously Sent

5.2.3 [DEC_301] Duplicated File Available

The file reported is available again at the *pull* interface ; if the inventory is active, DEC retrieves just once a given file from each interface. This message will be reported during every polling iteration unless the *duplicated* file is removed from the interface.

5.2.4 [DEC_320] Unknown File Available

The file reported is available in the *pull* interface, but did not match any filtering rule defined in the configuration *dec.incoming_files.xml*. This message will be repeated every polling iteration unless the *unknown* file is removed from the interface.

5.2.5 [DEC_330] File Stuck in Temporal Directory

This warning is associated to error message [DEC_620] informing that the file was successfully downloaded and stuck in the temporal directory available for contingency recovery.

5.2.6 [DEC_331] File Stuck in LocalInbox Directory

This warning is associated to error message [DEC_625] or [DEC_626] informing that the file was successfully downloaded and stuck in the *LocalInbox* directory of some interface due to problems during dissemination.

5.2.7 [DEC_401] File Previously Uploaded

The file reported has been found available again for upload towards an interface though it has been previously *pushed* there ; since the *push* iteration is executed with the "once" flag, this file has been discarded for upload.



5.2.8 [DEC_555] File Disseminated Exists

This message is raised when a previous file with same filename is found disseminating locally into an in-tray.

5.2.9 [DEC_556] Old File Removed

This message is raised upon detection of a previous file in the final intray to record its deletion prior the dissemination of the new one.



5.3 Error Messages

5.3.1 Scope

The error messages by DEC SW are meant in general for tracing problems encountered during one iteration which prevented the complete termination of any circulation rule.

5.3.2 Index of Messages

- [DEC_600] I/F "interface": Could not perform polling
- [DEC_605] I/F "interface": Pull Miss-Configuration
- [DEC_610] I/F "interface": Unable to connect to "Hostname" with FTP
- [DEC_611] I/F "interface": reason of the connection failure
- [DEC_612] I/F "interface": Cannot reach directory defined in any of the the "Download-Dirs"
- [DEC_613] I/F "interface": server message associated to the failure associated to the change of directory
- [DEC_614] I/F "interface": Cannot GET "URL"
- [DEC_615] I/F "interface": Failed to get list of files / FTP passive mode is "mode"
- [DEC_620] I/F "interface": Could not copy "file" into local "directory"
- [DEC_625] Dissemination failure of "file" into intray "directory" using mv command
- [DEC_626] Dissemination failure of "file" into intray "directory" using hard-links command
- [DEC_628] Failure when executing command
- [DEC_666] I/F "interface": Could not download "file"
- [DEC_705] I/F "interface": Push miss-configuration
- [DEC_711] Could not reach directory from *SourceDir* to fetch files for push
- [DEC_713] Could not place file in *LocalOutbox* to prepare files out-tray for push

5.3.3 [DEC_600] Failed to Pull from Interface

This message is raised at the completion of the interface polling operation (i.e. *pull* circulation) when it failed. Reason should have been previously logged (e.g. DEC_610, DEC_611, etc). Polling elapse time can be computed by referring to the associated DEC_005 message.

5.3.4 [DEC_601] Failed to Start Listener for Interface

This message is raised when the interface commanded for *pull* circulation is miss-configured. It is usually explained by DEC_605 message.



5.3.5 [DEC_603] Listener for Interface was not running

This message is raised when the interface commanded to stop or re-start its listener was not previously switched-on.

5.3.6 [DEC_605] Pull Miss-Configuration

This message is raised when interface commanded for *pull* circulation is miss-configured.

5.3.6.1 Not existing interface in dec_interfaces.xml

```
[DEC_605] I/F Foo: such is not a configured interface
```

5.3.6.2 Inventory db is not configured / reachable

```
[DEC_605] I/F Foo: db inventory is not configured / reachable
```

5.3.6.3 Not registered interface in database

Polling is performed using the database but such interface has not been registered.

```
[DEC_605] I/F Foo: such is not a registered I/F in db
```

5.3.6.4 Pull flag is disabled in dec_interfaces.xml

```
[DEC_605] I/F IERS: Enabled4Receiving flag is disabled
```

5.3.6.5 I/F LocalInbox not defined in dec_incoming_files.xml

```
[DEC_605] I/F Foo: LocalInbox configuration item not found
```

5.3.7 [DEC_610] Unable to Connect with FTP

This error is raised when it is not possible to connect to "Hostname" with FTP.

5.3.8 [DEC_611] Pull Server Error Message

This error code can bring different messages associated to the connection failure [DEC_610] is reporting. Errors can driven by miss-configuration of the Server associated to such interface or its unavailability due to network problems.

5.3.8.1 Hostname is unknown

```
[DEC_611] LOCALHOST_NOT_SECURE I/F: getaddrinfo: nodename nor servname provided, or not known
```

5.3.8.2 Service not enabled by host

```
[DEC_611] LOCALHOST_NOT_SECURE I/F: Connection refused - connect(2) for 127.0.0.1:21
```

5.3.8.3 SSL/TLS not configured by server

```
[DEC_611] I/F LOCALHOST_FTPS: 500 This security scheme is not implemented
```



5.3.8.4 Failed authentication

[DEC_611] LOCALHOST_NOT_SECURE I/F: 530 Login authentication failed

5.3.9 [DEC_612] Cannot Reach Interface Download Directory

Failed to reach one of the *Directory* of the "DownloadDirs" of a given interface.

5.3.10 [DEC_613] Server Error Message

The information replied by the server when error condition [DEC_612] arises is usually meaningless to understand the root reason to limit the risks of security attacks. It usually is related to file permissions on the server or miss-configuration problems referring to a non existing directory.

[DEC_613] LOCALHOST I/F: 550 Can't change directory to /a/if/local/: No such file or directory

5.3.11 [DEC_614] Cannot Get URL

Failed to get the URL associated to one *Directory* of the "DownloadDirs" of a given interface when using the HTTP protocol.

5.3.12 [DEC_615] Failed to list files with FTP

In practical terms, this is a failure when performing the FTP command list to obtain the list of files available in a given directory.

5.3.13 [DEC_620] Downloaded File not Copied into Final Dir

The file retrieved from the interface could not be copied into the final directory defined in the configuration. This is usually a problem of file permissions.

5.3.14 [DEC_625] File Move Dissemination Failure

This error is raised when DEC could not disseminate a file into a given *Intray* according to the *Dissemination rules* using a mv command. This is usually associated to file permission problems of the *Intray* directory.

5.3.15 [DEC_626] File Hard-Link Dissemination Failure

This error is raised when DEC could not disseminate a file into a given *Intray* according to the *Dissemination rules* using hard-links. This is usually associated to file permission problems of the *Intray* directory.

5.3.16 [DEC_628] Command Execution Failure

This error is raised when DEC tried to execute a command in sub-shell obtaining failure status.

5.3.17 [DEC_666] Download Failure

This error is raised when DEC could not download a file from a given interface.



5.3.18 [DEC_670] Deletion Failure

This error is raised when DEC could not delete from the interface a file which has been successfully downloaded (cf. [DEC_110]). For a given file from a specific interface this message is exclusive to [DEC_126].

5.3.19 [DEC_700] Push Failure to Interface

This message is raised at the completion of the interface *push* operation, when it failed, upon completion of the retry loops (cf. TXRXParams configuration). Reason should have been previously logged (e.g. DEC_710, DEC_711, DEC_712).

5.3.20 [DEC_703] Push Iteration to Interface is already running

This message is raised upon execution of a new instance of decSend2Interface for a given interface when there is already a previous on-going execution for such given interface.

5.3.21 [DEC_705] Push Miss-Configuration for Interface

This message is raised when interface commanded for *push* circulation is miss-configured.

5.3.21.1 Not existing interface in dec_interfaces.xml

[DEC_705] Foo I/F: such is not a configured interface

5.3.21.2 Push flag is disabled in dec_interfaces.xml

[DEC_705] IERS I/F: Enabled4Sending flag is disabled

5.3.22 [DEC_710] Failed to send file to Interface

This message is raised when failure to *push* a file towards an interface.

5.3.23 [DEC_711] Cannot Reach SourceDir Sub-Directory

This error is raised when DEC could not reach a *SourceDir* sub-directory to fetch the selected files to *push* according to some [Upload Rule miss-configuration.

5.3.24 [DEC_712] Cannot Reach Interface Upload Directory

Failed to reach *UploadDir* for a given interface.

5.3.25 [DEC_713] File Hard-link Failure into LocalOutbox

This error is raised when hard-linking from the source directory to the local outbox.

5.3.26 [DEC_715] Push Server Error Message

Server error message associated to the *push* failure.

5.3.26.1 No Write Permission

[DEC_715] I/F LOCALHOST_FTPS: 553 Could not create file

5.3.27 [DEC_740] Failed to Email Push Success Notification to Interface

This message is raised when *[decNotify2Interface]* failed to email the notification to inform about a *success push* iteration.

5.3.28 [DEC_741] Failed to Email Push Error Notification to Interface

This message is raised when *[decNotify2Interface]* failed to email the notification to inform about a *failed push* iteration.

5.3.29 [DEC_742] Email Server Error

This message is the (SMTP) server error when sending notification emails.

5.3.29.1 Credentials Not Accepted

[ERROR] 2020-04-14 18:44:38 NODE_1.mail - [DEC_742] LOCALHOST_NOT_SECURE I/F: Username and Password

5.3.29.2 SMTP Server Not Known

[ERROR] 2020-04-14 18:49:42 NODE_1.mail - [DEC_742] LOCALHOST_NOT_SECURE I/F: getaddrinfo: nodename

5.3.29.3 Time-Out / Port Miss-configuration

[ERROR] 2020-04-14 18:56:31 NODE_1.mail - [DEC_742] LOCALHOST_NOT_SECURE I/F: execution expired

5.3.29.4 Need TLS / Secure Flag Miss-configuration

[ERROR] 2020-04-14 18:58:58 NODE_1.mail - [DEC_742] LOCALHOST_NOT_SECURE I/F: Must issue a START

5.3.30 [DEC_750] Event Error

This message is logged when the command executed associated to some *Event* raised.



5.4 Debug Messages

5.4.1 Scope

The debug messages by DEC SW are meant in general for troubleshooting purposes when undesired behaviour raises ; for instance it may be useful to activate it when rehearsing new configurations.

By default the log debug messages are not generated ; they can be optionally activated at the execution time of the different DEC commands by usage of the *-Debug* or *-D* execution flag supplied at the command line interface.

5.4.2 Index of Messages

- [DEC_910] I/F "interface": Filtering directory with files "number" of items
- [DEC_911] I/F "interface": performance when filtering according to download rules
- [DEC_912] I/F "interface": performance when filtering according to database
- [DEC_913] I/F "interface": filtering file with database
- [DEC_914] I/F "interface": "file" found in database
- [DEC_915] I/F "interface": "file" not found in database
- [DEC_941] File dissemination command I
- [DEC_942] File dissemination command II
- [DEC_951] Removing "file" in "directory" which is "LocalInbox"

5.4.3 [DEC_910] Filtering Number of Files in Download Directory

This message reports the number of files published in the "DownloadDirs" which are about to be filtered according to the download rules and the database content.

5.4.4 [DEC_911] Filtering According to Download Rules

This message reports the CPU time resources used to perform the filtering operations.

5.4.5 [DEC_912] Filtering Number of Items with Database

This message traces the number of files which met the download rules during a given pull iteration and which are about to be filtered with respect to the database registry.

5.4.6 [DEC_913] Filtering File with Database

This message traces that a file found in the interface, which is matching the download rules, is about to be verified whether it has been previously received or not by checking its name reference in the database.



5.4.7 [DEC_914] File Found in Database

This message traces that a file found in the interface, which is matching the download rules, is already registered in the database referring to a previous successful download, and therefore such file will be filtered-out and it will not be pulled again.

5.4.8 [DEC_915] File Previously Not Recorded in Database

This message traces that a file found in the interface, which is matching the download rules, is not previously registered in the database, and therefore such file will be requested for download as part of the *pull* iteration.

5.4.9 [DEC_941] File Dissemination Command I

This message traces the file-system command used to perform the pulled file *first* dissemination from the Interface "*LocalInbox*" into the first *Intray* configured according to the *Dissemination Rules*.

5.4.10 [DEC_942] File Dissemination Command II

This message traces the file-system command used to perform the pulled file *remaining* dissemination(s) from the first *Intray* configured according to the *Dissemination Rules*.

5.4.11 [DEC_951] Removal from LocalInbox upon Dissemination

This message reports that the "file" has been removed from the "directory" "LocalInbox" upon a complete dissemination according to the configured rules.

6 Reference Commands

6.1 decCheckConfig

== Synopsis

This is a command line tool that checks the coherency of the DEC configuration. DEC configuration is distributed amongst different XML files. The information set up must be coherent. This tool ensures that all configuration critical elements are correct. (All DEC config files must be placed in the \$DEC_CONFIG directory). So, run this tool everytime a configuration change is performed.

-e flag:

With this option the Interfaces (Entities) configuration placed in dec_interfaces.xml is checked. As well it is checked the coherency between the dec_interfaces.xml configuration file and the DEC Inventory (DEC Database). (Note: if the network link to a given I/F is broken, the tool will not be able to connect and it will report a configuration error of this I/F).

-i flag:

With this option the Incoming file-types registered in the dec_incoming_files.xml are checked. Mainly what it is done is to check that the interfaces from a File is retrieved are configured in the dec_interfaces.xml file.

-m flag:

With this option the DEC Mail configuration placed in the ft_mail_config.xml is checked.

-s flag:

With this option the DCC Services configured in the dcc_services.xml file are checked. The check performed with this flag is that the executable set in the command of the service can be found in the \$PATH environment variable.



-t flag:

With this option the In-Trays configured in the dec_incoming_files.xml file are checked.

-a flag:

This is the all flag, which performs all the checks described before.

== Usage

decCheckConfig [--nodb]

-a checks all DEC configuration

-e checks entities configuration in dec_interfaces.xml

--nodb no Inventory checks

-i checks incoming file-types configured in dec_incoming_files.xml

-o checks outgoing file-types configured in dec_outgoing_files.xml

-m checks the mail configuration placed in ft_mail_config.xml

-t checks the In-Trays configuration placed in dec_incoming_files.xml

-l checks the log configuration

-h it shows the help of the tool

-u it shows the usage of the tool

-v it shows the version number

-V it performs the execution in Verbose mode

-D it performs the execution in Debug mode

== Author

DEIMOS-Space S.L. (bolf)

== Copyright

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6.2 decCheckSent

== Synopsis

This is a DEC command line tool that lists the contents of the <Upload> directory corresponding to a given interface configured in interfaces.xml

== Usage

```
decCheckSent -m <Interface_Name> [-t]
--mnemonic <MNEMONIC> (mnemonic is case sensitive)
--temp      it shows the content of the <UploadTemp> directory
--Show      it shows all available I/Fs registered in the Inventory
--help      shows this help
--usage     shows the usage
--Debug     shows Debug info during the execution
--version   shows version number
```

== Author

Deimos-Space S.L. (bolf)

== Copyright

Copyright (c) 2006 ESA - Deimos Space S.L.



6.3 decConfigInterface2DB

== Synopsis

This is a Data Exchange Component command line tool that synchronizes the Entities configuration with DEC Inventory. It extracts all the I/Fs from the dec_interfaces.xml file and inserts them in the DEC Inventory.

As well it allows to specify a new I/F mnemonic to be loaded into the DEC Inventory with the "--add" command line option.

== Usage

```
decConfigInterfaceDB --add <MNEMONIC> | --process EXTERNAL
--add <MNEMONIC>      (mnemonic is case sensitive) add the specified Entity
--process EXTERNAL    process $DEC_CONFIG/dec_interfaces.xml
--Show               it shows all I/Fs already loaded in the DCC Inventory
--Verbose            execution in verbose mode
--version            shows version number
--help              shows this help
--usage             shows the usage
```

== Author

Deimos-Space S.L. (bolf)

== Copyright

Copyright (c) 2006 ESA - Deimos Space S.L.

6.4 decDeliverFiles

6.5 decGetFiles4Transfer

== Synopsis

This is a DEC command line tool that retrieves files to be transferred (push) from a source directory specified by \$DEC_DELIVERY_ROOT environment variable.

Files present in the source directory are filtered according to the rules defined in ft_outgoing_files.xml

=> wildcards such as <File Type="S2A*">

=> children directories, such as <File Type="GIP_PROBA2">

Files gathered are finally placed into the directory defined in the configuration <GlobalOutbox> present in dec_config.xml

-O flag:

The "ONCE" flag registers in the Inventory all the files sent. As well it checks prior to the delivery whether a files has been previously sent or not to avoid delivering it twice to the same Interface.

== Usage

decGetFiles4Transfer [-O] [-l]

--ONCE The file is just sent once for each I/F

--list list only

--help shows this help

--usage shows the usage

--Debug shows Debug info during the execution

--version shows version number

== Author

Deimos-Space S.L. (bolf)

== Copyright

Copyright (c) 2006 ESA - Deimos Space S.L.



6.6 decGetFromInterface

decGetFromInterface

== Synopsis

This is a DEC command line tool that polls the I/Fs for retrieving files of registered filetypes. As well It retrieves the I/F exchange directory file content linked to a time-stamp.

-l flag:

With this option, only "List" of new availables files for Retrieving and Tracking is done. This flag overrides configuration flags RegisterContentFlag RetrieveContentFlag in dec_interfaces. So Check ONLY of new Files is performed anyway.

-R flag:

With this option (Reporting), DEC Reports will be created (see dcc_config.xml). Report files are initially placed in the Interface local inbox and if configured in files2InTrays.xml disseminated as nominal retrieved file.

--del-unknown:

It overrides the dcc_config.xml configuration parameter DeleteUnknown and explicitly commands for removal of unknown files not configured in ft_incoming_files.xml

== Usage

```
decGetFromInterface -m <MNEMONIC> [-l] [--nodb]
--mnemonic <MNEMONIC> (mnemonic is case sensitive)
--list      list only (not downloading and no ingestion)
--nodb      no Inventory recording
--no-intray skip step of delivery to intrays
--del-unknown it deletes remote files not configured in ft_incoming_files.xmls
--receipt   create only receipt file-list with the content available
--Report    create a Report when new files have been retrieved
--Show      it shows all available I/Fs registered in the DEC Inventory
--help      shows this help
--usage     shows the usage
--Debug     shows Debug info during the execution
--Unknown   shows Unknown files
--Benchmark shows Benchmark info during the execution
--version   shows version number
```

== Author

DEIMOS-Space S.L. (bolf)

6.7 decListener

== Synopsis

This is a Data Exchange Component (DEC) command line tool that manages the I/Fs listeners for data retrieval.

The DEC listeners automates the file pulling from the configured interface. One listener is devoted for every interface configured.

The behaviour of the listener is driven by the settings defined in the configuration file \$DEC_CONFIG/dec_interfaces.xml

Alternatively the listener settings can be overridden with the command line options.

== Usage

```
decListener --all [-R] | --mnemonic <MNEMONIC> --interval <seconds>
--all                      starts a listener for each I/Fs
--Reload                   force a Restart of all listeners
--stop <MNEMONIC>          it stops of the listener for the given I/F
--Stop                     it stops of all listeners
--check                    it checks whether the listeners are running
--mnemonic <MNEMONIC>      (mnemonic is case sensitive)
--interval                  the frequency it is polled I/F given by MNEMONIC (in seconds)
--nodb                      no Inventory recording
--no-intray                 skip step of delivery to intrays upon download
--help                      shows this help
--Debug                     shows Debug info during the execution
--version                   shows version number
```

== Author

DEIMOS-Space S.L. (bolf)

== Copyright

Copyright (c) 2005 ESA - DEIMOS Space S.L.



6.8 decManageDB

== Usage

decManageDB --create-tables | --drop-tables

--create-tables create all minarc required tables

--drop-tables drops all minarc tables

--rpf selector to include reference planning tables

--Debug shows Debug info during the execution

--help shows this help



6.9 decNotify2Interface

== Usage

```
decNotify2Interface -m <MNEMONIC> --OK | --KO
--mnemonic <MNEMONIC> (mnemonic is case sensitive)
--OK          notify success in the delivery to the I/F -f full_path_filelist list of files send
--KO          notify failure in the delivery to the I/F -f full_path_filelist list of files failed
--help        shows this help
--usage       shows the usage
--Debug       shows Debug info during the execution
--version     shows version number
```

6.10 decSend2Interface

== Synopsis

This is a DEC command line tool that deliver files to a given I/F in PUSH mode.
It delivers files using the configured protocols (s)ftp and email.
Files sent can be registered in an Inventory and the delivery date is set to the latest one.

This command can be used in order to send a given file just once
(for each delivery method: ftp, email) for a given Interface.
Use "-0" flag to enable this behaviour.

-R flag:

With this option (Report), a Report "List" with the new files sent is created.
This Report file is initially placed in the Interface local inbox.

== Usage

```
decSend2Interface -m <MNEMONIC> [-0] [--nodb]
--mnemonic <MNEMONIC> (mnemonic is case sensitive)
--ONCE      The file is just sent once for that I/F
--AUTO      local outbox Automatic management
--loops <n> n is the number of Loop retries to achieve the Delivery
--delay <s> s seconds of delay between each Loop Retry
[60 secs by default if it is not specified]
--retries <r> r is the number of retries on each Loop for each file
--Report    create a Report with the list of files delivered to the Interface
--list      list only (not downloading and no ingestion)
--Nomail    avoids mail notification to the I/F after successfully delivery
--Show      it shows all available I/Fs registered in the Inventory
--nodb      no usage of the Inventory for recording operations
--help      shows this help
--usage     shows the usage
--Debug     shows Debug info during the execution
--version   shows version number
```

== Author

Deimos-Space S.L. (bolf)

== Copyright

Copyright (c) 2006 ESA - Deimos Space S.L.



6.11 decSmokeTests

6.12 decStats

== Synopsis

This is a DEC/DCC command line tool that shows file reception statistics

== Usage

decStats

--Hours <hours>	status of last n hours
--file <filename>	status of a given filename
--help	shows this help
--usage	shows the usage
--Debug	shows Debug info during the execution
--version	shows version number

== Author

DEIMOS-Space S.L.

== Copyright

Copyright (c) 2008 ESA - DEIMOS Space S.L.

6.13 decUnitTests

6.14 decUnitTests_IERS

6.15 decValidateConfig

== Synopsis

This is a DEC command line tool that checks the validity of DEC configuration files according to DEC's XSD schemas. This tool should be run everytime a configuration change is performed.

-e flag:

With this option the Interfaces (Entities) configuration file (interfaces.xml) is validated using the schema interfaces.xsd

-g flag:

With the main DEC configuration file (dec_config.xml) is validated using the schema dec_config.xsd

-i flag:

With this option the Incoming file-types configuration file (dec_incoming_files.xml) is validated using the schema dec_incoming_files.xsd

-o flag:

With this option the Outgoing file-types configuration file (dec_outgoing_files.xml) is validated using the schema dec_outgoing_files.xsd

-m flag:

With this option the DEC Mail configuration file (ft_mail_config.xml) is validated using the schema ft_mail_config.xsd

-l flag:

With this option the DEC Logs configuration file (dec_log_config.xml) is validated using the schema dec_log_config.xsd

-a flag:

This is the all flag, which performs all the checks described before.

== Usage



```
-a    Check all DEC configuration files
-g    Check DEC's general configuration file dec_config.xml
-e    Check the Entities Configuration file dec_interfaces.xml
-m    Check the mail configuration file ft_mail_config.xml
-i    Check the incoming file-types configuration file dec_incoming_files.xml
-i    Check the outgoing file-types configuration file dec_outgoing_files.xml
-h    shows this help
-v    shows version number
```

== Author

DEIMOS-Space S.L. (rell)

== Copyright

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A General Configuration

A.1 General Configuration

The general configuration file *dec_config.xml* carries the items to drive the DEC report generation and workflow of files prior their circulation ; additionally it carries the *Inventory* configuration items.

A.2 Example dec_config.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<Configuration>

  <Project>
    <Name>Data Exchange Component</Name>
    <Id>DEC</Id>
    <Mission>UNIT TESTS</Mission>
    <SatPrefix>S2_</SatPrefix>
  </Project>

  <Filters>
    <IncomingFilters>
      <Filter>*</Filter>
    </IncomingFilters>
    <OutgoingFilters>
      <Filter>*</Filter>
    </OutgoingFilters>
  </Filters>

  <Options>
    <Upload>
      <DeleteSourceFiles>true</DeleteSourceFiles>
      <UploadFilePrefix>>false</UploadFilePrefix>
      <UploadDirs>>false</UploadDirs>
    </Upload>
    <Download>
      <DownloadDirs>>false</DownloadDirs>
      <DeleteUnknownFiles>>false</DeleteUnknownFiles>
      <DeleteDuplicatedFiles>true</DeleteDuplicatedFiles>
    </Download>
  </Options>
</Configuration>
```



```

<!--
<LogUnknownFiles>false</LogUnknownFiles>
<LogDuplicatedFiles>false</LogDuplicatedFiles>
-->
    </Download>
</Options>

<Reports>

<!-- DDC delivery reports / push (decSend2Interface) -->

    <Report Name="DeliveredFiles">
        <Enabled>true</Enabled>
        <Desc>List of Files Delivered</Desc>
        <FileClass>OPER</FileClass>
        <FileType>DEC_F_SENT</FileType>
    </Report>

    <Report Name="EmergencyDeliveredFiles">
        <Enabled>false</Enabled>
        <Desc>List of Files Delivered in Emergency Mode</Desc>
        <FileClass>OPER</FileClass>
        <FileType>DEMERGENCY</FileType>
    </Report>

<!-- DCC Retrieval reports (decGetFromInterface) -->

    <Report Name="RetrievedFiles">
        <Enabled>true</Enabled>
        <Desc>List of Files Retrieved</Desc>
        <FileClass>OPER</FileClass>
        <FileType>DEC_F_RECV</FileType>
    </Report>

    <Report Name="UnknownFiles">
        <Enabled>true</Enabled>
        <Desc>List of unknown Files present</Desc>
        <FileClass>OPER</FileClass>
        <FileType>DECUNKNOWN</FileType>
    </Report>

</Reports>

<Workflow>
    <SourceDir>/tmp/dec_delivery_root</SourceDir>
    <GlobalOutbox>/tmp/dec/outbox</GlobalOutbox>
    <ReportDir>/tmp/dec/in_basket_if_localhost_notsecure</ReportDir>
    <TempDir>/tmp/dec/tmp</TempDir>

```




```
</Workflow>
```

```
<Inventory>
```

```
  <Database_Adapter>sqlite3</Database_Adapter>
```

```
  <Database_Name>/tmp/dec_inventory</Database_Name>
```

```
  <Database_User>root</Database_User>
```

```
  <Database_Password>2mysql</Database_Password>
```

```
</Inventory>
```

```
</Configuration>
```

B Interfaces Configuration

B.1 Interface Configuration

The general configuration file *dec_interfaces.xml* carries the items TBW TBW TBW.

B.2 Example dec_interfaces.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<Interfaces xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

  <Interface Name="IERS">

    <Desc>IERS Interface</Desc>

    <TXRXParams>
      <Enabled4Sending>false</Enabled4Sending>
      <Enabled4Receiving>true</Enabled4Receiving>
      <ImmediateRetries>3</ImmediateRetries>
      <LoopRetries>2</LoopRetries>
      <LoopDelay unit="s">300</LoopDelay>
      <PollingInterval unit="s">20</PollingInterval>
      <PollingSize>470</PollingSize>
      <ParallelDownload>5</ParallelDownload>
    </TXRXParams>

    <Server>
      <Protocol>FTP</Protocol>
      <Hostname>ftp.iers.org</Hostname>
      <Port>21</Port>
      <User>anonymous</User>
      <Pass>guest</Pass>
      <RegisterContentFlag>false</RegisterContentFlag>
      <RetrieveContentFlag>true</RetrieveContentFlag>
      <SecureFlag>false</SecureFlag>
      <VerifyPeerSSL>false</VerifyPeerSSL>
      <CompressFlag>false</CompressFlag>
      <PassiveFlag>true</PassiveFlag>
      <CleanupFreq Unit="s">5</CleanupFreq>
    </Server>
  </Interface>
</Interfaces>
```



```
</Server>

<DeliverByMailTo>
  <Address>mario.bross@deimos-space.com</Address>
</DeliverByMailTo>

<Notify>
<SendNotification>>false</SendNotification>
<To>
<Address>mario.draghi@supereuro.com</Address>
</To>
</Notify>

<Events>
  <Event Name="NewFile2InTray"          executeCmd="auxConverter -f %F" />
</Events>

<ContactInfo>
  <Name>Mr draghi</Name>
  <EMail>mario.draghi@supereuro.com</EMail>
  <Tel>0039-800 454 432</Tel>
  <Fax>0039-800 454 433</Fax>
  <Address>Citta Uova</Address>
</ContactInfo>

</Interface>

</Interfaces>
```

C Pull Circulations Configuration

C.1 General Configuration

The general configuration file *dec_incoming_files.xml* carries the items to drive pull circulations from the defined interfaces.

C.2 Example *dec_incoming_files.xml*

```
<?xml version="1.0" encoding="UTF-8"?>

<Config>

  <ListInterfaces xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

    <Interface>
      <Name>ECDC</Name>
      <LocalInbox>/tmp/dec/in_basket_if_ecdc</LocalInbox>
      <DownloadDirs>
        <Directory DepthSearch="0">covid19/casedistribution/csv</Directory>
      </DownloadDirs>
      <Switches>
        <DeleteDownloaded>>false</DeleteDownloaded>
        <DeleteDuplicated>>false</DeleteDuplicated>
        <DeleteUnknown>>false</DeleteUnknown>
        <LogDuplicated>>false</LogDuplicated>
        <LogUnknown>>false</LogUnknown>
      </Switches>
    </Interface>
  </ListInterfaces>

  <DownloadRules xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

    <File Type="csv">
      <Description>Comma Separated Value</Description>
      <FromList>
        <Interface>ECDC</Interface>
      </FromList>
    </File>
  </DownloadRules>
</Config>
```



```
</DownloadRules>

<DisseminationRules xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

  <ListIntrays>

    <Intray>
      <Name>DIAS</Name>
      <Directory>/tmp/dec_final_dissemination/DIAS/</Directory>
    </Intray>

  </ListIntrays>

  <ListFilesDisseminated>

    <!--
      SORT Rules ranking from more restrictive ones
      Only the first rule matching the file pattern is applied
    -->

    <File Type="S2?_*OPENHUB*.csv">
      <HardLink>false</HardLink>
      <ToList>
        <Intray>DIAS</Intray>
      </ToList>
    </File>

  </Configuration>
```

D Log Configuration

D.1 Log4r Configuration

The log capability by DEC SW are based on the *ruby* Log4r capabilities, which is a porting of the widely spread Java library Log4j.

The associated configuration file *dec_log_config.xml* is not DEC SW specific and it can be directly handled by *log4r* and can be similar to other components which use the same logging *Log4r* library.

D.1.1 Rolling File Outputter

This section recalls the Log4r *RollingFileOutputter* which is used by default in DEC SW.

- *type* : RollingFileOutputter
- *filename* : pull path filename
- *formatter* : PatternFormatter
- *trunc* : If true, deletes the existing log files, otherwise continues logging where it left off last time
- *maxsize* : Maximum size of every log file in bytes
- *max_backups* : Maximum number of prior log files kept
- *maxtime* : Maximum age of every log file in seconds

D.1.2 Server

The *Server* configuration item defines the parameters which rule the network protocol of choice selected to rule the file circulations either in *pull* and *push* mode.



D.2 Example dec_log_config.xml

```
<log4r_config>

  <pre_config>
    <parameter name="mainLoggerName" value="NODE_1"/>
  </pre_config>

  <outputter name="console" level="INFO" >
    <type>StdoutOutputter</type>
    <formatter type="Log4r::PatternFormatter" pattern="[%5l] %d %c.#{moduleName} - %m">
    <date_pattern>%Y-%m-%d %H:%M:%S</date_pattern>
    </formatter>
  </outputter>

  <outputter name="dec_log" level="DEBUG">
    <type>RollingFileOutputter</type>
    <filename>/tmp/DEC.log</filename>
    <formatter type="PatternFormatter" pattern="[%5l] %d %c.#{moduleName} - %m">
    <date_pattern>%Y-%m-%d %H:%M:%S</date_pattern>
    </formatter>
    <trunc>false</trunc>
    <maxsize>10000000</maxsize>
    <max_backups>4</max_backups>
    <maxtime>2592000</maxtime>
  </outputter>

  <logger name="NODE_1" level="DEBUG" trace="false">
    <outputter>console</outputter>
    <outputter>dec_log</outputter>
  </logger>

</log4r_config>
```