



# Setting up a Multidimensional Raster Data Exchange Platform with FME Server

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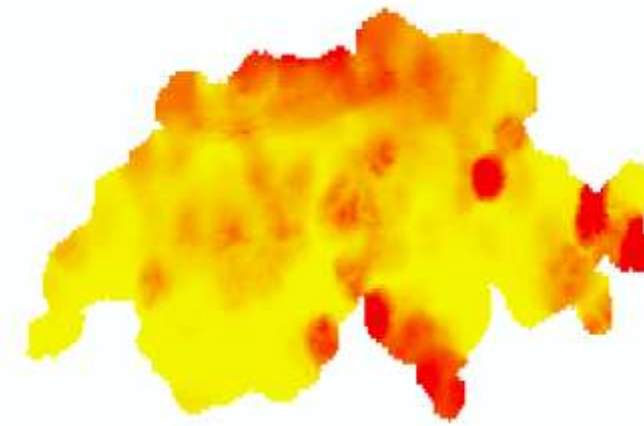
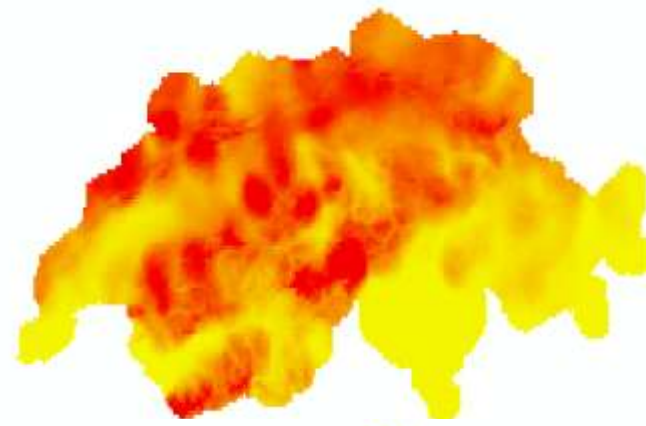
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GIS Analyst



- **Client:** Swiss Federal Office of Meteorology and Climatology
- **Aim of the project:** Building a raster data store for central distribution
- **Input data:** Daily meteorological raster data in netCDF (RainFall, Temperature ..)
- **Storage:** Geodatabase RasterCatalog with Attributes about Date, Type of Measurement, etc

# netCDF Data

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# Raster Catalog

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NAME	OBJECTID	DATUM	DATUMIMPORT	PARAMETER
rre150d0_20070101	33	01.01.2007	18.02.2009 12:12:14	rre150d0
rre150d0_20070102	34	02.01.2007	18.02.2009 12:12:17	rre150d0
rre150d0_20070103	35	03.01.2007	18.02.2009 12:12:18	rre150d0
rre150d0_20070104	36	04.01.2007	18.02.2009 12:12:18	rre150d0
rre150d0_20070105	37	05.01.2007	18.02.2009 12:12:18	rre150d0
rre150d0_20070106	38	06.01.2007	18.02.2009 12:12:18	rre150d0
rre150d0_20070107	39	07.01.2007	18.02.2009 12:12:19	rre150d0
rre150d0_20070108	40	08.01.2007	18.02.2009 12:12:19	rre150d0
rre150d0_20070109	41	09.01.2007	18.02.2009 12:12:19	rre150d0
rre150d0_20070110	42	10.01.2007	18.02.2009 12:12:19	rre150d0
rre150d0_20070111	43	11.01.2007	18.02.2009 12:12:20	rre150d0
rre150d0_20070112	44	12.01.2007	18.02.2009 12:12:20	rre150d0
rre150d0_20070113	45	13.01.2007	18.02.2009 12:12:20	rre150d0
rre150d0_20070114	46	14.01.2007	18.02.2009 12:12:20	rre150d0
rre150d0_20070115	47	15.01.2007	18.02.2009 12:12:20	rre150d0
rre150d0_20070116	48	16.01.2007	18.02.2009 12:12:21	rre150d0
rre150d0_20070117	49	17.01.2007	18.02.2009 12:12:21	rre150d0
rre150d0_20070118	50	18.01.2007	18.02.2009 12:12:21	rre150d0
rre150d0_20070119	51	19.01.2007	18.02.2009 12:12:21	rre150d0
rre150d0_20070120	52	20.01.2007	18.02.2009 12:12:22	rre150d0
rre150d0_20070121	53	21.01.2007	18.02.2009 12:12:22	rre150d0
rre150d0_20070122	54	22.01.2007	18.02.2009 12:12:22	rre150d0
rre150d0_20070123	55	23.01.2007	18.02.2009 12:12:22	rre150d0
rre150d0_20070124	56	24.01.2007	18.02.2009 12:12:22	rre150d0
rre150d0_20070125	57	25.01.2007	18.02.2009 12:12:23	rre150d0
rre150d0_20070126	58	26.01.2007	18.02.2009 12:12:23	rre150d0
rre150d0_20070127	59	27.01.2007	18.02.2009 12:12:23	rre150d0
rre150d0_20070128	60	28.01.2007	18.02.2009 12:12:23	rre150d0
rre150d0_20070129	61	29.01.2007	18.02.2009 12:12:24	rre150d0
rre150d0_20070130	62	30.01.2007	18.02.2009 12:12:24	rre150d0
rre150d0_20070131	63	31.01.2007	18.02.2009 12:12:24	rre150d0
rre150d0_20070201	64	01.02.2007	18.02.2009 12:12:24	rre150d0
rre150d0_20070202	65	02.02.2007	18.02.2009 12:12:25	rre150d0
rre150d0_20070203	66	03.02.2007	18.02.2009 12:12:25	rre150d0
rre150d0_20070204	67	04.02.2007	18.02.2009 12:12:25	rre150d0
rre150d0_20070205	68	05.02.2007	18.02.2009 12:12:25	rre150d0
rre150d0_20070206	69	06.02.2007	18.02.2009 12:12:25	rre150d0
rre150d0_20070207	70	07.02.2007	18.02.2009 12:12:26	rre150d0
rre150d0_20070208	71	08.02.2007	18.02.2009 12:12:26	rre150d0

Overview Selection

Geography

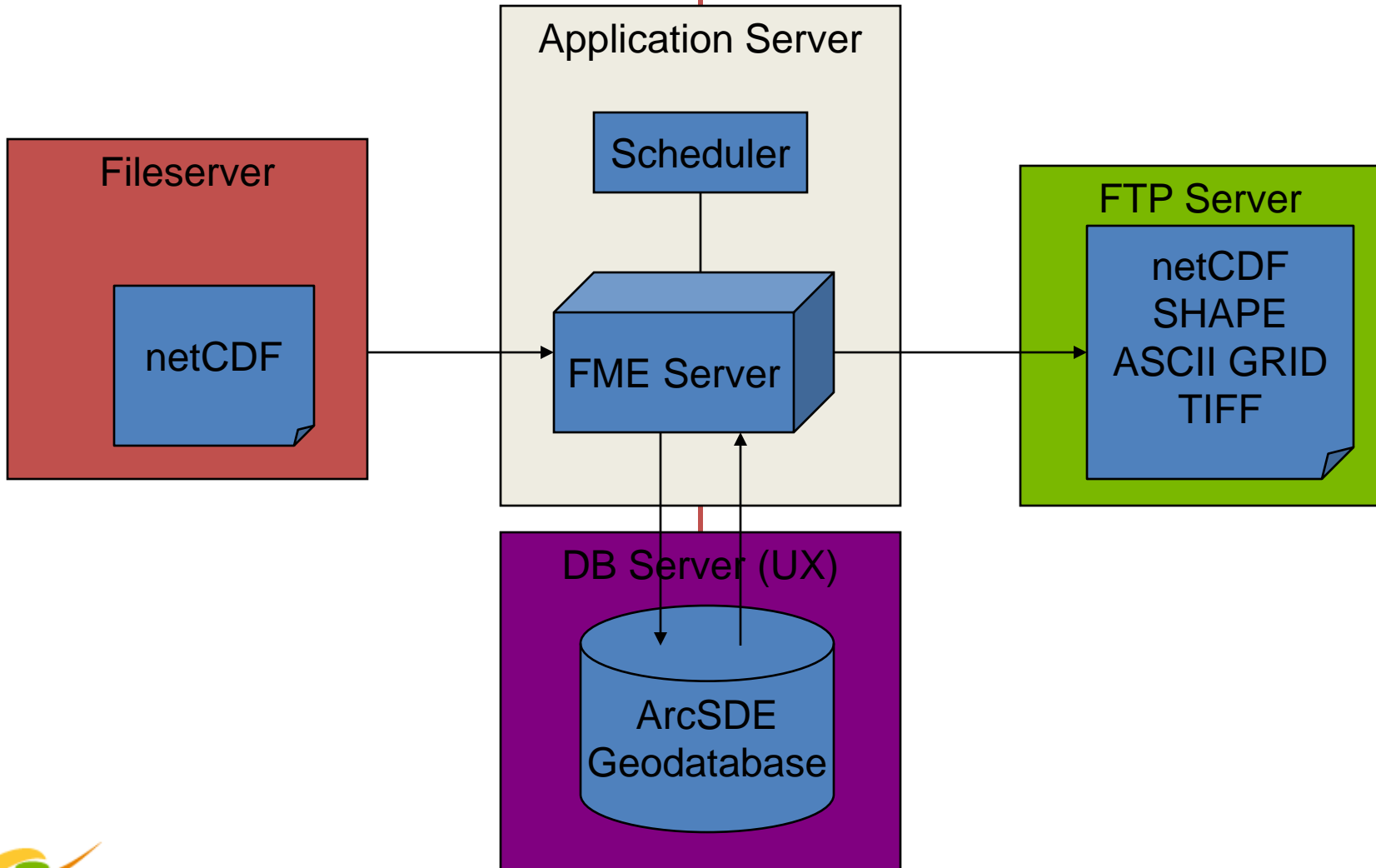
# Architecture

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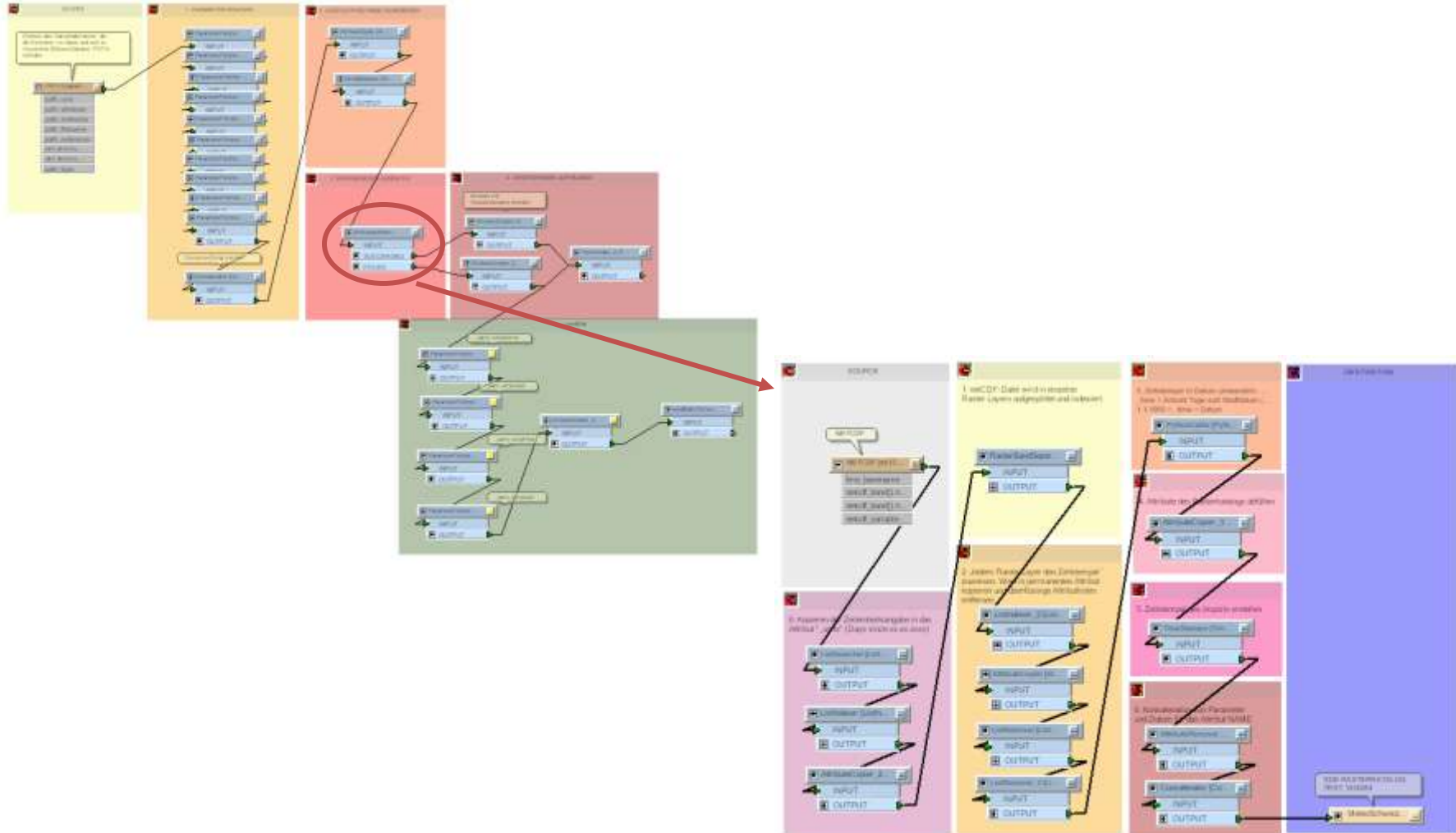
IMPORT

EXPORT



- **Input:** netCDF
- **Output:** ArcSDE
- **Data:** Raster dataset containing 1 raster band per time of measure (e.g. month, day, or hour)
- **Workflow:** Master-Workbench triggered by scheduler scanning a directory and calling a Detail-Workbench for every input netCDF-file
- **Detail:** Separate the bands, analyze the attributes, calculate dates, load the data into ArcSDE

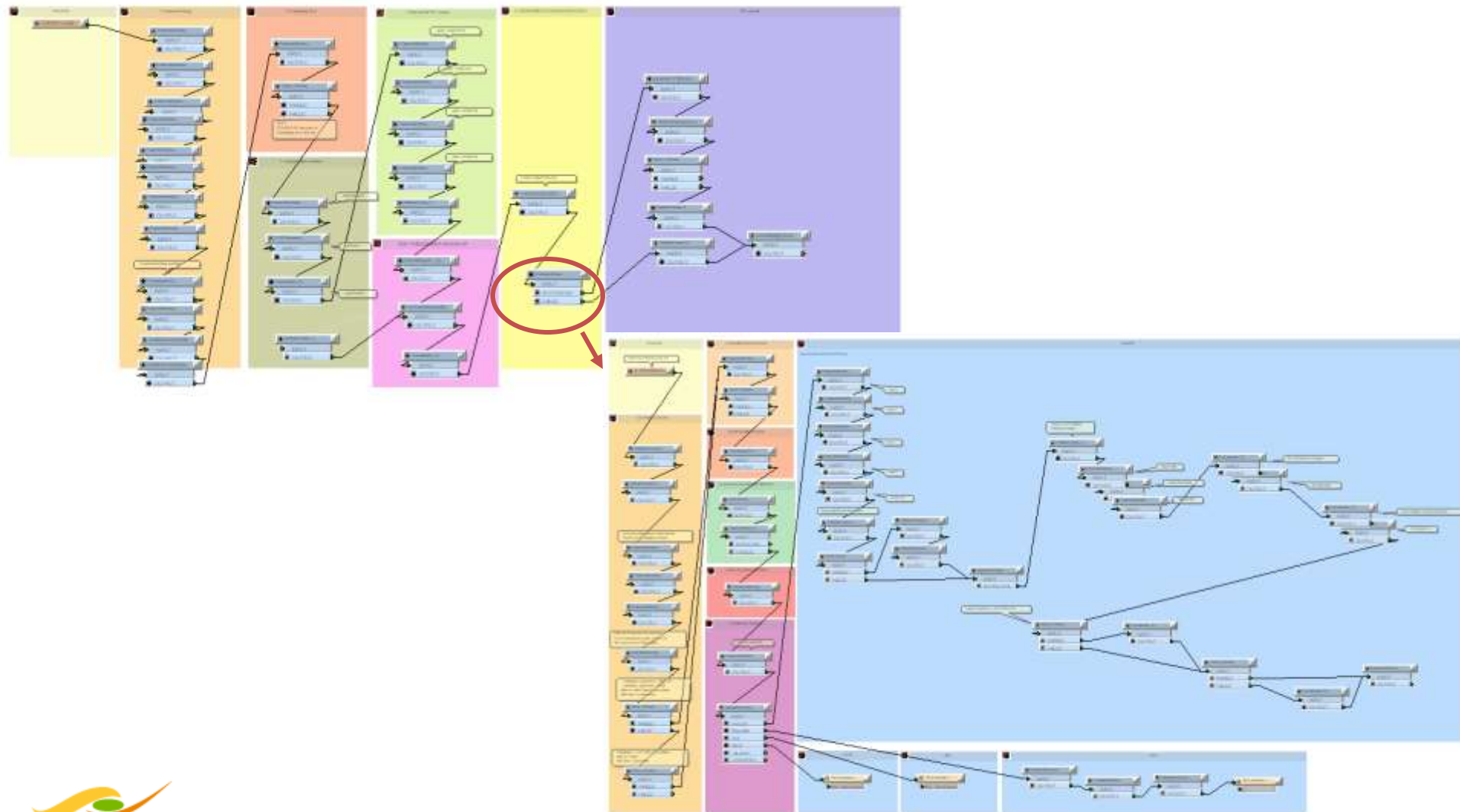
# Importing Data: Workspaces



- **Input:** ArcSDE Rastercatalog
- **Output:** netCDF, SHAPE, TIFF, ESRI ASCII GRID
- **Workflow:** Master-Workbench triggered by scheduler (e.g. daily 10am, every27th 11am, ..) reading a job table and running a Detail-Workbench for each of the jobs
- Once a job is finished:
  - SUCCESSFUL: FTP the result to the client according to the connection information found in the job table
  - FAILED: Email to the administrator to inform about the problems that have occurred

# Exporting Data: Workspaces

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- Transformation of Dates
  - netCDF:
    - Units: days since xx.xx.xxxx (e.g. 01.01.1900)
  - ArcSDE:
    - Oracle Dates
- FTP- Upload using ftplib
- Email to administrator using smtplib
- Exporting netCDF data is done with an ArcObjects java tool that is called through a pythonCaller shell-call

# Example: zipAndFTP

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```
import pyfme,os,zipfile,ftplib,shutil

class zipAndFTP(object):
    def __init__(self):
        self.logger = pyfme.FMELogfile()
        pass
    def input(self,feature):
        zipDir= feature.getAttribute('_destinationDir')
        outDir = feature.getAttribute('_newDestDir')
        ftpServer = feature.getAttribute('FTPSEVER')
        ftpPath = feature.getAttribute('FTPPATH')
        ftpUser = feature.getAttribute('FTPUSER')
        ftpPwd = feature.getAttribute('FTPPWD')
        jobID= feature.getAttribute('OBJECTID')
        date= feature.getAttribute('_timestamp')
        logFile=feature.getAttribute('_logFileName')
        zipFileName=str(zipDir)+"\\MeteoSuisseExport"+str(jobID)+"_"+str(date)+".zip"
        #copy logfile
        shutil.move(logFile,zipDir+"\\MeteoSuisseExport"+str(jobID)+"_"+str(date)+".log")
        #zip the data in the dir
        self.zip(str(outDir),zipFileName)
        #remove dir
        self.deldir(str(outDir)+"\\",zipDir)
        #upload zip
        try:
            self.uploadToFTP(ftpServer,ftpPath,ftpUser,ftpPwd,zipFileName)
            feature.setAttribute('FTP',"OK")
            pass
        except:
            #raise "Could not upload to FTP"
            feature.setAttribute('FTP',"NOT OK")

        #delete the zip -> commented out at the moment for better testing
        #os.remove(zipFileName)

        #output the feature again
        self.pyoutput(feature)
        pass
    def close(self):
        pass
```

- Today:
  - Win32
  - Tomcat
  - Windows Scheduler calling a .bat file which calls fmeserverconsole.exe to submit a job to the FME-Server
  
- By the end of year
  - Solaris 64
  - Weblogic
  - Scheduling : CRON ?

- The use of the Master-Detail approach using the Workspace-Runner allows OS-independent workflow automation with FME
- The power of Python allows you to seamlessly integrate protocols as FTP, SMTP, IMAP into your workflow
- "FME will never do raster" ?
  - Yet it does and it does it well 😊

# Thank You!

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- Questions?
- For more information
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