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Simplification of Routine Data Analysis & Tasks

SAS CLUB Vienna

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Goals and advantages

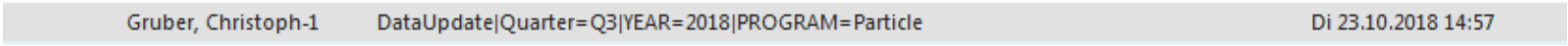
- The data analysis, plots and tables can be fully prepared for any specified task at any time by just sending an Email with the specified needs.
- Routine Work (daily, weekly, monthly, etc.) can be fully automated (or at least partially automated).
- No additional Software needed. The output can be delivered in various Fileformats (Excel, Word, pdf, csv, etc.)
- No interference with vacations, sick leaves, etc.

Software Requirements

- SAS (tested for 9.3 and newer):
- Check with: **proc setinit; run;**
- Depending on your operating system:
  - Windows: MS Outlook (2007 and newer), MS Access (2007 and newer), Windows Task Scheduler (usually pre-installed), SAS/ACCESS Interface to ODBC (also check with proc setinit;)
  - `libname test odbc dsn=outlook;`
  - Unix/Linux: http://support.sas.com/resources/papers/proceedings09/002-2009.pdf
- Please note that there are far more options of Email-clients and/or different ways to read your Emails.

General Process

- Automate routine data analysis
  - Routine data availability required, e.g. SAP, Excel, csv., txt., SAS-Datasets, etc.
  - Define scope and goals with responsible person
- Write an Email with the predefined inputs (User requirements):
  - Usually „Trigger-Word“ (i.e. „DataUpdate“), Program-Name, etc.



- The Windows Task scheduler opens the main SAS-Program via .bat-file
  - 2 different options: on demand from user via Email or automatically
- Example of Bat-File "C:\Program Files\SASHome\SASFoundation\9.4\sas.exe" -SYSIN "$PATH.\$FILENAME.sas" -LOG "C:\temp\test1.log" -PRINT "C:\temp\test1.lst"

Excursion: Automatic Task without Emails

- Main SAS-program starts a SAS-subprogram at a predefined time and weekday/month/quarter.
- `%let wkd=%sysfunc(weekday(%sysfunc(today())));`
- Used for daily routines
- Example: Import Data from Server into SAS-Datasets

On Demand via Emails from user

- The Inbox is mirrored into Access-Database
- The SAS-Program checks the Inbox and creates a SAS-Dataset out of these Emails with all available data in there

Subject	From	Message To...	Message C...	Sender Name
DataUpdate|Quarter=Q3|YEAR=2018|PROGRAM=Particle	Gruber, Christoph-1	1	0	Gruber, Christoph-1

- The SAS-Program searches for Subjects with the trigger-word (i.e. „DataUpdate“). NB: Usually the user will set the SAS-program to search only the last 24 hours or todays Emails.
- If yes, then the respective program(s) will be automatically executed and the results will be directly copied into the desired directory. NB: include this option into your main-SAS program `options noxwait;`
- `x copy "&path1\*.*" "&path2\";`

Useful SAS-Code for the creating of directories

- If the user desires a special subdirectory (e.g. For every month), the program will create this subdirectory

```
%macro DirExist(dir=) ;
%LOCAL rc fileref return;
%let rc = %sysfunc(filename(fileref,&dir)) ;
%if %sysfunc(fexist(&fileref))  %then %do;
                    %let return=1;
%end;
%else %do;
                    %let return=0;
                  x mkdir "&dir.";
                     %put &return;
%end;
%mend DirExist;
```

Adding a SAS-variable to prevent the double execution of a demand

- After the job is done, the SAS-program will include another variable into the SAS-Dataset for Emails, i.e. job_done=“yes”
- This will prevent that SAS executes the same demands twice or more often

Use SAS to send Emails

- After the job is done or an Error occurred, you can use SAS to send Emails (*Please note: Talk to your IT, if SAS is allowed to write an Email via Outlook or other Email clients)*:

```
Filename outbox clear;

filename outbox email FROM="christoph-1.gruber@novartis.com" ;

data _null_;

file outbox

to=(“max.mustermann@musterland.com")

subject ="Hello";

PUT "This Email was written with SAS";

PUT "Yours, Christoph Gruber";

run;


Filename outbox clear;
```

Options and Remarks (1)

- The frequency of the Windows Task Scheduler (or Crontab on Linux/Mac) can be set individually (every 15 minutes, every hour, etc.)
- Only specified and permitted users for the specific program will receive results. I.e. Only a person from HR can request data for HR. (SAS-Column „From“)
- If you are creating graphs using ods (output delivery system), always include in the beginning of your SAS-Subprogram the following code: `ods listing close;`

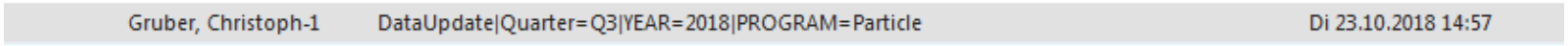
Options and Remarks (2)

- The SAS-Dataset of your Inbox/Sent Emails can be easily used to store Emails and search for Senders, Subjects, etc.

	Importance	Icon	Priority	Subject	From	Message To...	Message C...	Sender Na...	CC	To	Received	Message Si...	Contents	Created
1	1	IPM.Note	0	DataUpdate|P...	Gruber, Christo...	1	0	Gruber, Christo...		Gruber, Christo...	23SEP2019:15...	67475		23SEP2019:15...
2	1	IPM.Note	0	Test	Gruber, Christo...	1	0	Gruber, Christo...		Gruber, Christo...	05NOV2019:15...	67616	All that you want	05NOV2019:15...

Example „on demand“ (1)

- Write an Email



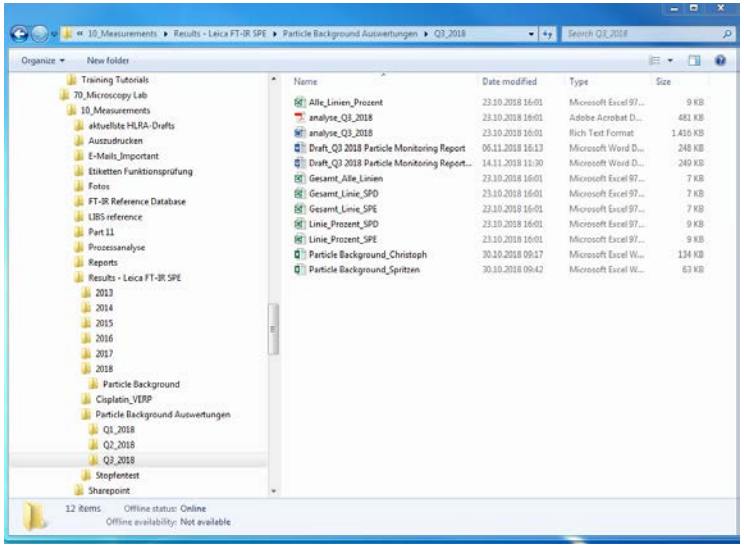
- Email is automatically mirrored to the database

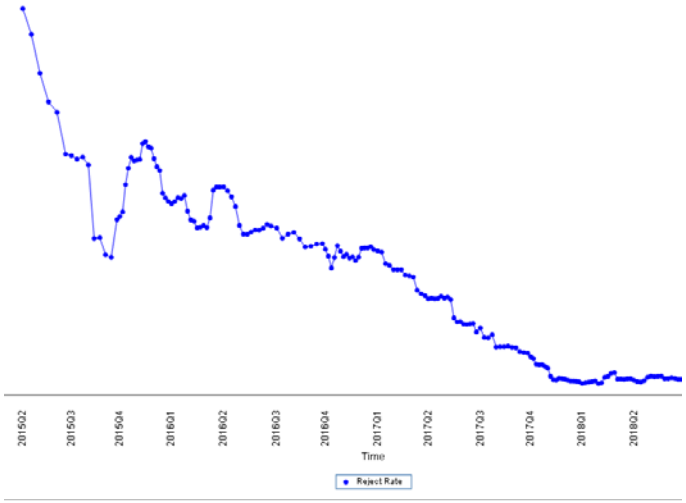
Subject	From	Message To...	Message C...	Sender Name
DataUpdate|Quarter=Q3|YEAR=2018|PROGRAM=Particle	Gruber, Christoph-1	1	0	Gruber, Christoph-1

- In the Email subject are all relevant Macro-Variables:
  - DataUpdate is the trigger word for the main SAS-program
  - Program=Particle will lead the main SAS-program to the SAS-subprogram Particle
  - Quarter and Year are used as Macro-Variables for SAS
- SAS imports the respective Excel

Example „on demand“ (2)

- Subdirectory was created and all results (pdf, rtf, xlsx) were automatically copied into this directory

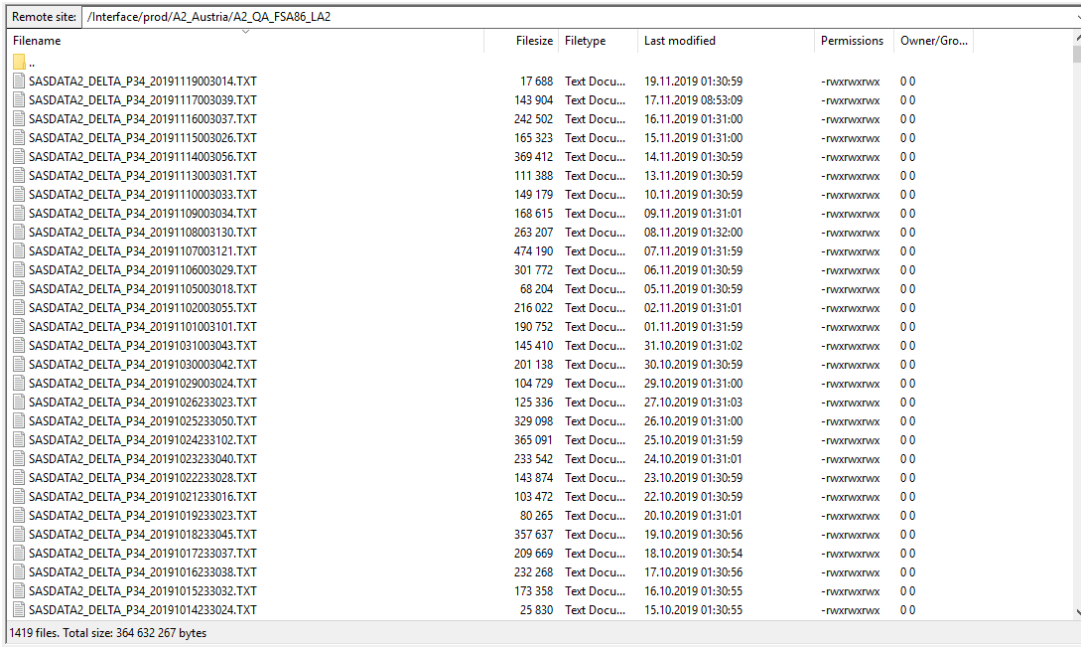




- Results (Tables, Graphs) are delivered as specified

Example Automatisation of Data Trending

- Data is daily transferred as .txt-files to sftp-server
- SAS copies the files from sftp-server and imports to SAS-datasets



Remote site: /Interface/prod/A2_Austria/A2_QA_FSA86_LA2

Filename	Filesize	Filetype	Last modified	Permissions	Owner/Gro...
..					
SASDATA2_DELTA_P34_20191119003014.TXT	17 688	Text Docu...	19.11.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191117003039.TXT	143 904	Text Docu...	17.11.2019 08:53:09	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191116003037.TXT	242 502	Text Docu...	16.11.2019 01:31:00	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191115003026.TXT	165 323	Text Docu...	15.11.2019 01:31:00	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191114003056.TXT	369 412	Text Docu...	14.11.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191113003031.TXT	111 388	Text Docu...	13.11.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191110003033.TXT	149 179	Text Docu...	10.11.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191109003034.TXT	168 615	Text Docu...	09.11.2019 01:31:01	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191108003130.TXT	263 207	Text Docu...	08.11.2019 01:32:00	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191107003121.TXT	474 190	Text Docu...	07.11.2019 01:31:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191106003029.TXT	301 772	Text Docu...	06.11.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191105003018.TXT	68 204	Text Docu...	05.11.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191102003055.TXT	216 022	Text Docu...	02.11.2019 01:31:01	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191101003101.TXT	190 752	Text Docu...	01.11.2019 01:31:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191031003043.TXT	145 410	Text Docu...	31.10.2019 01:31:02	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191030003042.TXT	201 138	Text Docu...	30.10.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191029003024.TXT	104 729	Text Docu...	29.10.2019 01:31:00	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191026233023.TXT	125 336	Text Docu...	27.10.2019 01:31:03	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191025233050.TXT	329 098	Text Docu...	26.10.2019 01:31:00	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191024233102.TXT	365 091	Text Docu...	25.10.2019 01:31:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191023233040.TXT	233 542	Text Docu...	24.10.2019 01:31:01	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191022233028.TXT	143 874	Text Docu...	23.10.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191021233016.TXT	103 472	Text Docu...	22.10.2019 01:30:59	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191019233023.TXT	80 265	Text Docu...	20.10.2019 01:31:01	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191018233045.TXT	357 637	Text Docu...	19.10.2019 01:30:56	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191017233037.TXT	209 669	Text Docu...	18.10.2019 01:30:54	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191016233038.TXT	232 268	Text Docu...	17.10.2019 01:30:56	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191015233032.TXT	173 358	Text Docu...	16.10.2019 01:30:55	-rwxrwxrwx	0 0
SASDATA2_DELTA_P34_20191014233024.TXT	25 830	Text Docu...	15.10.2019 01:30:55	-rwxrwxrwx	0 0

1419 files. Total size: 364 632 267 bytes

Summary and Conclusions

- No additional software or licence is needed.
- Writing an Email with the specified parameters triggers the start of the program.
- The automatisation of this routine will reduce time and errors
- Options:
  - Write an automatised Email when Results are ready

References

- http://support.sas.com/resources/papers/proceedings10/086-2010.pdf
- http://support.sas.com/resources/papers/proceedings13/372-2013.pdf

Thank you

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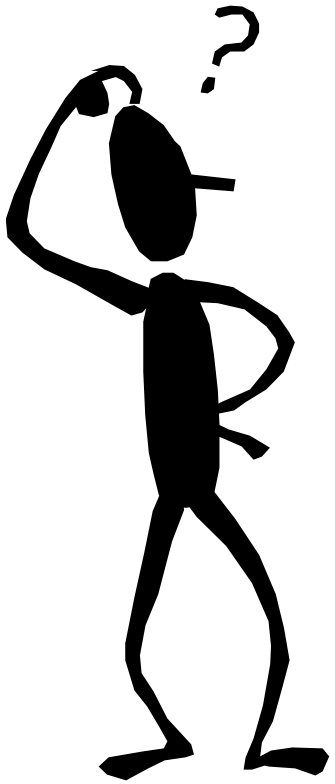

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