

Analysis software in .NET and SAS®



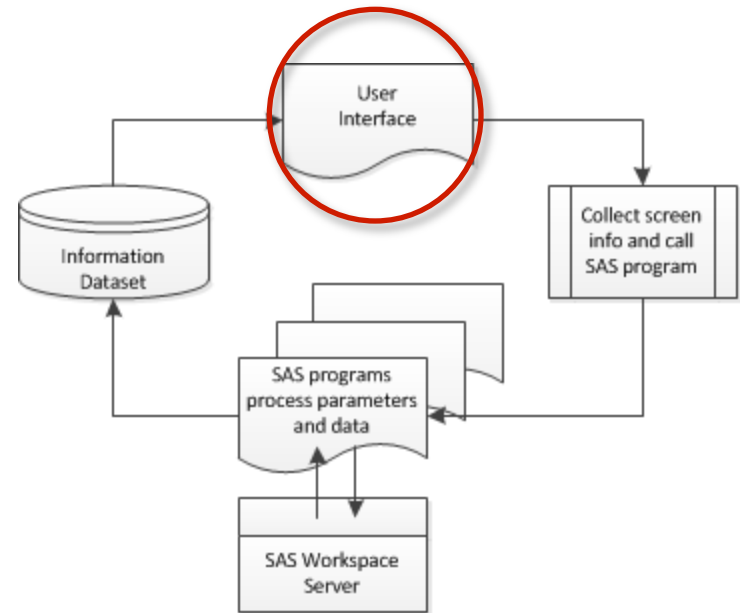
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“To show the audience a way to develop an application with a familiarly looking user interface that is based on SAS technology on the background.”

- ❖ Introduction
- ❖ The user interface
- ❖ A simple example
- ❖ The SAS backend
- ❖ Communication
- ❖ A more complex example
- ❖ Programming practices
- ❖ Conclusion
- ❖ Questions

- ❖ Why such applications?
- ❖ What do I need?
- ❖ The components of an application

- ❖ User interface
- ❖ Call to SAS program
- ❖ SAS programs
- ❖ SAS Workspace Server
- ❖ Information Dataset



- ❖ **Regular SAS dataset in WORK**
- ❖ **Describes every (changing) element on the user interface**
- ❖ **Columns like Element Name, Element Type, Value, Enabled Y/N, Visible Y/N**
- ❖ **Examples later in the presentation**

- ❖ **Developed independently from SAS**
- ❖ **Communicates with SAS**
- ❖ **Any preferred language, also web**
- ❖ **Can be replaced after completion**

Simple Calculator Example

5+5*5

Calculation result:

dataset **work.ids**

Name	Type	Value
CalcResult	TextBox	30

```
%let calc=5+5*5;
%include "calculate.sas";

/** CALCULATE.SAS */
data work.calc;
    result = &calc.;
run;

data work.ids;
    set work.calc;
    name = "CalcResult";
    type = "TextBox";
    value = put(result, 8.);
run;

/* End of Program. */
```

- ❖ **SAS Workspace Server**
- ❖ **UI creates SAS code**
- ❖ **SAS code is executed by WS**

- ❖ Two-way communication
- ❖ From UI to SAS: code and macro vars
- ❖ From SAS to UI: 'information dataset'



Laboratory Measurements

Trial name:

S14-04-C300
S83-01-B12
T01-188-V01

Patient number:

Select

Data entry

Data review

```
%let GrpTrials=S83-01-B12;
%include "getPatients.sas";

===== getPatients.sas =====
data work.ids;
  set db.patients
    (where = (trial = "S83-01-B12"));
  field = "GrpPatients";
  value = patno;
  visible = "Y";
run; /* End of Program. */
```

Field	Value	Vis.
GrpPatients	00101	Y
GrpPatients	00102	Y
GrpPatients	00104	Y
GrpPatients	00201	Y
GrpPatients	00202	Y

Laboratory Measurements

Trial name:

S83-01-B12

Patient number:

00101
00102
00104
00201
00202

Select

Data entry

Data review

```
%let GrpTrials=S83-01-B12;
%let GrpPatients=001002;
%include "DataEntry.sas";

===== DataEntry.sas =====
%createIDSforVisits (tr=&GrpTrials,
                    pt=&GrpPatients);
%createIDSforLabGroups (tr=&GrpTrials);
%createIDSforLabParams (tr=&GrpTrials);

data work.ids for Lab Params
=====
proc sql noprint;
set work.visits
.. set work.labgroups as
select &GrpTrials
field = "LBVisit";
value = visit;
run; quit;
quit;
field = "LBVisit";
data work.labgroups;
value = visit;
set work.labgroups;
field = "LBLabGrp" || _n_;
output;
visible = "Y";
run;
run;
```

Laboratory Measurements

Trial name: S83-01-B12

Patient number: 001002

Select

Data entry

Data review

Field	Value	Vis.
GrpVisits	SCREENING	Y
GrpVisits	BASELINE	Y
GrpVisits	VISIT 1	Y
LBLabGrp1	Hematology	Y
LBLabGrp2	Chemistry	Y
LBLabGrp3	Urinalysis	Y
LB101	WBC	Y
LB102	RBC	Y
et cetera		
LB112		N
LB201-212	<text>	Y
LB301-306	<text>	Y
LB307		N
LB308		N
et cetera		

Laboratory Measurements

Trial name:

S83-01-B12

Patient number:

00102

Select

Data entry

Data review

Visit:

BASELINE

Revert

Save

Hematology

Chemistry

Urinalysis

WBC

Txt101

RBC

Txt102

HGB

Txt103

HCT

Txt104

MCV

Txt105

MCH

Txt106

MCHC

Txt107

CHCM

Txt108

RDW

Txt109

PLT

Txt110

MPV

Txt111

Txt112

ALT

Txt201

AST

Txt202

CA

Txt203

CL

Txt204

CREA

Txt205

GLU

Txt206

PHOS

Txt207

K

Txt208

TP

Txt209

BUN

Txt210

DB

Txt211

CK

Txt212

Na

Txt301

CL

Txt302

P

Txt303

K

Txt304

CREA

Txt305

CA

Txt306

Txt307

Txt308

Txt309

Txt310

Txt311

Txt312

A More Complex Example

Field	Value	Vis.
Txt101		Y
Txt102		Y
<i>et cetera</i>		
Txt112		N
Txt201-212		Y
Txt301-306		Y
Txt307		N
<i>et cetera</i>		

```
%let GrpTrials=S83-01-B12;
%let GrpPatients=00102;
%let GrpVisits=BASELINE;

%include "getLabValues.sas";
```

Laboratory Measurements

Trial name:

S83-01-B12

▼

Patient number:

00102

▼

Select

Data entry

Data review

Visit:

BASELINE

▼

Revert

Save

Hematology

WBC	7.2
RBC	6.4
HGB	40.0
HCT	35.1
MCV	12
MCH	13
MCHC	10.5
CHCM	185
RDW	96.8
PLT	14
MPV	112.1

Chemistry

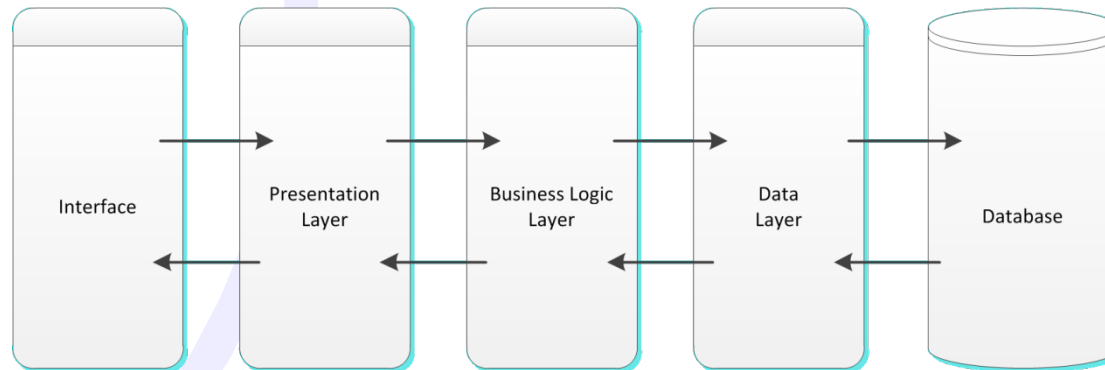
ALT	76
AST	34
CA	3.4
CL	0.14
CREA	5.2
GLU	3.3
PHOS	1.2
K	14
TP	43.12
BUN	12.6
DB	19.3
CK	56.1

Urinalysis

Na	75.1
CL	233
P	15
K	111.2
CREA	76
CA	44.8

Field	Text	Vis.
TrialName	S83-01-B12	1
PatNumber	00408	1
Tab1	Data entry	1
Tab2	Data review	1
Visit	Visit	1
Visit	BASELINE	1
Revert	Revert	0
Save	Save	1
Lab1_1	7.2	1
Lab1_2	6.4	1
Lab1_3	40.0	1
Lab2_1	76	1
Lab2_2	34	1
Lab2_3	3.4	1
Reminder	0	1
Demography	work.mdem	0

- ❖ **Graphs**
- ❖ **Datagrids**
- ❖ **PDF or RTF documents**
- ❖ **Anything you can produce from SAS**



- ❖ Users cannot read or edit the application or SAS code
- ❖ Output doesn't require additional validation if programs don't change
- ❖ Important to define design upfront
- ❖ Windows-based interface makes it user friendly

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