

A Guide to Deploying Subversion for Version Control of SAS Programs in the Pharmaceutical Industry

PhUSE 2013

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Bernadette, living with lupus



Inspired by **patients.**
Driven by **science.**

Subversion Environment

- **Client:** TSVN 1.6, 64 bit client on Windows Server 2008
- **Repository:** SVN. 1.6, Linux
- **Work Area:** NetApp, *shared*

What is SVN?

SVN is:

- Source Control Management (SCM) tool
- version control for *programs*
- open source

SVN does not provide:

- traceability between data, programs and outputs

SVN is not ideal for:

- binary files (SAS datasets, outputs)
- use in a shared-folder structure environment

Getting Started

IT

- Servers, OS
- Existing deployments of SVN
- Skill sets: PERL? Python?



Programmers

User Requirements

- Development, Validation, Production?
- Incremental moves to Production?
- How is code identified as Production? Archived?
- Separate data from programs and outputs?
- Shared versus private work areas?
- Workshop proof of concept.

Reasons to Validate a Computerized System

- 4 Pass audits and inspections
- 2 Confirm reliable handling and protection of data
- 3 Confirm works as expected with network, other systems, infrastructure
- 1 Ensure the system performs the activities users need

- Dr. Teri Stokes

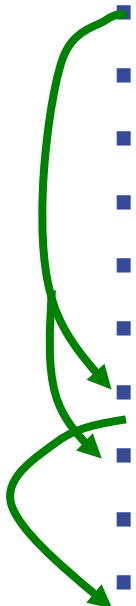
Validation Requirements

Define with Quality Assurance & Compliance

Validation Plan

Business Case (formal or informal)

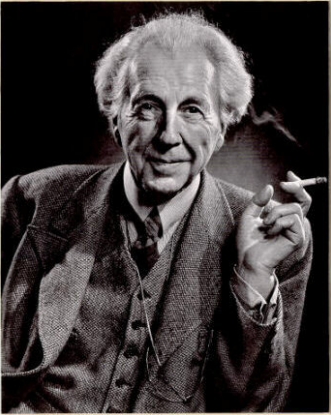
Systems Development Life Cycle (SDLC)

- User Requirements
 - Traceability matrix
 - Supplier Risk Assessment, Qualification
 - Impact Assessment
 - Risk Analysis
 - Installation Qualification
 - Functional Specification
 - Design Specification
 - Installation Qualification Protocol/Execution/Report
 - Operational Qualification Protocol/Execution/Report
 - Performance Qualification Protocol/Execution/Report
 - Validation Summary Report
 - Periodic Review
- } combine : FSDS
- } OQ
PQ
- 

**Responsibilities
Matrix**

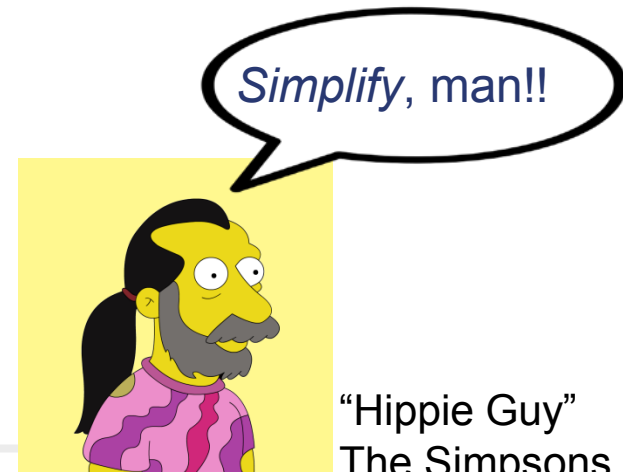
- **Create**
- **Review**
- **Approve**

Deployment: Complexity versus Simplicity

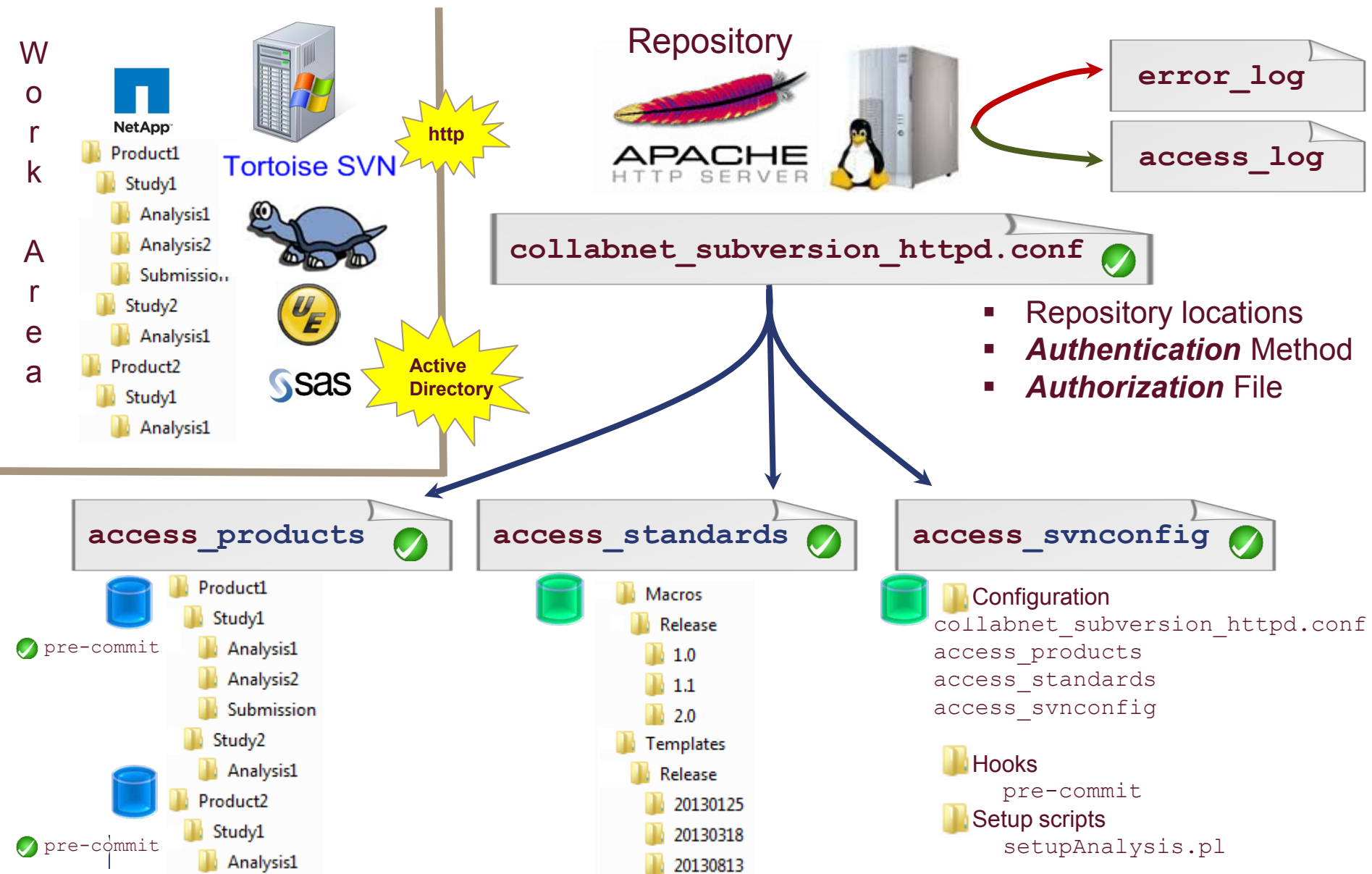


“The architect should strive continually to simplify...”

Frank Lloyd Wright 1869-1959
American Architect



Configuration Overview



Access = Authentication & Authorization

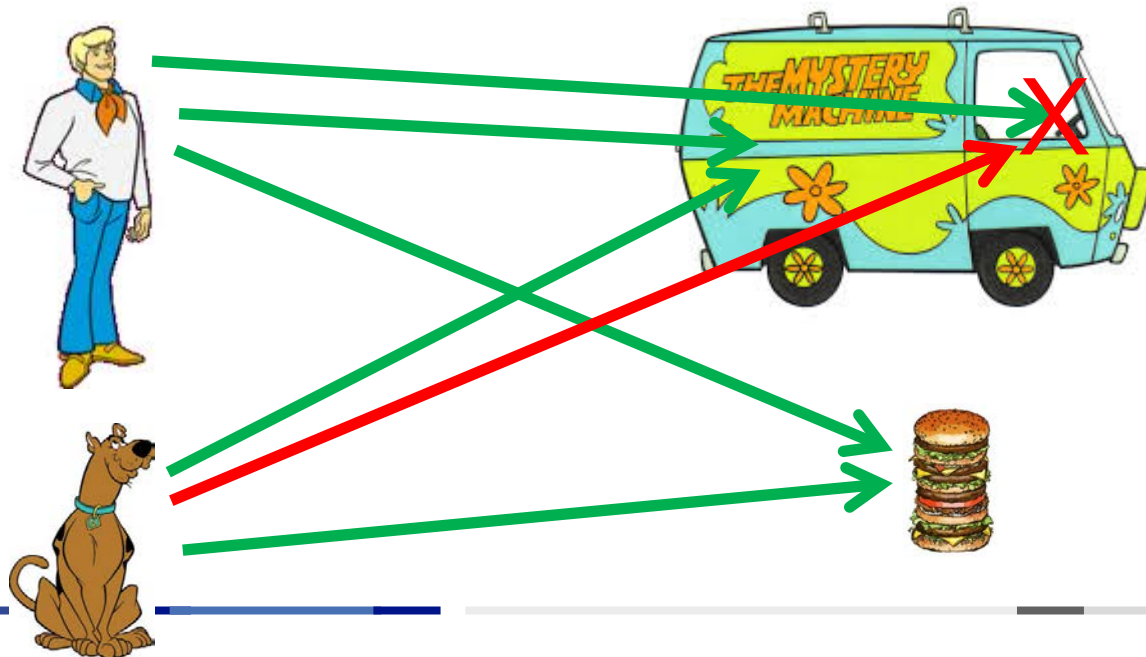
Authentication – *Who are you?*

- Active Directory
 - same username
 - password expiration, length and complexity



Authorization – *May you access this item?*

- access file
- path-based permissions
- Highly configurable



Path-based security in SVN

```
# $HeadURL: http://*****/config/prod_server/svn_access_products $  
# $Rev: 1619 $  
# $Date: 2013-08-02 09:54:48 -0400 (Fri, 02 Aug 2013) $  
# $Author: twilliams $ Author of Last Commit
```

[groups]

```
ucb_allsas = twilliams, jsasman, jillsweetcoder
```

```
ext_croSDG = fred, velma, scoobydoo, shaggy, daphne
```

```
#---END SCRIPT-BUILT GROUPS SECTION. DO NOT EDIT SECTION ABOVE -----#
```

Custom groups

```
svnadmin = twilliams, ucbadmin1
```

```
svnsetups = e140253,e140122a
```

[Product1:/Study1]

```
@svnsetups = rw
```

```
@ucb_allsas = rw
```

```
@ext_croSDG = rw
```

[Product2:/Study1]

```
@svnsetups = rw
```

```
@ucb_allsas = rw
```

```
velma = rw
```

```
fred = r
```

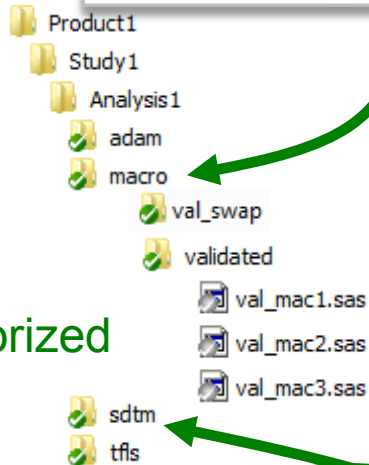
```
scoobydoo =
```



svn:externals for Validated Macros

Work area

svn:externals http:// <validated repo path>/Release/2.0 validated



Authorized

access_products



[groups]

ext_croSDG = scoobydoo, shaggy...

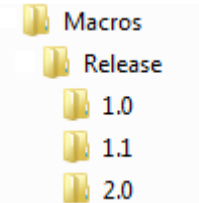
[product1 /Study1]

@ext_croSDG = rw



Product 1 Repository

Standards Repository



val_mac1.sas
val_mac2.sas
val_mac3.sas

svn:needs-lock

X Not Authorized

access_standards



[valmacros:/Macros/Release]

@ucb_standards = rw

@ext_croSDG = r



Active Directory

Authenticated

SVN Usage and Administration

Blame – A Perception Problem

How some programmers see “Blame”

TortoiseBlame - ae.sas : 1-HEAD

Revision	Author	Line	
5544	E144789	48	data dict;
5544	E144789	49	set oc.dict;
22656	E144789	50	if dict='MedDRA' then nver=input(ver,best.);
5544	E144789		13-May-13 15:33:25
5544	E144789		For dictionary version, use OC.DICT.VER='MEDDRA' instead of 'MEDDRA'.
5544	E144789	53	nver=input(date,date9.);
5544	E144789	54	end;
5544	E144789	55	run;



EditTest.sas Revision 91 - TortoiseMerge

Revision	Author	Line	
42	E140253	3	\$HeadURL\$\$
42	E140253	4	\$Rev\$
42	E140253	5	\$Date\$
42	E140253	6	\$Author\$ Author of Last
42	E140253	7	Primary Author :
42	E140253	8	Purpose (optional) : Tes
42	E140253	9	Modified date/by:
42	E140253	10	Mod. Reason:
42	E140253	11	** Next line not needed
42	E140253	12	** Next line not needed
42	E140253	13	** Next line not needed
42	E140253	14	** Next line not needed
42	E140253	15	** Next line not needed
42	E140253	16	** Next line not needed
42	E140253	17	** Next line not needed
42	E140253	18	** Next line not needed
42	E140253	19	** Next line not needed
91	E140253	1	\$HeadURL\$\$
91	E140253	2	\$Rev\$
91	E140253	3	\$Date\$
91	E140253	4	\$Author\$ Author of Last
91	E140253	5	Primary Author :
91	E140253	6	Purpose (optional) : Tes
91	E140253	7	Modified date/by:
91	E140253	8	Mod. Reason:
91	E140253	9	** Next line not needed
91	E140253	10	** Next line not needed
91	E140253	11	** Next line not needed
91	E140253	12	** Next line not needed
91	E140253	13	** Next line not needed
91	E140253	14	** Next line not needed
91	E140253	15	** Next line not needed
91	E140253	16	** Next line not needed
91	E140253	17	** Next line not needed



Commit – A Pervasive Problem

Working Copy -

Path	Text status	Author	Revision	Date
root project				
adam/adexc.sas	modified			
sdtm/ae.sas	modified			
sdtm/ce.sas	modified			
sdtm/cm.sas	modified			
sdtm/da.sas	modified			
sdtm/dm.sas	modified			
sdtm/ds.sas	modified			
sdtm/ex.sas	modified			
sdtm/fa.sas	modified			
sdtm/lb.sas	modified			
sdtm/mh.sas	modified			
sdtm/pe.sas	modified			

☐ Show unversioned files
☐ Show unmodified files
☐ Show ignored files
☒ Show items in externals
☐ Show properties

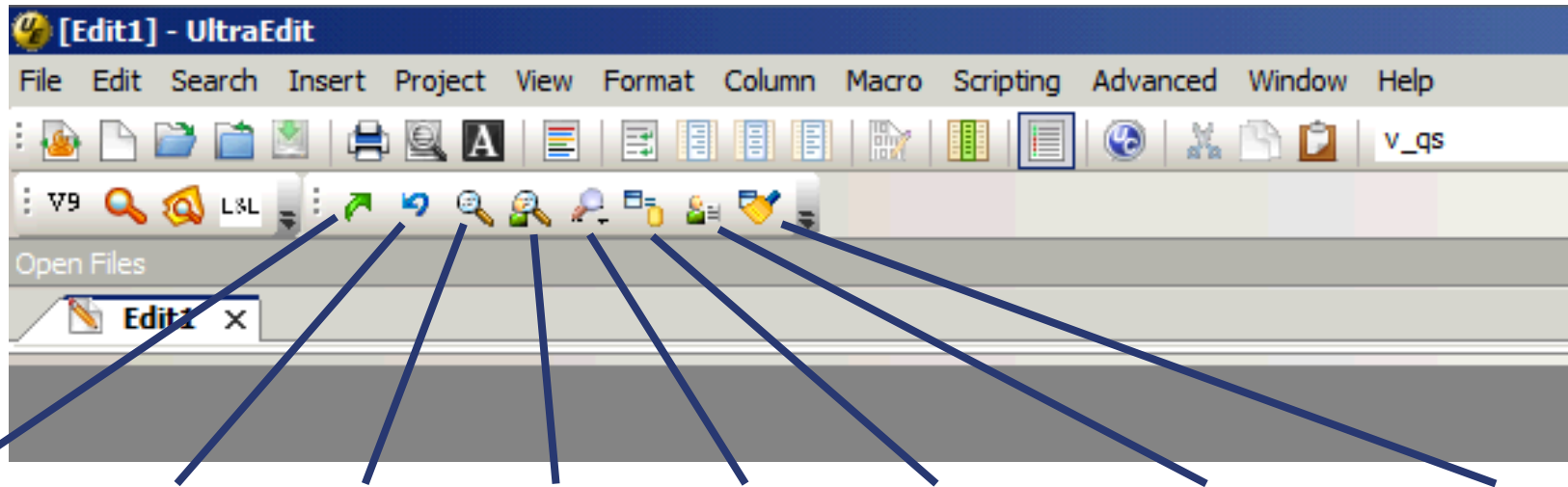
Lowest shown revision: 33178 - Highest shown revision: 34437

normal=160, non-versioned=96, modified=44, added=0, deleted=0, conflicted=0

Refresh Check repository OK

Integration with other tools

UltraEdit



commit

revert

diff

blame

log

status

properties

cleanup

 TortoiseProc.exe /command:commit /path:"%f" /closeonend:0

SAS Enhanced Editor

“How to add TortoiseSVN-Functionality to SAS® Enhanced Editor”

■ - Oliver Wirtz, UCB Biosciences

Breaking Old Habits : Backup Files and Folders

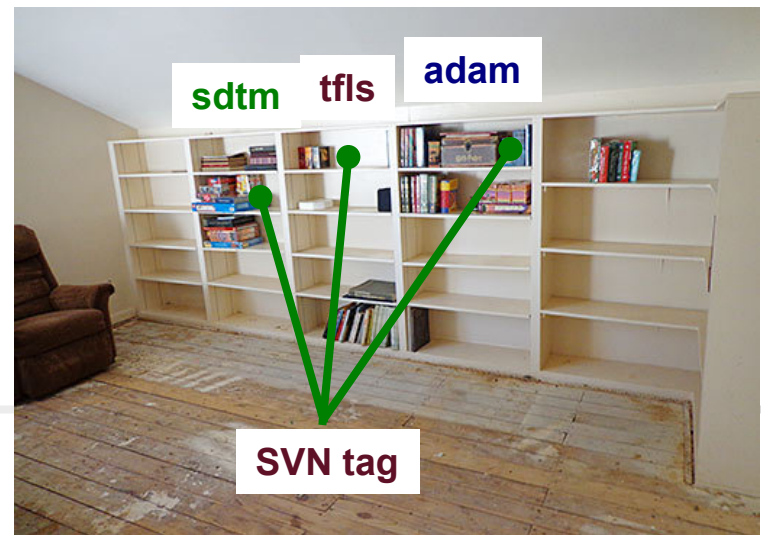
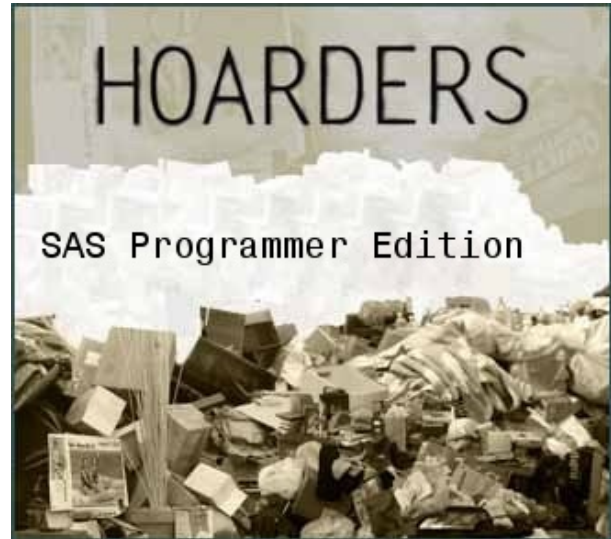


tfls-FDA2130308

SVN Solutions

- history
- audit trail
- svn tags

Comfy Chair



Git versus SVN

Git

- Highly configurable
- Performance
- Distributed teams
- Flexible merging

SVN

- Strict governance
- History cannot be altered or changed
- Larger binaries
- Familiar terminology
- Ease of deployment and validation
- Intuitive structures in repository
- Better merging in 1.8

Recent improvements in SVN

- Better merging
- Properties wizard
 - Custom properties
- Performance
- Single .svn folder at root of checkout

Conclusion

- A top choice for SAS program code
- SVN does not provide end-to-end traceability between data, programs and outputs. It is a Source Control Management (SCM) system.

Key elements of a successful deployment

- Users
- Process and Work Culture
- Training
- Validation
- Follow up

Q & A