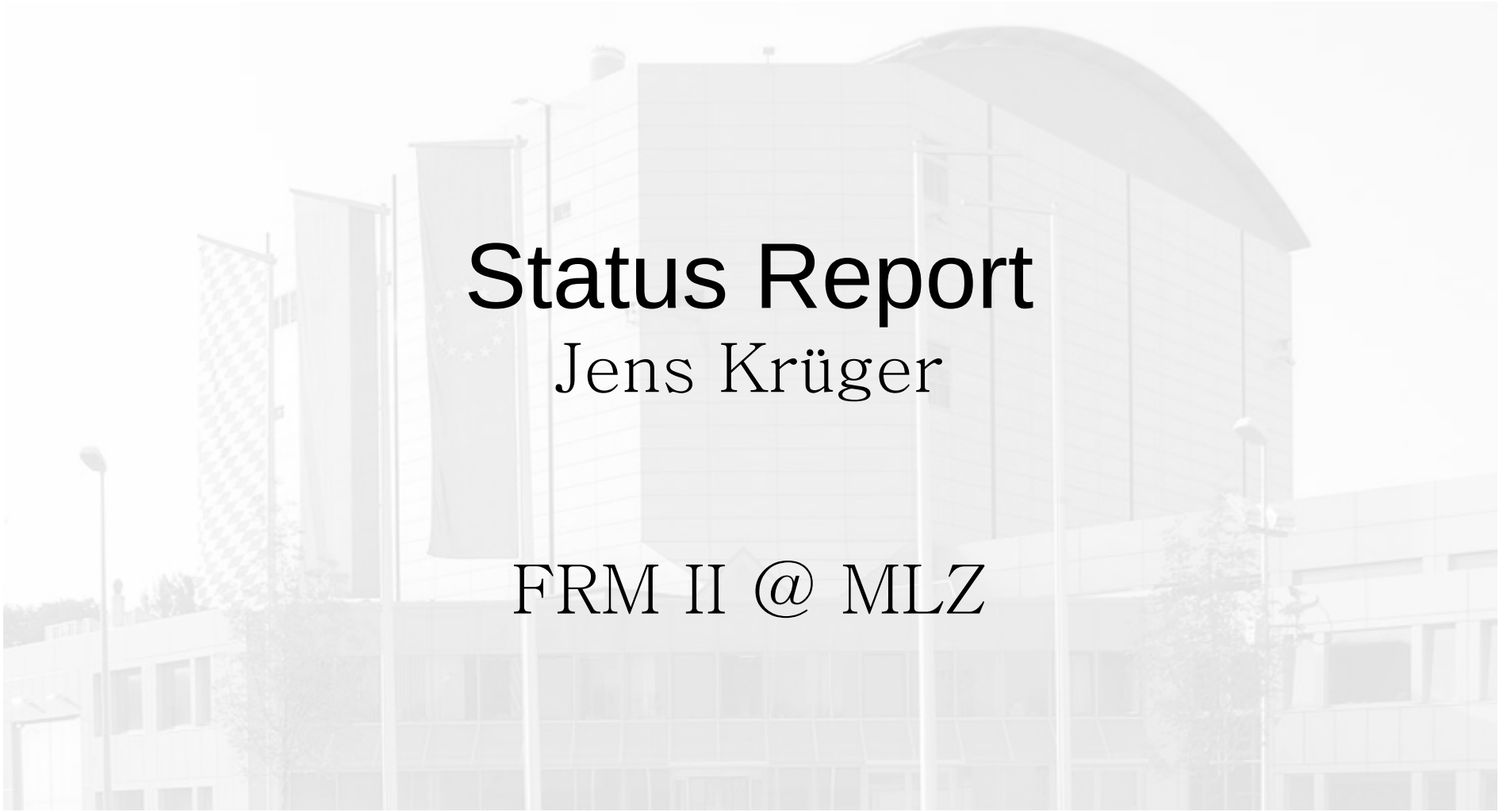

Status Report

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The story of (re)using existing servers

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Start

- Select hardware: Eurotherm 2408 was laying on my desk

- Background
  - Exists a TACO servers
  - Eurotherm configured for Modbus communication
  - Serial line interface

- Looking for a Modbus server
- Found
  - Interface looks promising, similar to our existing TACO interface
  - We want (re)use this TANGO server
- Check out the sources

Compiling the Modbus server ...

```
jkrueger@taco23:~/sources/tango/servers/Modbus/src$ make
Makefile:111: /segfs/tango/cppserver/env/tango.opt: No such file or directory
Makefile:145: /segfs/tango/cppserver/env/common_target.opt: No such file or directory
make: *** No rule to make target `/segfs/tango/cppserver/env/common_target.opt'.  Stop.
jkrueger@taco23:~/sources/tango/servers/Modbus/src$
```

autotools

Why autotools?

- Personal experiences
- Result
  - Useable on all Unix like platforms (Linux, BSD, Mac, …)
  - Highly configurable via a lot of options
  - Short Makefiles
  - Easy separation between library and server
  - Easy generation of tarballs
  - Package could easily installed
    - configure
    - make
    - make install
- Windows systems are not influenced
- Easy to maintain

Autoscan

```
jkrueger@taco23:~/sources/tango/servers/Modbus/src$ autoscan
jkrueger@taco23:~/sources/tango/servers/Modbus/src$ cat configure.scan
#                                               -*- Autoconf -*-
# Process this file with autoconf to produce a configure script.

AC_PREREQ([2.69])
AC_INIT([FULL-PACKAGE-NAME], [VERSION], [BUG-REPORT-ADDRESS])
AC_CONFIG_SRCDIR([ModbusClass.h])
AC_CONFIG_HEADERS([config.h])

# Checks for programs.
AC_PROG_CXX
AC_PROG_CC

# Checks for libraries.

# Checks for header files.
AC_CHECK_HEADERS([arpa/inet.h fcntl.h netinet/in.h sys/ioctl.h sys/socket.h sys/time.h sys/t
imeb.h unistd.h])

# Checks for typedefs, structures, and compiler characteristics.
AC_CHECK_HEADER_STDBOOL
AC_TYPE_SIZE_T

# Checks for library functions.
AC_CHECK_FUNCS([gettimeofday memset select socket strcasecmp])

AC_CONFIG_FILES([Makefile])
AC_OUTPUT
jkrueger@taco23:~/sources/tango/servers/Modbus/src$
```

Modify the configure.ac

- **Add:**
- AC_CONFIG_MACRO_DIR([m4])

- AM_INIT_AUTOMAKE([foreign dist-bzip2 1.11])
- AM_SILENT_RULES([yes])

- LT_INIT
- link_all_deplibs=yes
- link_all_deplibs_CXX=yes

- **Modify:**
- AC_INIT([tango-modbus], [3.6.8], [tango@esrf.eu], [],
- [http://sf.net/projects/tango-ds])

Creating Makefile.am

```
ACLOCAL_AMFLAGS = -I m4

bin_PROGRAMS    = Modbus

Modbus_SOURCES  = ClassFactory.cpp \
                  main.cpp \
                  ModbusClass.cpp \
                  ModbusCore.cpp \
                  ModbusCoreSL.cpp \
                  Modbus.cpp \
                  ModbusStateMachine.cpp \
                  CacheThread.cpp

include_HEADERS = CacheThread.h \
                  ModbusClass.h \
                  ModbusCore.h \
                  ModbusCoreSL.h \
                  Modbus.h
```

Bootstrapping autotools

- Call sequence of commands:
- `libtoolize --force --copy --automake`
- `aclocal`
- `autoheader`
- `automake -Wall --add-missing --copy --include-deps`
- `autoconf`

Continue to build Modbus server ...

- Build of Modbus server
- `./configure [options if needed]`
- `make`
- ...

Result of make …

```
jkrueger@taco23:~/sources/tango/servers/Modbus/src$ make
make  all-am
make[1]: Entering directory `/home/jkrueger/sources/tango/servers/Modbus/src'
  CXX      ClassFactory.o
ClassFactory.cpp:51:19: fatal error: tango.h: No such file or directory
 #include <tango.h>
                   ^
compilation terminated.
make[1]: *** [ClassFactory.o] Error 1
make[1]: Leaving directory `/home/jkrueger/sources/tango/servers/Modbus/src'
make: *** [all] Error 2
jkrueger@taco23:~/sources/tango/servers/Modbus/src$
```

Expected !

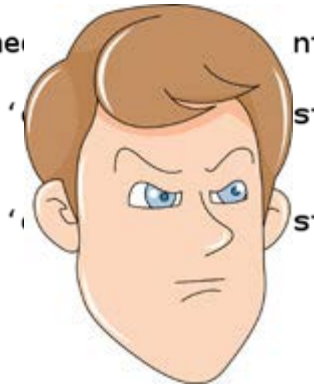
Search for TANGO installation

Searching for TANGO installation ...

- TANGO provides a database file for the `pkg-config` tool
- Autoconf supports the query of the `pkg-config` database
- Modify `configure.ac`:
  - Add:
  - `PKG_CHECK_MODULES([TANGO], [tango >= 7.2.0]`
- Modify `Makefile.am`:
  - Add:
  - `AM_CPPFLAGS = @TANGO_CFLAGS@`
  - `Modbus_LDADD = @TANGO_LIBS@`

Running make ...

```
jkrueger@tac023:~/sources/tango/servers/Modbus/src$ make
make  all-am
make[1]: Entering directory `/home/jkrueger/sources/tango/servers/Modbus/src'
  CXX      ClassFactory.o
  CXX      main.o
  CXX      ModbusClass.o
  CXX      ModbusCore.o
ModbusCore.cpp: In member function 'long int ModbusCore::GetRTUResponse(unsigne                    nt, long int
*)':
ModbusCore.cpp:763:61: warning: deprecated conversion from string constant to '                    strings]
   LogError("Missing char",_query,_query_length,frame,nchar+2);
                                                             ^
ModbusCore.cpp:779:70: warning: deprecated conversion from string constant to '                    strings]
   LogError("Invalid CRC",_query,_query_length,frame,response_length+3);
                                                                      ^
  CXX      ModbusCoreSL.o
  CXX      Modbus.o
  CXX      ModbusStateMachine.o
  CXX      CacheThread.o
  CXXLD    Modbus
ClassFactory.o: In function `Tango::DServer::class_factory()':
/home/jkrueger/sources/tango/servers/Modbus/src/ClassFactory.cpp:64: undefined reference to `Serial_ns::Ser
ialClass::init(char const*)'
collect2: error: ld returned 1 exit status
make[1]: *** [Modbus] Error 1
make[1]: Leaving directory `/home/jkrueger/sources/tango/servers/Modbus/src'
make: *** [all] Error 2
```



Switch to SerialLine class ...

- Checking out the sources
- Switch into source directory
- Calling make

```
jkrueger@taco23:~/sources/tango/servers/SerialLine/src$ make
cc  -c Serial.cpp -o obj//Serial.o
Serial.cpp:39:19: fatal error: tango.h: No such file or directory
 #include <tango.h>
                   ^
compilation terminated.
make: *** [obj//Serial.o] Error 1
jkrueger@taco23:~/sources/tango/servers/SerialLine/src$
```

Goto Slide 6 ...

- Do the same as for **Modbus** for **SerialLine**, except:
  - Create a separate library for the SerialLine class
  - Add a configure option to enable/disable build of server
  - Add a database file for pkg-config
  - Enable/disable of shared/static library comes with use of libtool
  - Build the SerialLine class library and server
  - Install library and server
  - Jump back to Modbus server …

Back at Modbus server …

- Add in configure.ac
  - `PKG_CHECK_MODULES([LIBSERIAL], [libSerial])`
- Modify in Makefile.am:

```
AM_CPPFLAGS     = @TANGO_CFLAGS@


AM_CPPFLAGS     = @LIBSERIAL_CFLAGS@
Modbus_LDADD    = @TANGO_LIBS@

Modbus_LDADD    = @LIBSERIAL_LIBS@
```

- Run make

Result ...

```
jkrueger@taco23:~/sources/tango/servers/Modbus/src$ make
make  all-am
make[1]: Entering directory `/home/jkrueger/sources/tango/servers/Modbus/src'
  CXX      ClassFactory.o
  CXX      main.o
  CXX      ModbusClass.o
  CXX      ModbusCore.o
ModbusCore.cpp: In member function 'long int ModbusCore::GetRTUResponse(unsigned char*, short int, long int
*)':
ModbusCore.cpp:763:61: warning: deprecated conversion from string constant to 'char*' [-Wwrite-strings]
   LogError("Missing char",_query,_query_length,frame,nchar+2);
                                                             ^
ModbusCore.cpp:779:70: warning: deprecated conversion from string constant to                 :e-strings]
   LogError("Invalid CRC",_query,_query_length,frame,response_length+3);
                                                                      ^
  CXX      ModbusCoreSL.o
  CXX      Modbus.o
  CXX      ModbusStateMachine.o
  CXX      CacheThread.o
  CXXLD    Modbus
make[1]: Leaving directory `/home/jkrueger/sources/tango/servers/Modbus/src'
```

Exterior view ...

- Who are „external viewers“?
  - Scientists with new instruments
  - New facilities
  - Companies
  - ...

- What do they see?
  - Very good, stable, scaleable, distributed frame work easy to install
  - A lot of devices servers for „nearly“ all purposes
  - But if they want to install and use them they are lost !!!
    - **No packages (source or binary) !!!**
  - Not everybody is able or willing to modify the install routines or to write the needed servers

They will give up and looking for another solution !!

Conclusions

- (Re)use of existing servers from the repository starts painful
  - The (Linux) makefiles include (too many) site specifics
  - There are (nearly) no information about dependencies
  - For the investigated servers no (official) maintainer addressed
- Autotools could be **one** solution to overcome the problems
  - Available on many platforms
  - Creation of tarballs is automatically included (`make dist`)
  - **Only** on package creating machines needed
  - Could be integrated into `pogo`
- It seems to be easier to write the own servers with `pogo` than use of servers written by others !!!

TODOS

- Make users happy
  - Create packages to install servers
    - tarballs for Unix like systems
    - Installers for Window systems
  - Maintainer for each server
  - Improve documentation
    - describe classes
    - add dependencies if needed
    - describe properties, attributes, and commands

Thank you!

Introduction of class library ...

```
AC_ARG_ENABLE([server], [AS_HELP_STRING([--disable-server],
[build the Serial server (default is yes)])], [enable_server=$enableval],
    [enable_server=yes])

AM_CONDITIONAL([BUILD_SERVER],
[test x"$enable_server" == x"yes"])
```

```
AM_CPPFLAGS = @TANGO_CFLAGS@

lib_LTLIBRARIES = libSerial.la

libSerial_la_SOURCES    = SerialClass.cpp \
                          Serial.cpp \
                          SerialStateMachine.cpp
libSerial_la_LIBADD     = @TANGO_LIBS@

nodist_pkgconfig_DATA   = libSerial.pc


EXTRA_DIST      = SerialWin32.cpp \
                  SerialLinux.cpp \
                  libSerial.pc.in

include_HEADERS = SerialClass.h \
                  Serial.h

if BUILD_SERVER
bin_PROGRAMS    = Serial

Serial_SOURCES  = ClassFactory.cpp \
                 main.cpp

Serial_LDADD    = libSerial.la
endif
```