

Ideas for cooperative software development for future GGOS stations

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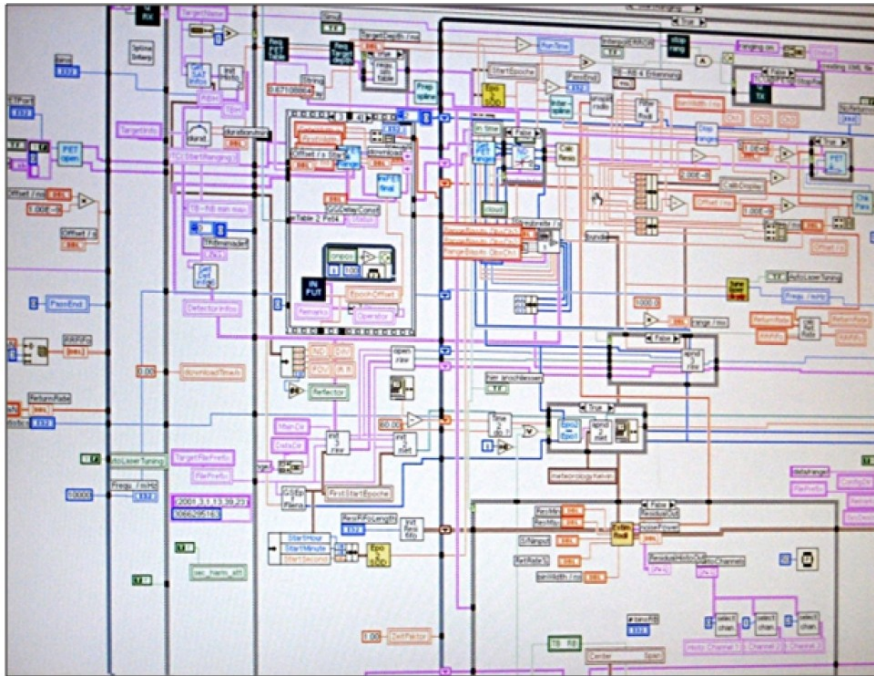
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ettl@fs.wetzell.de

FESG



Scientific Software

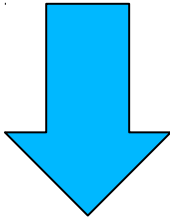


- Tendency to become complex and unstructured
- Highly specialized for dedicated purposes (e.g. PhD)
- Undocumented, unreadable, not maintainable code
- Error-prone, not well tested, not optimized realizations
- Written in different computer languages
- ...

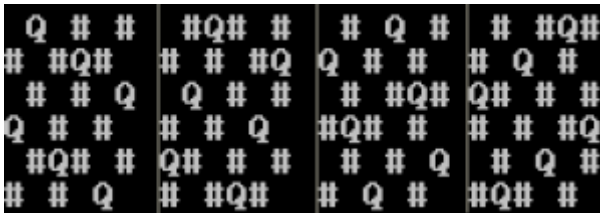
Scientific Software

```

1  int v, i, j, k, l, s, a[99];
2  main()
3  {
4      for ( scanf( "%d", &s ); *a--s; v=a[ j*=v ]-a[ i ], k=i<s, j+=(v=j<s &&!k &&! printf( 2+ "\n\n
          %c" -(!l<<!j), " #Q"[ l^v?(l^j) &l:2 ]&& ++l || a[ i ]<s && v && v-i+j && v+i-j ) && !(l
          %c=s), v || ( i==j ? a[ i+=k ]=0: ++a[ i ] )>=s*k && ++a[ --i ] )
5      ;
6  }
    
```



**Calculates all solutions
for the queens puzzle
(of chess boards with
sizes from 1x1 to 99x99)**

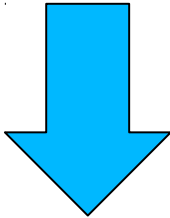


Dsovianski, Doron; Nissenbaum, Baruch: baruch.c.baruch.hint. In: Noll, Landon Curt; Cooper, Simon; Seebach, Peter; Broukhis, Leonid A.: The International Obfuscated C Code Contest. Winning entries. 1990. 7th International Obfuscated C Code Contest. 2003, <http://www.de.ioccc.org/years.html#1990>, Download 2011-08-04.

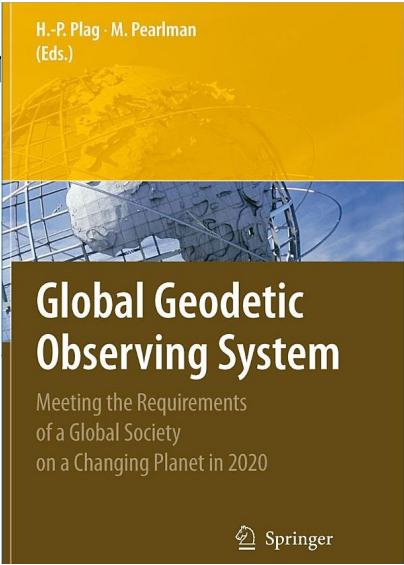
Scientific Software

```

1  int v, i, j, k, l, s, a[99];
2  main()
3  {
4    for ( scanf( "%c", &s ); *a--s; v=a[ j*=v ]-a[ i ], k=i<s, j+=(v=j<s &&!k &&! printf( 2+ "\n\n
        %c" -(!l<<.j), " #Q"[ l^v?(l^j) &l:2])&& ++l || a[ i ]<s &&v &&v-i+j &&v+i-j ) &&!(l
        %c=s), v || ( i==j ? a[ i+=k ]=0 : ++a[ i ] )>=s*k && ++a[ --i ] )
5    ;
6  }
    
```



Calculate all solutions for the queens puzzle (of chess boards with sizes from 1x1 to 99x99)



Dsovolski, Doron; Nissenbaum, Baruch: baruch.c.baruch.hint. In: Noll, Landon Curt; Cooper, Simon; Seebach, Peter; Broukhis, Leonid A.: The International Obfuscated C Code Contest. Winning entries. 1990. 7th International Obfuscated C Code Contest. 2003, <http://www.de.ioccc.org/years.html#1990>, Download 2011-08-04.

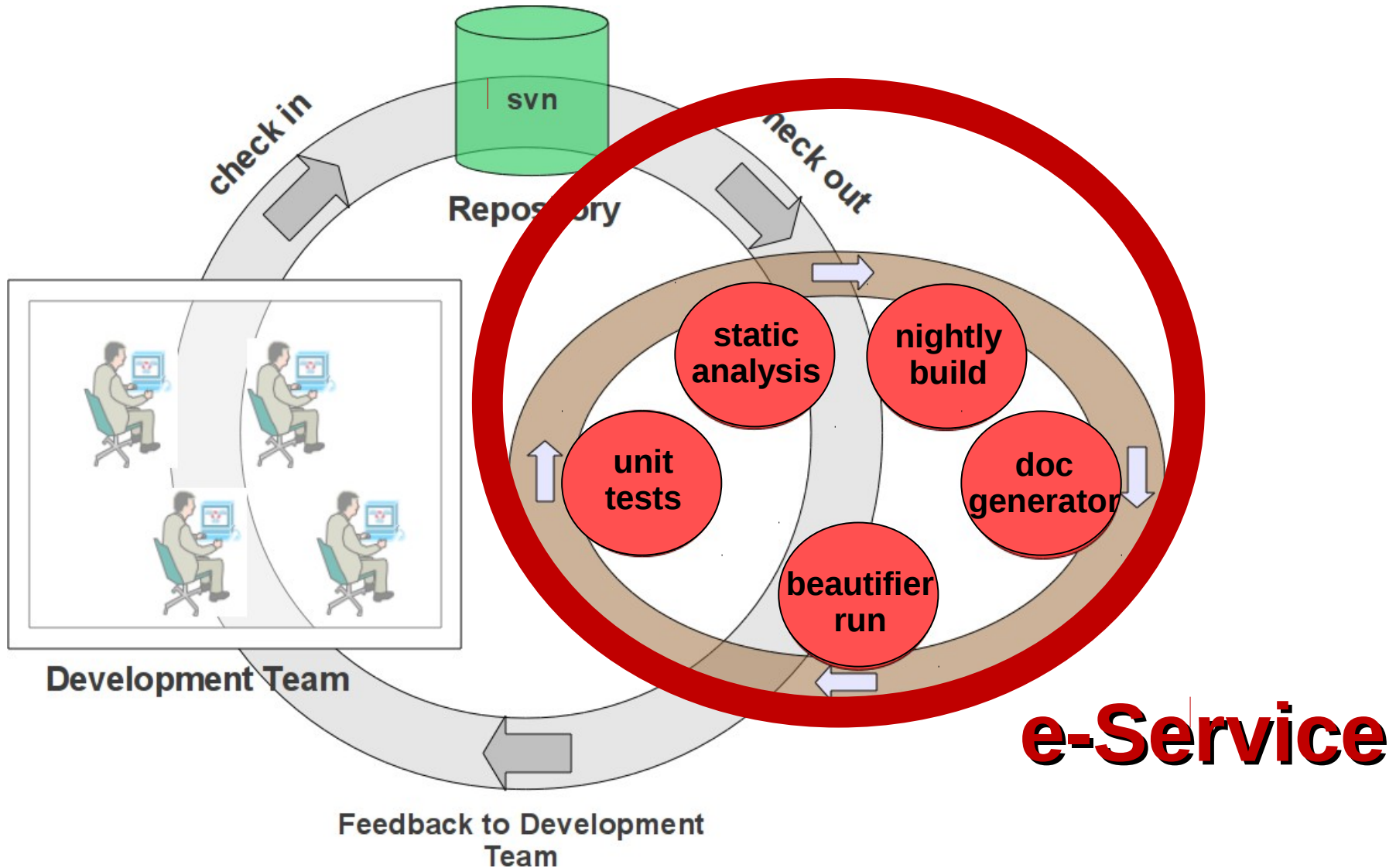
Scientific software



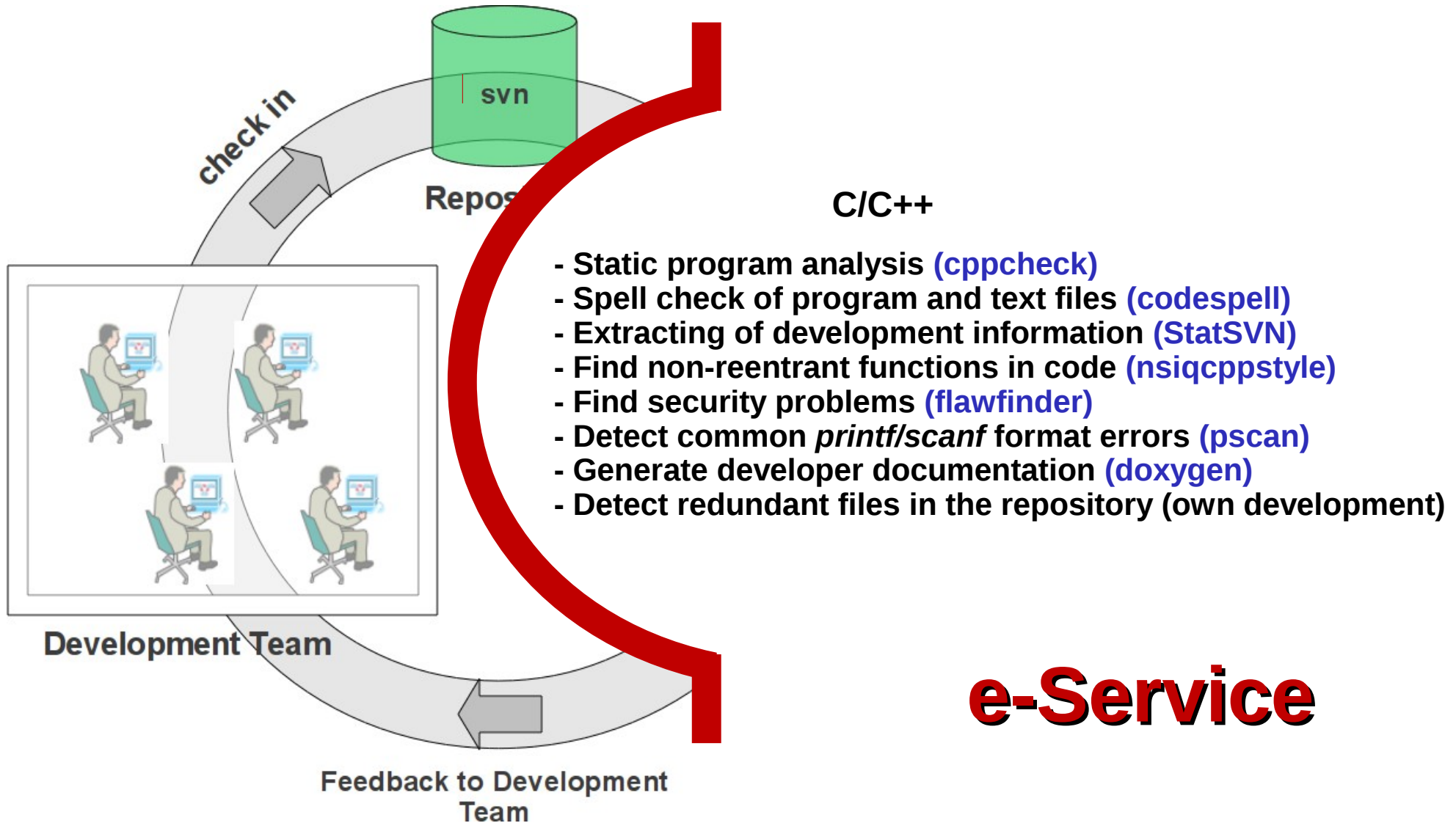
Reduction to a few software languages

- Style guide with coding layout and coding policies
- A general way to use legacy code
- Documentation generation
- Automated code tests and inspections
- Version control
- Offering of tested, open source toolboxes

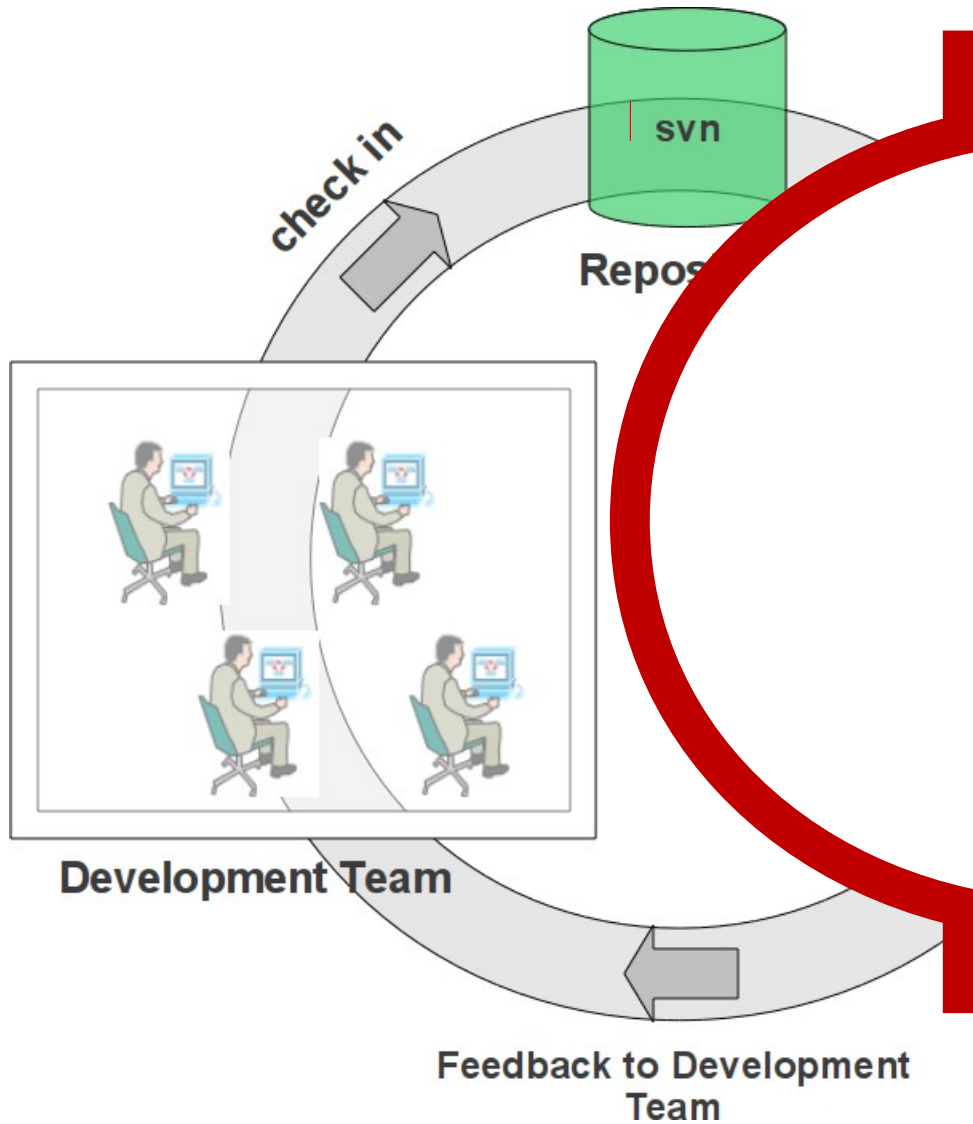
Continuous Integration as a supporting service



Continuous Integration as a supporting service



Continuous Integration as a supporting service



<http://econtrol-software.de/>





The screenshot shows the website for 'e-control-software.de'. The header includes the TUM logo and navigation tabs for 'Home', 'VLBI', and 'Service'. The main content area features a section for 'DiFX' e-Service, which lists several automated checks performed on code:

- Static program analysis based on **checkstyle**
- Spell check of program and test files based on **codespell**
- Extracting developer email information, based on **git-email**
- Detecting redundant files in the repository
- Find non-member functions in code, based on **checkpatch**
- Find security issues based on **findsecbugs**
- Detect code style format issues based on **pep8**
- Automating the process
- Running unit tests

The text below the list states: 'The corresponding results are automatically collected in web-pages. These results are visible to all developers of the group and can be found here.'

e-Service

Continuous Integration as a supporting service, e.g. status overview

Projekt	SVN Statistics (statsvn)	Developer Docu (doxygen)	Static analysis (cppcheck)	Redundant files	Duplicated code (simian)	Project checker	Beautify files (artistic style)	xsamba.wtz Debian 32bit	
	Run time	(Daily 04:00)	(So. 12:00)	(Daily 22:00)	(Daily 23:00)	(Daily 03:30)	(Daily 04:00)	(Sa. 00:00)	Autobuild
slr	statistics	n.a.	 report <small>Sun Mar 4 07:42:20 2012</small>	 report <small>Sun Mar 4 02:02:00 2012</small>	 report <small>Sun Mar 4 04:13:56 2012</small>	n.a.	 report <small>Sat Mar 3 00:34:05 2012</small>	 report <small>Sun Mar 4 05:05:41 2012</small>	n.a.
tools <hr/> vendor	statistics	n.a. ---	 report <small>Sun Mar 4 05:04:34 2012</small>  report <small>Sun Mar 4 03:55:43 2012</small>	 report <small>Sun Mar 4 02:33:16 2012</small> n.a.	 report <small>Sun Mar 4 03:48:40 2012</small> n.a.	report ---	 report <small>Sat Mar 3 00:26:42 2012</small> ---	 report <small>Sun Mar 4 03:48:32 2012</small> ---	 report/coverage <small>Sun Mar 4 02:32:35 2012</small> ---
vlbi	statistics	n.a.	 report <small>Sun Mar 4 07:57:06 2012</small>	 report <small>Sun Mar 4 02:15:17 2012</small>	 report <small>Sun Mar 4 04:02:05 2012</small>	n.a.	 report <small>Sat Mar 3 00:45:02 2012</small>	 gcc-4.1  gcc-4.2  gcc-4.3 <small>Sat Mar 3 23:53:28 2012</small>	n.a.
sysmon	statistics	n.a.	 report <small>Sat Mar 3 22:15:25 2012</small>	 report <small>Sun Mar 4 02:03:51 2012</small>	 report <small>Sun Mar 4 04:22:19 2012</small>	n.a.	 report <small>Sat Mar 3 00:48:49 2012</small>	 gcc-4.1  gcc-4.2  gcc-4.3 <small>Sat Mar 3 23:28:11 2012</small>	n.a.
wxgui	statistics	n.a.	 report <small>Sun Mar 4 05:40:08 2012</small>	 report <small>Sun Mar 4 02:33:51 2012</small>	 report <small>Sun Mar 4 04:31:53 2012</small>	n.a.	 report <small>Sat Mar 3 00:47:04 2012</small>	 gcc-4.1  gcc-4.2  gcc-4.3 <small>Wed Dec 7 12:34:22 2011</small>	n.a.

Continuous Integration as a supporting service, e.g. static checks

Automatic cppcheck report: /home/subversion/codecheck/trunk/scripts/static_analysis/cppcheck

Generated: Sun Mar 4 05:07:28 UTC 2012

Cppcheck version: Cppcheck 1.53

Start of static checking

```
[ http://xsamba.wtz/svn/wxqui/trunk/rpc/SensicamInterface/SensicamInterface_client.cpp ]: (style) at line 1761 Consecutive return, break, continue, goto or throw statements are unnecessary.
[ http://xsamba.wtz/svn/wxqui/trunk/rpc/SensicamInterface/SensicamInterface_client.cpp ]: (style) at line 1829 Consecutive return, break, continue, goto or throw statements are unnecessary.
[ http://xsamba.wtz/svn/wxqui/trunk/rpc/domectrl/domectrl_client.cpp ]: (style) at line 1761 Consecutive return, break, continue, goto or throw statements are unnecessary.
[ http://xsamba.wtz/svn/wxqui/trunk/rpc/domectrl/domectrl_client.cpp ]: (style) at line 1829 Consecutive return, break, continue, goto or throw statements are unnecessary.
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[ http://xsamba.wtz/svn/wxqui/trunk/rpc/eurolas/eurolas_client.cpp ]: (style) at line 1829 Consecutive return, break, continue, goto or throw statements are unnecessary.
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[ http://xsamba.wtz/svn/wxqui/trunk/rpc/tru_dac_rpc/tru_dac_rpc_client.cpp ]: (style) at line 1761 Consecutive return, break, continue, goto or throw statements are unnecessary.
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[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (error) at line 3955 Invalid number of character () when these macros are defined: ''.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (error) at line 3955 Invalid number of character () when these macros are defined: 'DEBUG'.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (error) at line 3955 Invalid number of character () when these macros are defined: 'DEBUG; DEBUG EXTRA'.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (error) at line 3955 Invalid number of character () when these macros are defined: 'SCHED_NO_SUN'.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3077 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3252 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3268 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3296 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3332 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3348 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3376 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3412 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3428 Exception should be caught by reference.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxReturnWindow.cpp ]: (style) at line 153 Found obsolete function 'rand_r'. It is recommended to use the function 'rand' instead
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxReturnWindow.cpp ]: (style) at line 180 Found obsolete function 'rand_r'. It is recommended to use the function 'rand' instead
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxReturnWindow.cpp ]: (style) at line 259 Found obsolete function 'rand_r'. It is recommended to use the function 'rand' instead
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxReturnWindow.cpp ]: (style) at line 264 Found obsolete function 'rand_r'. It is recommended to use the function 'rand' instead
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxpTCTri.cpp ]: (style) at line 898 Found duplicate branches for if and else.
[ http://xsamba.wtz/svn/wxqui/trunk/test/modules/rpc/test_client.cpp ]: (style) at line 1761 Consecutive return, break, continue, goto or throw statements are unnecessary.
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```

End of static checking

Statistic

```
error.....: 4
warning.....: 0
portability.....: 0
style.....: 42
performance.....: 0
information.....: 0
```

Continuous Integration as a supporting service, e.g. static checks

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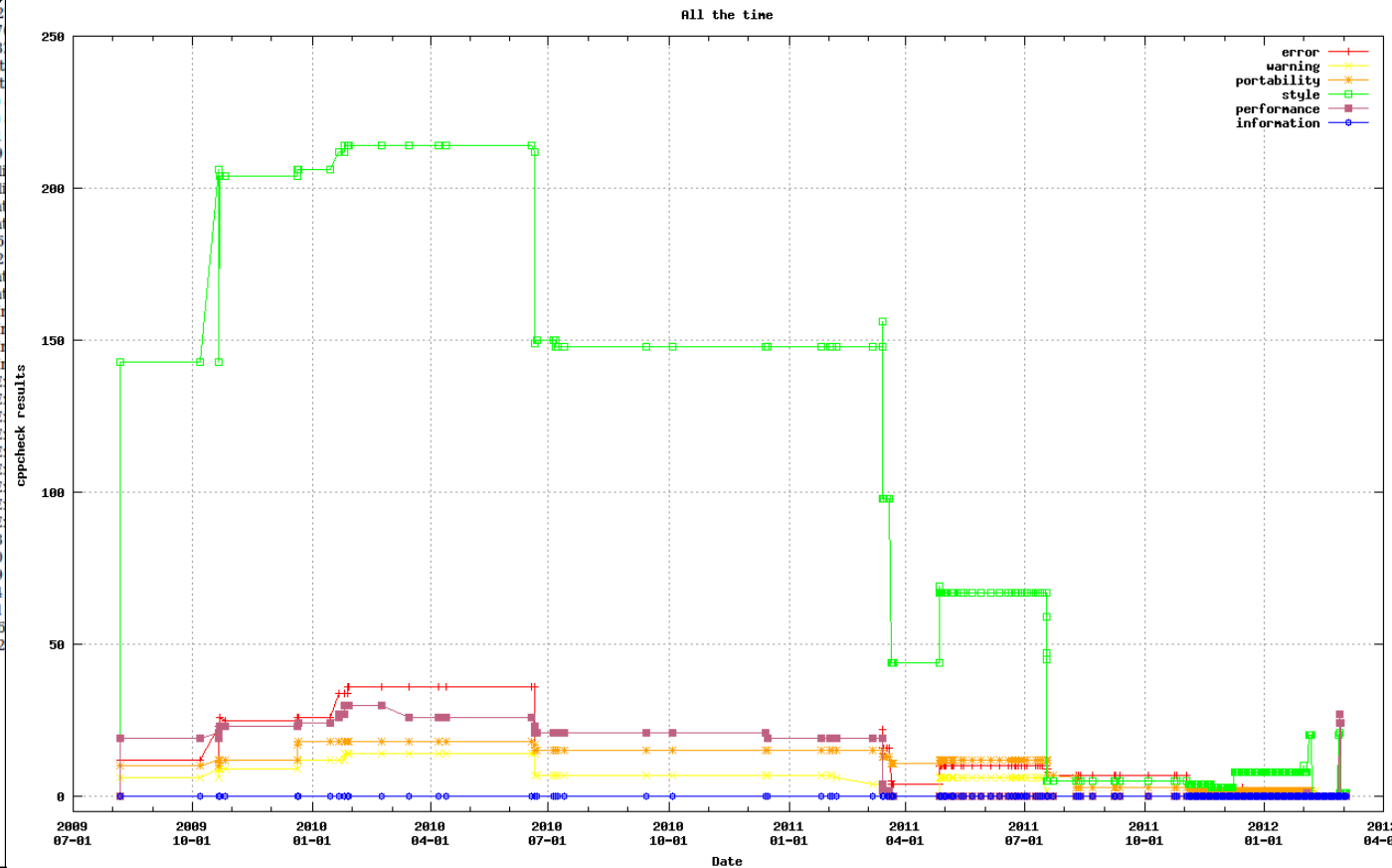
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[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (error) at line 3955 Inconsistent indentation.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (error) at line 3955 Inconsistent indentation.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (error) at line 3955 Inconsistent indentation.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3077 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3252 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3268 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3296 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3332 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3348 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3376 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3412 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/TestScheduler.cpp ]: (style) at line 3428 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxReturnWindow.cpp ]: (style) at line 153 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxReturnWindow.cpp ]: (style) at line 180 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxReturnWindow.cpp ]: (style) at line 259 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxReturnWindow.cpp ]: (style) at line 264 Eol.
[ http://xsamba.wtz/svn/wxqui/trunk/src-sosw/wxpETCtrl.cpp ]: (style) at line 898 Found.
[ http://xsamba.wtz/svn/wxqui/trunk/test/modules/rpc/test_client.cpp ]: (style) at line 1761 Consecutive return, break, continue, goto or throw statements are unnecessary.
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```

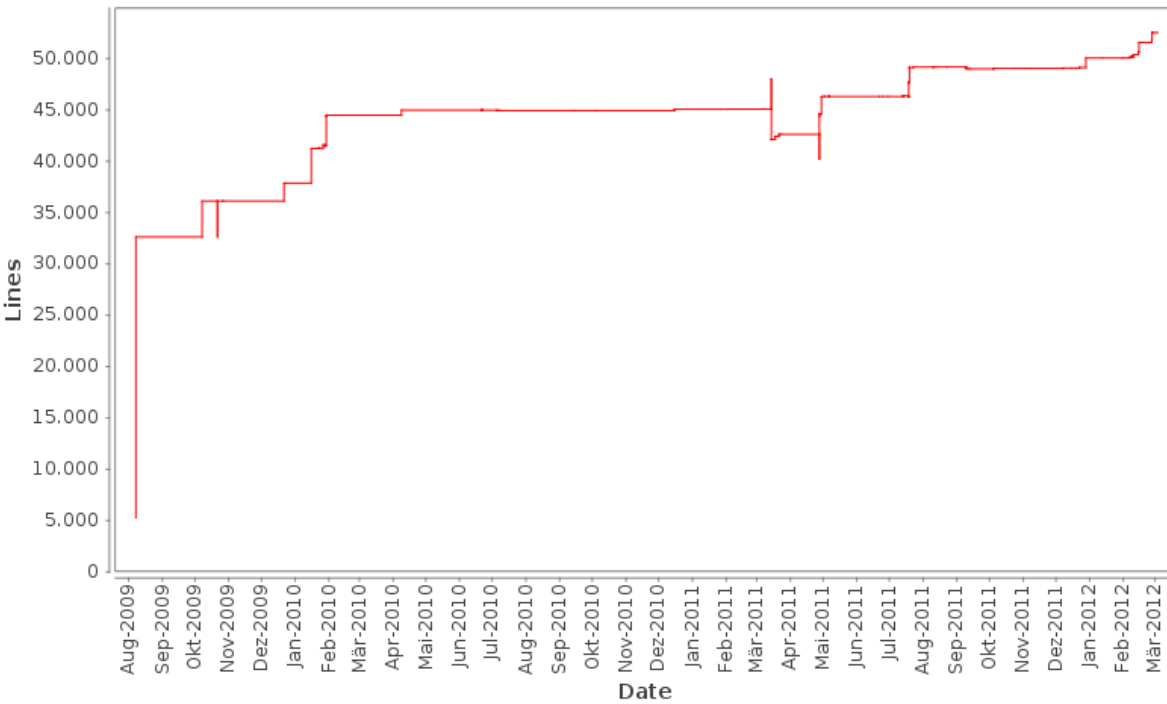
End of static checking

Statistic	
error.....	4
warning.....	0
portability.....	0
style.....	42
performance.....	0
information.....	0



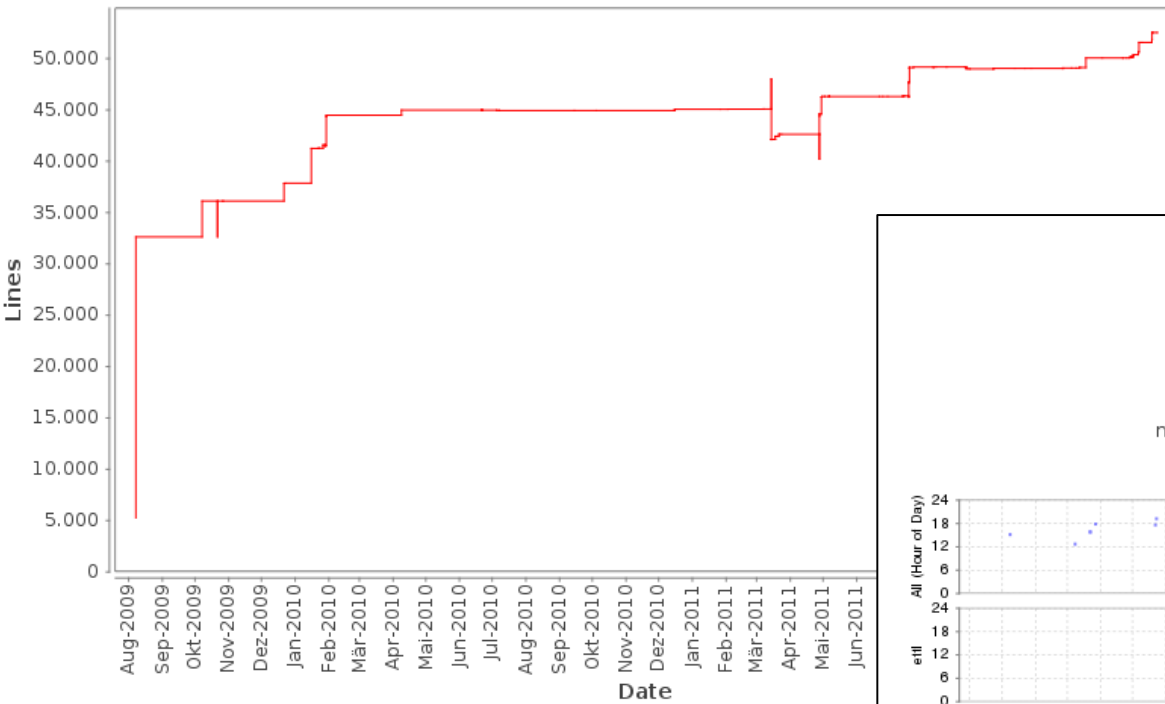
Continuous Integration as a supporting service, e.g. statistics

vlbi: Lines of Code

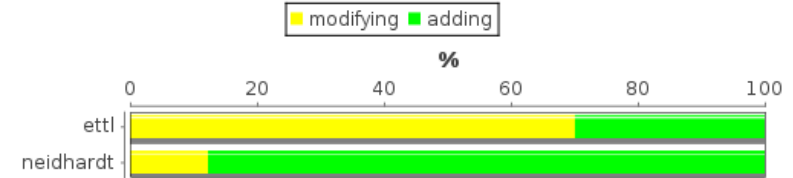


Continuous Integration as a supporting service, e.g. statistics

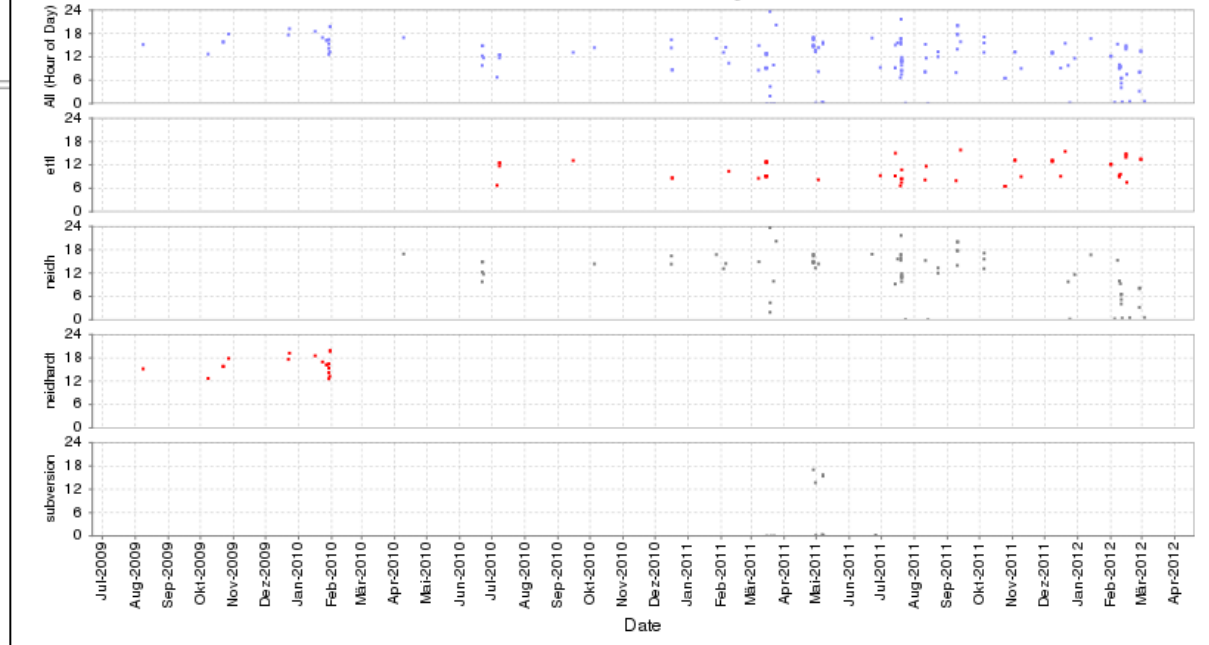
vlbi: Lines of Code



vlbi: Author Activity

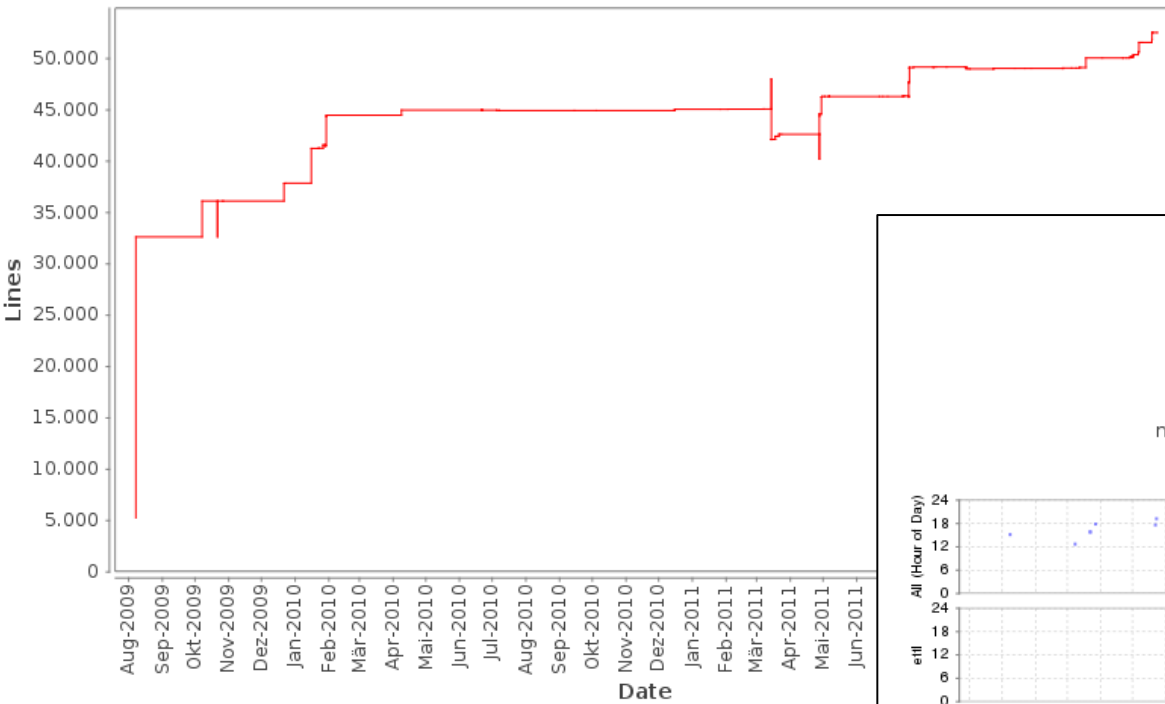


vlbi: Commit Activity

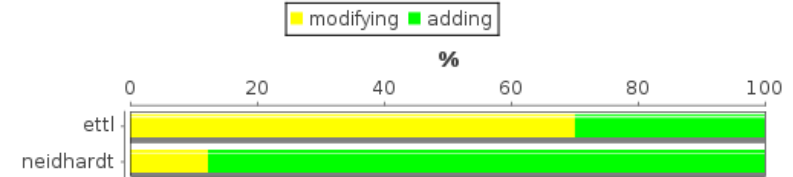


Continuous Integration as a supporting service, e.g. statistics

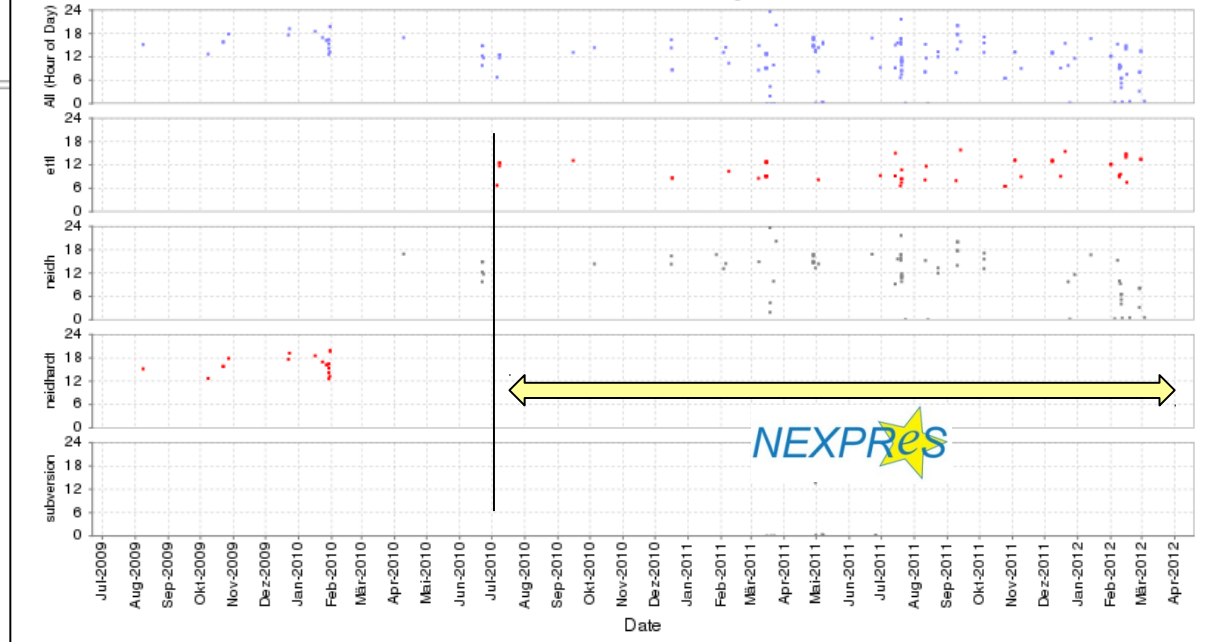
vlbi: Lines of Code



vlbi: Author Activity



vlbi: Commit Activity



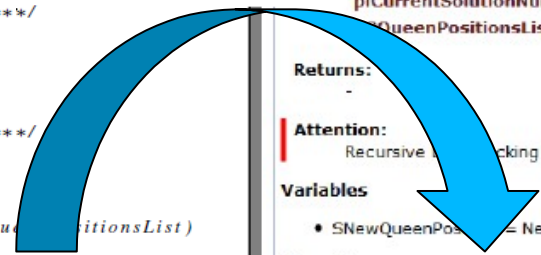
Continuous Integration as a supporting service, e.g. documentation

```

1  /*****
2  * function vFindNextQueenPosition
3  *****/
4  /*! Find position for the next queen using a recursive algorithm
5   \param iChessBoardSize -> Size of the chess board
6   \param iCurrentQueenNumber -> Current number of the queen which was
7     positioned and should be checked
8   \param piCurrentSolutionNumber <-> Current number in the ascending numbers
9     of solutions
10  \param pSQueenPositionsList <-> Row/column list of queens position
11  \return -
12  \attention Recursive backtracking algorithm
13  *****/
14 /* author A. Neidhardt
15 date 2011-08-05
16 revisions
17 2011-08-05 Original (A. Neidhardt)
18 *****/
19 void vFindNextQueenPosition (int iChessBoardSize,
20                             int iCurrentQueenNumber,
21                             int * piCurrentSolutionNumber,
22                             QueenPositionStructType * pSQueenPositionsList)
23 {
24     /*!<b> Variables </b> */
25     QueenPositionStructType SNewQueenPosition = {-1, -1};
26     /*! \li SNewQueenPosition = New queen position structure with
27       row and column fields */
28
29     /*!<b> Operations </b> */
30     /*! The algorithm is recursive. The function places a queen step by step
31       on the columns of the current row, which was handed over. The starting
32       first row (= 0) is handed over by the main program. The recursive
33       function checks if the positioned queen is safe, using the dedicated
34       function "iCheckIfQueenPositionIsSave". If it is safe, it calls itself
35       again with the next line. If all queens are set and the maximum number
36       of possible rows is reached, it prints the found solution. Then it
37       returns to the previous calling state on the previous row and continues
38       setting those queens on this row. A possible step-by-step behavior for
39       a 4x4 board is shown in the following image:
40       \image html 4QueensProblemExample.jpg "A possible step-by-step behavior
41       for a 4x4 board."
42
43     /*! Check if the last queen for the current solution was placed and the
44       chess board configuration is complete. */
45     if (iCurrentQueenNumber == iChessBoardSize)
46     {
47         /*! If chess board configuration is complete print solution */
48         (*piCurrentSolutionNumber)++;
49         vPrintChessBoard (*piCurrentSolutionNumber,
50                         pSQueenPositionsList,
51                         iChessBoardSize);
52     }

```

Doxygen



```

void vFindNextQueenPosition ( int
                             int
                             int *
                             QueenPositionStructType *
                             )

```

Find position for the next queen using a recursive algorithm

Parameters:

- iChessBoardSize** -> Size of the chess board
- iCurrentQueenNumber** -> Current number of the queen which was positioned and should be checked
- piCurrentSolutionNumber** <-> Current number in the ascending numbers of solutions
- pSQueenPositionsList** <-> Row/column list of queens positions

Returns:

-

Attention:

Recursive backtracking algorithm

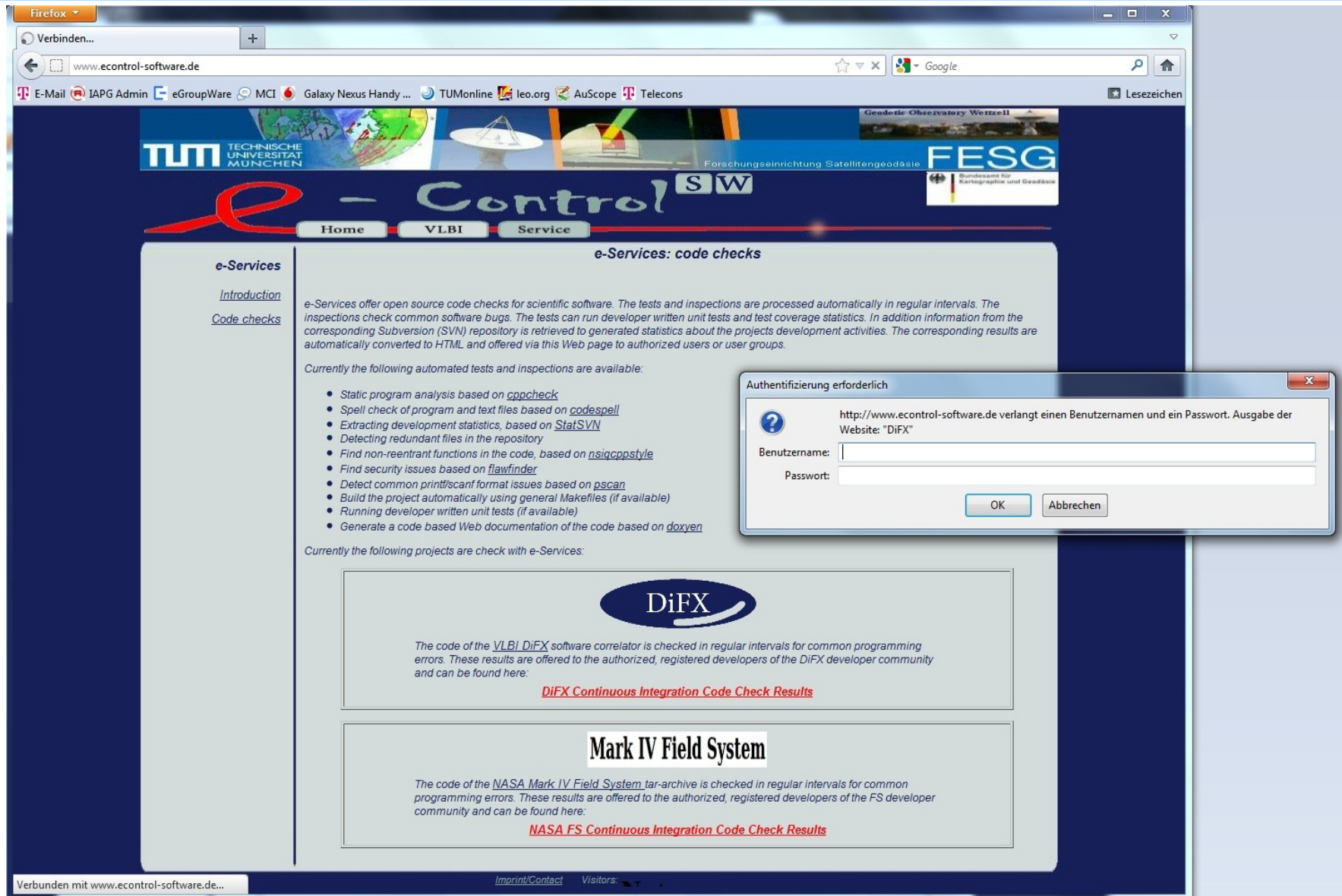
Variables

- SNewQueenPosition = New queen position structure with row and column fields

Operations

The algorithm is recursive. The function places a queen step by step on the columns of the current row, which was handed over. The starting first row (= 0) is handed over by the main program. The recursive function checks if the positioned queen is safe, using the dedicated function "iCheckIfQueenPositionIsSave". If it is safe, it calls itself again with the next line. If all queens are set and the maximum number of possible rows is reached, it prints the found solution. Then it returns to the previous calling state on the previous row and continues setting those queens on this row. A possible step-by-step behavior for a 4x4 board is shown in the following image:

Experience



Firefox

Verbinden... +

www.econtrol-software.de

E-Mail IAPG Admin eGroupWare MCI Galaxy Nexus Handy ... TUMonline leo.org AuScope Telecons

Technische Universität München

Forschungseinrichtung Satellitengeodäsie

FESG

Bundesamt für Kartographie und Geodäsie

e - Control SW

Home VLBI Service

e-Services

[Introduction](#)

[Code checks](#)

e-Services: code checks

e-Services offer open source code checks for scientific software. The tests and inspections are processed automatically in regular intervals. The inspections check common software bugs. The tests can run developer written unit tests and test coverage statistics. In addition information from the corresponding Subversion (SVN) repository is retrieved to generated statistics about the projects development activities. The corresponding results are automatically converted to HTML and offered via this Web page to authorized users or user groups.

Currently the following automated tests and inspections are available:

- Static program analysis based on [cppcheck](#)
- Spell check of program and text files based on [codespell](#)
- Extracting development statistics, based on [StatSVN](#)
- Detecting redundant files in the repository
- Find non-reentrant functions in the code, based on [nsgicppstyle](#)
- Find security issues based on [lawfinder](#)
- Detect common printt/scanf format issues based on [pscan](#)
- Build the project automatically using general Makefiles (if available)
- Running developer written unit tests (if available)
- Generate a code based Web documentation of the code based on [doxygen](#)

Currently the following projects are check with e-Services:

DiFX

The code of the VLBI DiFX software correlator is checked in regular intervals for common programming errors. These results are offered to the authorized, registered developers of the DiFX developer community and can be found here:

[DiFX Continuous Integration Code Check Results](#)

Mark IV Field System

The code of the NASA Mark IV Field System tar-archive is checked in regular intervals for common programming errors. These results are offered to the authorized, registered developers of the FS developer community and can be found here:

[NASA FS Continuous Integration Code Check Results](#)

Authentifizierung erforderlich

http://www.econtrol-software.de verlangt einen Benutzernamen und ein Passwort. Ausgabe der Website: "DiFX"

Benutzername:

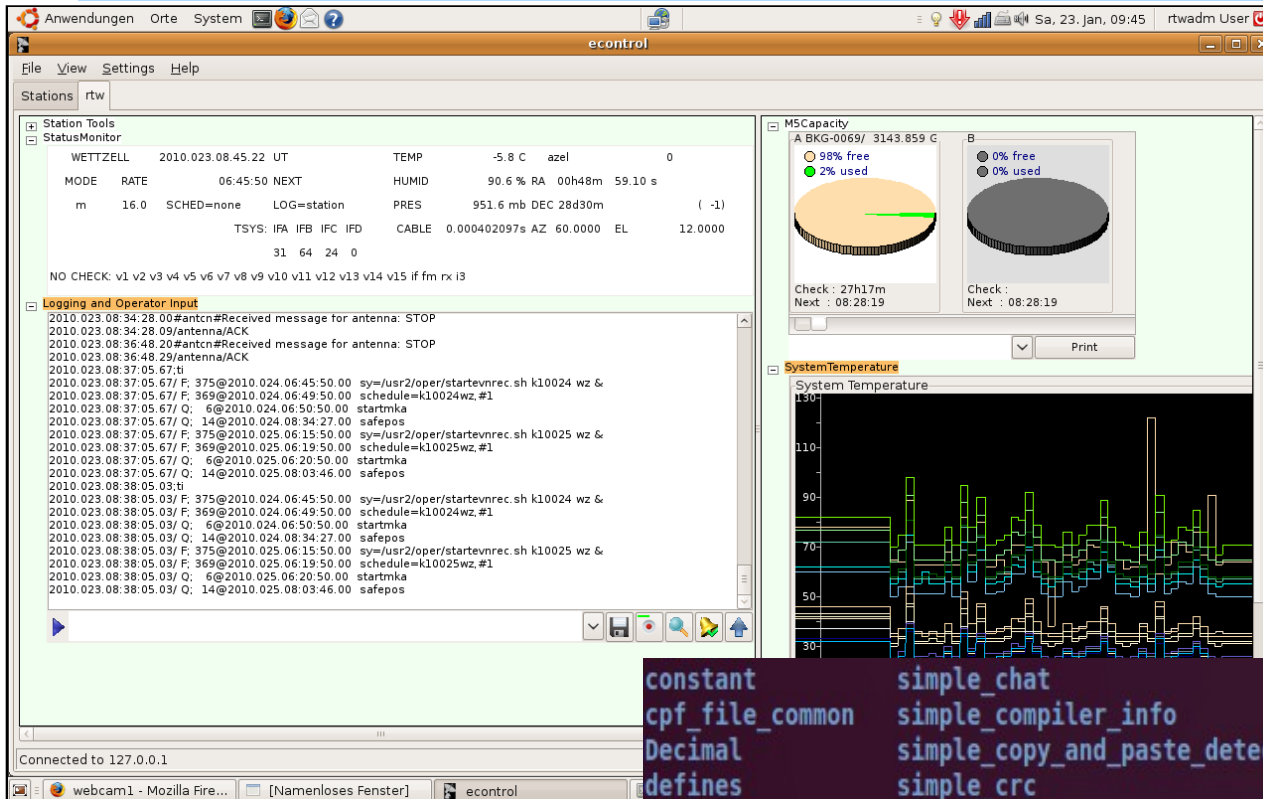
Passwort:

OK Abbrechen

Verbunden mit www.econtrol-software.de...

Imprint/Contact Visitors

Experience

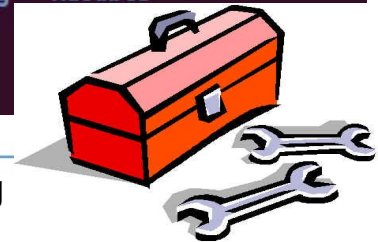


Wettzell Toolbox

e-RemoteCtrl

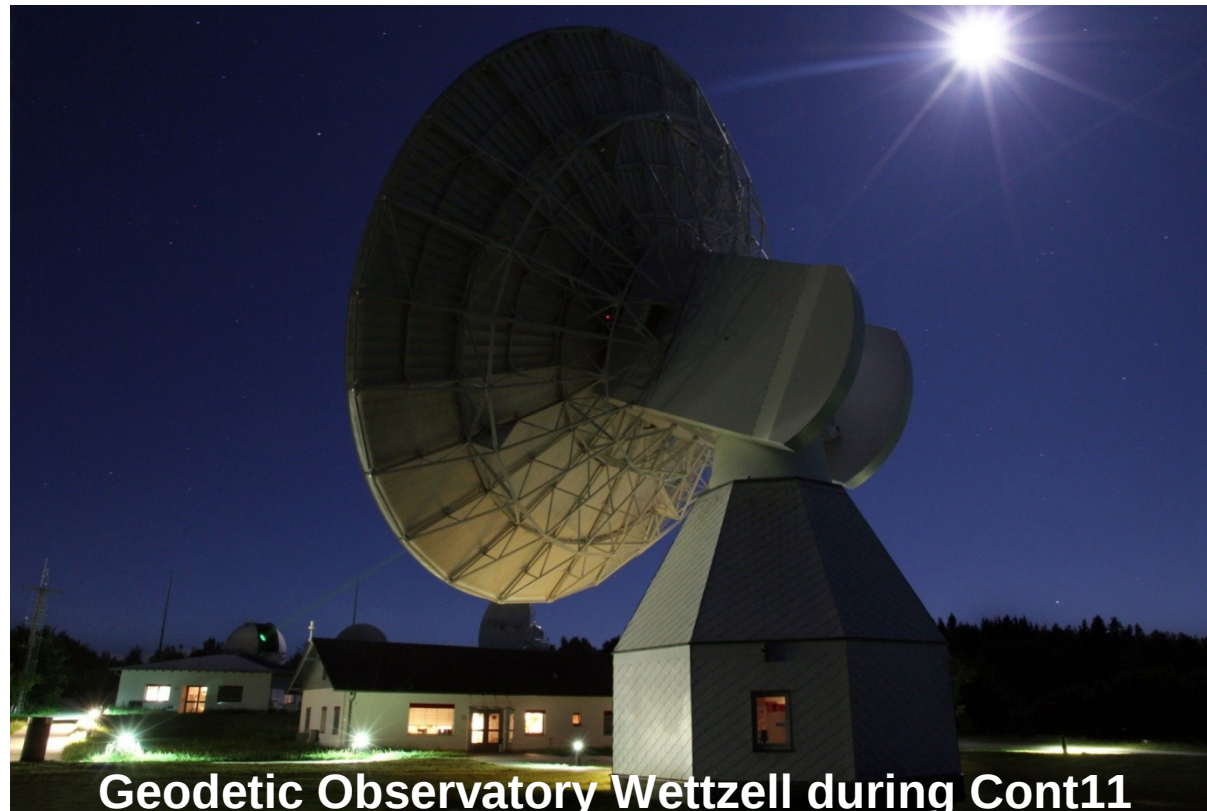
```

constant simple_chat simple_md5 simple_socket
cpf_file_common simple_compiler_info simple_network_util simple_stopwatch
Decimal simple_copy_and_paste_detector simple_passage simple_string_mathlib
defines simple_crc simple_program_monitor simple_string_util
doc simple_debug simple_progstarter simple_structured_conf
eurolas simple_enumgen simple_progstarter_old simple_system_info
interpol simple_epoch simple_psqlquery simple_tail
lauberlaser simple_factoring_tools simple_random_seed simple_testsuite
lauberrpc simple_file_lister simple_role_manager simple_tokenize
Makefile simple_filesystem_util simple_run_length_encode timecalc
orbitcalc simple_findpattern simple_scattered_string Xdouble
progstarter simple_floating_point_util simple_sem
simple_aes simple_input_fuzzer simple_serial
simple_benchmark simple_mathlib_verify simple_shell_macros
    
```



Thank you

The service is also available for your tests on our
Web page <http://www.econtrol-software.de>
after contacting us



Geodetic Observatory Wettzell during Cont11