Minutes of Meeting LOFAR Software

Date:	2008-10-29
Next meeting:	2008-11-12 9:15-10:15
	Multimedia room
Present:	
Andre Gunst	Yes
Ronald Nijboer	Yes
Ruud Overeem	Yes
John Romein	Yes
Michael Wise	Yes
Marcel Loose	As special guest for the build part.

cc: Arnold Meijster, Rob van Nieuwpoort, Arthur Coolen, Jurjen Sluman, Pieter Donker, Chris Broekema, Martin Gels, Joris v. Zwieten, Marcel Loose, Adriaan Renting, Ger van Diepen, Max Avruch, Michiel v. Haarlem, Jan Reitsma, Ger de Bruyn, Arno Schoenmaker, Hanno Holties, Corina Vogt, Jan Noordam, Joe Masters, Lars Bähren, Dion Kant, Johan Hamaker, Maaijke Mevius

Remarks previous minutes

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Announcements

- Specification for next phase in CEP tender is done. However, we cannot send it yet because the next phase is on a hold. One of the not succesfull bidders asked for clarification.
- Next week Jan-David Mol will start. He will start with the tied array beamforming design for the pulsar pipeline.
- The LOFAR18 machine is ready to use as development machine (follow up of LOFAR17). Teun defined two virtual machines on it.

Action item overview

ID	Date submitted	Description	Owner	Planned date	Status
68	20080723	Test whether TBB dumps are actually possible from the station hardware (not just the test hardware).	Michael	20081020	Open
69	20080813	Draft set of regression tests for CIMAGER (with input from Casey).	Michael	20081031	Open
70	20080820	Contact Tim Cornell about CIMAGER testdata.	Ronald	20081020	Open
73	20081029	Michael will ask Jason to perform tests with the TAB implemented by Rob. The implemented TAB supports one beam which is correlated with the rest of the stations.	Michael	20081112	Open
74	20081029	Issue track tool is required. Put on the agenda in a next meeting.	Andre	20081120	Open

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Progress

Stations (André):

Achieved since last meeting:
- Arie is extending the tests for the TBB via Python for the production company.
- Eric Kooistra is busy to translate a TCL script to Python to more thoroughly test the HBA connection on the LCU.

Problems / current activities:
- Dips: Michiel Brentjens can currently predict the dips and the cause appears to be in the BeamServer software. The problem has not been solved yet.
- Reading back the status of the HBA tiles fails often.

Next actions:
- Continue with LOFAR20

OLAP (John):

Achieved since last meeting:
- Integration with MAC/SAS works. The integration with the Navigator is not finished yet. Some minor issues popped up.
- TAB is waiting for tests of Michiel Brentjens. According to Michael it is better that someone of the pulsar KSPs (e.g. Jason) performs these tests, since Michiel is already overloaded with tasks. The current TAB mode produces one tied array beam and correlates the result with the rest of the stations.
- Broadcast check script is written by Chris.

Problems / current activities:
- Weekend observation failed. Maybe because the lock directory was full. Another cause is that the applications were killed without rebooting the BG/P (caused by the FIFOs in the tree network which are in an inconsistent state when an application is killed).
- Chris is still busy with the interrupts. With respect to the tree interrupts there was a telecon last Wednesday with IBM. The problem is caused by the software and not the hardware.
- Martin is integrating Marcel's exceptions stuff. This is to backtrace exceptions from where it came from. This helps the debugging significantly.
- Translation Look aside Buffer work waits for actions in Argonne.
- For LOFAR20 we need one Pset and many storage writers (currently it is the opposite). Chris will do this in the next phase. Furthermore the robustness for failing disks should be included.

Next actions:

- Continue with LOFAR20

Offline pipeline (Ronald):

Achieved since last meeting:
- Bug in the flagger was found.
- The definition of the clock phase correction is done. This will be written up by Ger de Bruyn.
- DP^3 can handle VDS file formats. In this way it can be distributed over the cluster.
- Maaijke has a very rough implementation of the SPAM software. This is tested by Gianni.

Problems / current activities:
- Marcel is not sure if the integration of DP^3 in the pipeline can be ready this week. We really aiming for finishing it before Step 1 is closed.
- Ger build on top of the parameter database a local sky model and this connects to the BBS predict.
- Joris is busy to adapt BBS for the new parameter database.
- Ger is busy with implementing the parameter database.
- Joris is looking at the solution based flagging. This will be finished in Step 2 (low priority).
- Online bandpass correction verification by Pandey waits for station data. An observation of 48 hours was defined. The observation failed this weekend. We have to postpone it to the next step together with the global bandpass.
- Pandey will commission the Global Solver in the next phase.

Next actions:
- Continue with LOFAR20

SAS + MAC + SHM (Ruud):

Achieved since last meeting:
- Arthur updated the SAS user interface for the new OLAP settings including the TAB functionality.
- Arthur finished the performance tests on the stations last week. Ruud documented the results. Conclusion: 10.000 message each second can be handled and a round trip time of 1.6 ms is achieved (TCP takes up 1 ms and PVSS 0.6 ms). With other words it takes 1.6 ms from detecting a trigger to freezing the TBBs as an example.
- The feedback communication from SHM to MAC works.
- A build of the MAC tree against the latest head of the repository was successful.
- The system executables are going to the sbin directory. The MAC executables are in the bin directory. The reason behind this is that different users have different access rights to the different bins.

- Pieter finished the software for the temperature control. He is now implementing the hardware in CS010.

Problems / current activities:
- Arthur is fixing minor issues in Navigator 2.0 (popped up during integration tests with OLAP).
- Stefan will do tests with the Matlab C++ compiler.
- Red Hat licenses are not bought yet (waiting for ETM).
- The ITRF check with Michiel will be done this afternoon.
- Issue: 7 seconds per subband. Optimization is already made. Three seconds can be gained with this.
- Metadata flow work is ongoing. Arno is busy with a mechanism to distribute the static meta data from SAS to the stations.
- Extra status registers which are implemented in the FPGAs are not driven yet by the LCU. This will be moved to Step 2.

Next actions:
- Continue with LOFAR20

User Software (Michael):

Achieved since last meeting:
- Lars cleaned up the DAL.
- Definition of the cosmic ray pipeline done.
- Modifying datawriter to handle inputs from multiple TBBs in one file is made by Lars.
- Lars incorporated a header in the datawriter to include the antenna positions.

Problems / current activities:
- A commissioning template was made.
- Lars is solving bugs in the datawriter: opening more than 32 MS is a problem and there is an issue with using 48 subbands.
- Casey will design a set of scientific validation tests for the CIMAGER. Casey is busy to automate the first five tests.
- Lars is continuing to work on the CR near-field imager.
- Members of the Magnetism KSP are exploring using the VisIVO package to visualize RM synthesis cubes.

Next actions:
- Continue with LOFAR20

Software integration

Achieved since last meeting:
- See next section.

Problems / current activities:
- Compile a list of anticipated data products and calibration or metadata files associated with each of the pipelines.

Next actions:
- A test program will be initiated to verify the functioning of the LOFAR software in a more structured way. In OLAP it is possible to store the raw station data and feed this into the pipeline later on. This makes it possible to define a standard data set, which can be applied to the pipeline as soon as major software changes have been taken place.
- Merge the repositories of the USG and LOFAR development to one.

Build environment

Martin and Lars have set up a cmake environment and tested that with the CEP storage software. The conclusion was that the build time was reduced significantly (a factor of 10). According to Lars the transfer to cmake would be "quite easy".

All requirements on the list composed half year ago can be met with cmake or can be met by scripts around cmake. However, still a lot of work needs to be done to make cmake work for the rest of the software development. The main advantage is that the build time is significantly reduced. Furthermore cmake works together with ctest (automatic testing) and dashboard. With the last you see quite easy which packages are successfully built or not, etc. The USG is already using cmake. As an extra advantage the software development in all groups will be lined up and make use of one single repository and way of working.

What is the price to pay? According to Marcel, Lars and Martin 3 human months are required to complete the move to cmake (includes input from Lars). Main tasks:
-properly implement the features in the current test environment which occur automatically (like the regression tests)
-the RUB tool needs to be modified to work with cmake or cmake should be modified for RUB.

Decision: we will transfer the build environment to cmake.

This can be done in parallel with using the build environment for the autotools.

Decisions

ID	Date submitted	Decision
02	20061220	Every Step will start with a Kick-off meeting, in which the complete software team participates.
~~03~~	~~20061220~~	~~The project team starts immediately with the preparations of the next CDR in order to preserve progress of the CS1 realization~~
04	20070116	This meeting will take place every week on Tuesday 11:00. The existing software team meeting with all developers will stop to exist.
05	20070130	Step 1 will be changed to 16 subbands instead of 32 subbands.
06	20070130	Step 2 will contain a multiple node BBS. 6 µStations/Station will be postponed. Instead of this, 32 subbands measurements will be realized.
07	20070206	Step 1 will support 160 MHz observations. The other steps will support 200 MHz as well.
08	20070424	Step 2 will support 16 subbands @ 200MHz and 24 MHz at 160 MHz
09	20070424	During the rest of step two, OLAP will only support observations during the weekend.
10	20070522	The number of subbands per Measurement Set is set to 6 or 8 default.
11	20070522	Scheduler activities will be preferably activated in Q4 2007.
12	20070522	Procure, three Local Control Units to accommodate 12 microstations in CS010 in a quick way.
13	20070529	Integrate version numbers in all software.
14	20070529	Distinguish the software between a production version and an engineering version (partly now already the case).
15	20070605	All developed software under CVS will be transferred to Subversion. The main reason for this is that Subversion supports the integration of version numbers in the executables. In this way you can always retrieve which software is used for a certain build. First the impact of the transfer will be investigated by Marcel.
16	20070619	Marcel Loose will be the librarian of the LOFAR software. The available time for this will be shared with his BBS work.
17	20070710	The known pulsar survey mode will be the next mode to support (not in its full extent but partly on-line and off-line).
18	20070710	The temporarily off-line part of the known pulsar mode pipeline will not be under control of SAS/MAC. This will be put under control of SAS/MAC as soon as that software is available in the on-line part of the system.
19	20070814	Joe Masters makes the routine to read in the TBB data.
20	20071002	Fault tolerance of the system (mainly OLAP) is put at the top of the priority list after closing the SAS-MAC and CEP integration.
21	20071123	Kubuntu 7.10 desktop 64 bit OS is chosen for all machines except the BG/L and MAC/SAS machines
22	20071123	Station calibration work is smeared out over Step 4 and Step 5.
23	20071123	Global bandpass shape is moved to Step 5 because of its low priority.
24	20071211	Multiple beams per observation will be implemented instead of multiple observations (this is consistent with the plan).
25	20071211	Step 3 will be closed next Thursday. Any open items will be finished in Step 4.
26	20080130	Multiple beams are defined as multiple directions with the same set of antennas. Hence, only the angle, subbands and beamlets can be modified per beam.
27	20080206	Step 4 and Step 5 for MAC/SAS will be changed. The control of the offline pipeline will be postponed because the offline subsystems are not fixed yet. Currently the definition and design of the metadata flows will be set as goal for Step 4 and the implementation of the metadata flow will be the end goal of Step 5. Hence, after Step 5 (part of) the metadata is included in the Measurement Set.

28	20080213	Currently a single subband and single beam is stored in a Measurement Set. As soon as we are ready for mosaicing this probably should be changed in the future.
29	20080220	For storing the raw station beams the sanitizing operations like input buffer will be included in the online part. For this OLAP has to give operational support or instructions to the observers how to start up manually such observations. Since, this is an between solution this will not be automated via SAS/MAC.
30	20080227	Weekly build environment will be updated and automated.
31	20080227	After Step 5 the software documentation will be updated and obsolete packages will be removed.
32	20080423	Basically two Low Band modes will be supported initially: a LBL and LBH mode. The connection between antennas and RCUs have to be chosen such that those to modes make sense.
33	20080528	The position of all individual dipoles will be made available centrally in the database.
34	20080603	The data format of the positions will be delivered in ETRS coordinates by the roll out team. However, the data format of the positions will be stored in ITRF format in the LOFAR databases. Hence, all software and configuration files dealing with coordinates must be made compatible with the ITRF dataformat. Hans van de Marel is responsible to convert the ETRS coordinates to ITRF coordinates for the LOFAR system.
35	20080903	Kubuntu will be installed on LOFAR18, which will serve as a software development machine.
36	20081022	Station cabinet will be heated (if necessary) to 10 degrees Celsius (for the LCU).
37	20081029	We will transfer the build environment to cmake.
38	20081029	Step 1 will be closed at 11 November.

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Table round

- Michael: We need a tool to track issues. Postponed to next meeting.
- Michael: We like to plan a pulsar busy week from 17-21 November. In this week is should be possible to "claim" any developer for solving issues.