Minutes of Meeting LOFAR Software

Date:	2008-03-19
Next meeting:	2008-04-01 9:15-10:15
	Paviljoen West room
Present:	
Andre Gunst	Yes
Ronald Nijboer	Yes
Ruud Overeem	Yes
John Romein	Yes
Michael Wise	Yes

cc: Arthur Coolen, Jurjen Sluman, Pieter Donker, Chris Broekema, Martin Gels, Joris v. Zwieten, Marcel Loose, Adriaan Renting, Ger van Diepen, Max Avruch, Peter Boonstoppel, 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

- Mark Bentum will leave ASTRON and accepted a job at the University of Twente. He remains working for ASTRON for 1 day a week.
- LOFAR management has made a decision about the station hardware suppliers and contract negotiations are started.
- Today a meeting will be held about a Million Source Shallow Survey which is planned when the first 20 stations are in the field. The goal is to focus the activities for the coming year such that all functionalities for this survey are in place.
- The WAN procurement offers are received and the selection process will start now.
- Sven Duscha was last week here and introduced in the LOFAR project.
- Martin Gels his contract is extended for 1 month.
- A LOFAR plenary will be held at 31 March 2008.

Action item overview

ID	Date submitted	Description	Owner	Planned date	Status
46	20080109	Testing SAS/MAC on CS001T with the new OLAP software. SAS part is producing a parameter set which can be used by OLAP. Almost done. The connection to Groningen was down, which needs to be solved. Connection is up and testing is started but not finished yet.	Ruud	20080116	Closed
48	20080116	Plan discussion about HDF5. Several discussions are held.	Michael	20080330	Closed
49	20080116	Simultaneous data storage of TBB and in OLAP to validate inverse poly phase filter bank of Kalpana.	John/Andre	20080204	Ongoing

		Dataformat should be changed. A new format was defined. For multiple beams something in the format needs to be changed.			
51	200080206	Ruud made a meta data chart. John should check the inputs and the outputs of the online subsystem and Ronald of the offline subsystem.	John, Ronald	20080220	Closed
53	200080206	Estimation of work if CS1 is scaled up to 20 stations. See the section before the decisions in the minutes.	John, Ruud, Ronald	20080227	Open
54	20080305	Versions should be included in all the software. The executables should be able to print the version number.	John, Ruud, Ronald	20080312	Closed

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Progress

Stations (André):

Achieved since last meeting:

- Eric Kooistra implemented ARP in the FPGAs and that works. However, it is still desired to route the data with static MAC adrresses defined in the switch to prevent broadcasting if the BG/L is down.
- The station calibration algorithm is functionally validated with a LBA data set. The next step is to implement this in the LCU.

Problems / current activities:

- Long distance delay tracking is not tested again
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Next actions:

- Step 4

OLAP (John):

Achieved since last meeting:

- Succesfull pulsar observations have been done by Martin.

Problems / current activities:

- Martin is busy with testing the integration of multiple beams with MAC/SAS.
- Chris is working on the CEP white paper.
- John was busy writing raw data after the buffer in the BG/L solution, which is necessary for the Kalpana experiment and for pulsar observations. This includes coarse delay tracking.
- John discovered that one link of CS010 was degrading. Operations have not solved this yet.
- Robustness for failing disks is not included yet (Arnold Meijsters).

Next actions:

- Step 4

Offline pipeline (Ronald):

Achieved since last meeting:

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Problems / current activities:

- Marcel and Joris worked on the global solver. They need input on the size of the solve domain.
- An agreed specification document must be written first before writing software for the Global Sky Model.
- Ger is writing a converter to convert the LOFAR parset format (distributed by SAS/MAC) and CONRAD parset.
- The distributed imager has problems with 64 bit machines (low priority).
- Open tasks which are not assigned yet due to lack of people:
    - documentation of the imager,
    - profiling of the imager,
    - speed up of the BBS parameter database (question: is this the bottle neck?),
    - global sky model,
    - station beam modeling and validation (LBA and HBA),
    - flagger
    - source finding
- Maaijke is ready to start implementing an ionospheric model, but it is not clear yet which model to implement. It is wise to implement a framework wherein the model can be included.

Next actions:

- Step 4.

SAS + MAC + SHM (Ruud):

Achieved since last meeting:

- The problems between the JAVA and C++ in SAS are solved.
- Step 4 can be finished if the integration tests with OLAP are succesfull.

Problems / current activities:

- Pieter is busy to work on the cable length compensation, which must be set from the LCU. Furthermore he is working on the temperature control with a low priority.
- Arthur is working on Navigator 2.0 screens.

- Ruud cleaned MAC trees. Now there are fewer dependencies.
- Pieter is working on supporting ARP in the LCU.
- Ruud will check with Pandey the DP3 interface.

Next actions:
- Step 4

User Software (Michael):

Achieved since last meeting:
- Joe was successfully sending data from the TBBs to the storage nodes.
- Raw beamformed data is successfully packed in the defined format.
- Lars is busy to create dynamic spectra from TBB data.
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Problems / current activities:
- Alexander writes a requirements document for the mosaicing feature.
- Lars is busy with the near field imager (skymapper).
- Joe started working on the hooks in DAL to include metadata (some of the metadata should end up in the header of the dataproducts).
- Alexander is checking how much work is required to connect DAL to CASA core for using the HDF5 data format.

Next actions:
- Review activities for Step 4.

Software integration

Achieved since last meeting:
- Michael joined a meeting with NOVA and we can continue with the software plan. Next ISC (Instrument Steering Committee) the commissioning should be filled in. Basically we get the money.

Problems / current activities:
- Marcel is busy with streamlining the build environment
- Compile a list of anticipated data products and calibration or metadata files associated with each of the pipelines.
- LOFAR development software needs to be build in Kubuntu (Michael has volunteered)

Next actions:
- Define the length of Step 4.

- Step 2+: 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.

Scaling up work for 20 stations

Stations:

- For the stations the split HBA field boards must be produced and tested in the field.
- The firmware for the HBA field split must be written.
- Additions in the LCU software for the HBA field split are required.
- One central clock should be implemented in the super station.
- HBA calibration should be in place

OLAP:

- Should be made suitable to handle multiple independent RSP datastreams without correlating all of them (now OLAP correlates also the different RSP datastreams from the same station to support microstations).
- The network surrounding BG/L should be modified in order to split BG/L in four independent partitions.
- Possibly optimizations in the IO nodes to cope with the 32 MHz bandwidth.
- Making the storage section fault-tolerant and more efficient by using multiple compute cores.

SAS/MAC:

- Finishing Navigator 2.0
- Making screens for the 20 station configuration

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.

Last: 31

Table round

- Question (Ronald): can you make the LOFAR plenary presentations available for all who are travelling to Perth? Answer (Andre): yes.

- Question (Andre): Can we increase the number of beams in practice to more than 8 when more LCU processing power is added. And how many machines can be added in this way? Answer (Ruud): Without modifications you can install maximal three LCUs, which all do their own processes. For example one LCU runs the RSPDriver, another one the BeamServer and the last on the CalServer. In this way one machine can be made totally responsible for calculating weights for all beams. Performance tests will be done as soon most of the software is installed on the LCU (including station calibration which requires more load than originally anticipated due to scintillation effects). Even more LCUs are possible after modifications.
- Ronald will be off from 31 March – 11 April (conference in Perth).
- Michael is absent from 24-28 March.