ONLINE UPGRADATION

What is the online, how does it work. Problems and limitations of the present online. Why do we upgrade the online. Will it rotate the antennas faster. Will it save the setup time. Can we get the more on source time. Can we schedule the observations easily. Will it improve GMRT operations. Will it be user friendly. Will it be more automated and intelligent. What is not there and what can be done (improvements). What about stability. Can a GTAC user watch his/her observations online. Can a GTAC user get all kinds of observing help online. What are the major advantages after the upgrade.

SOME IMPORTANT POINTS WHILE DESIGING THE NEW ONLINE

1. HARDWARE INTERFACE LAYER (MCM – ANT)

2. COMMUNICATION LAYER (ANT - ONLINE)

3. USER INTERFACE & COFIGURATION LAYER
   (USERS & ONDISPS)

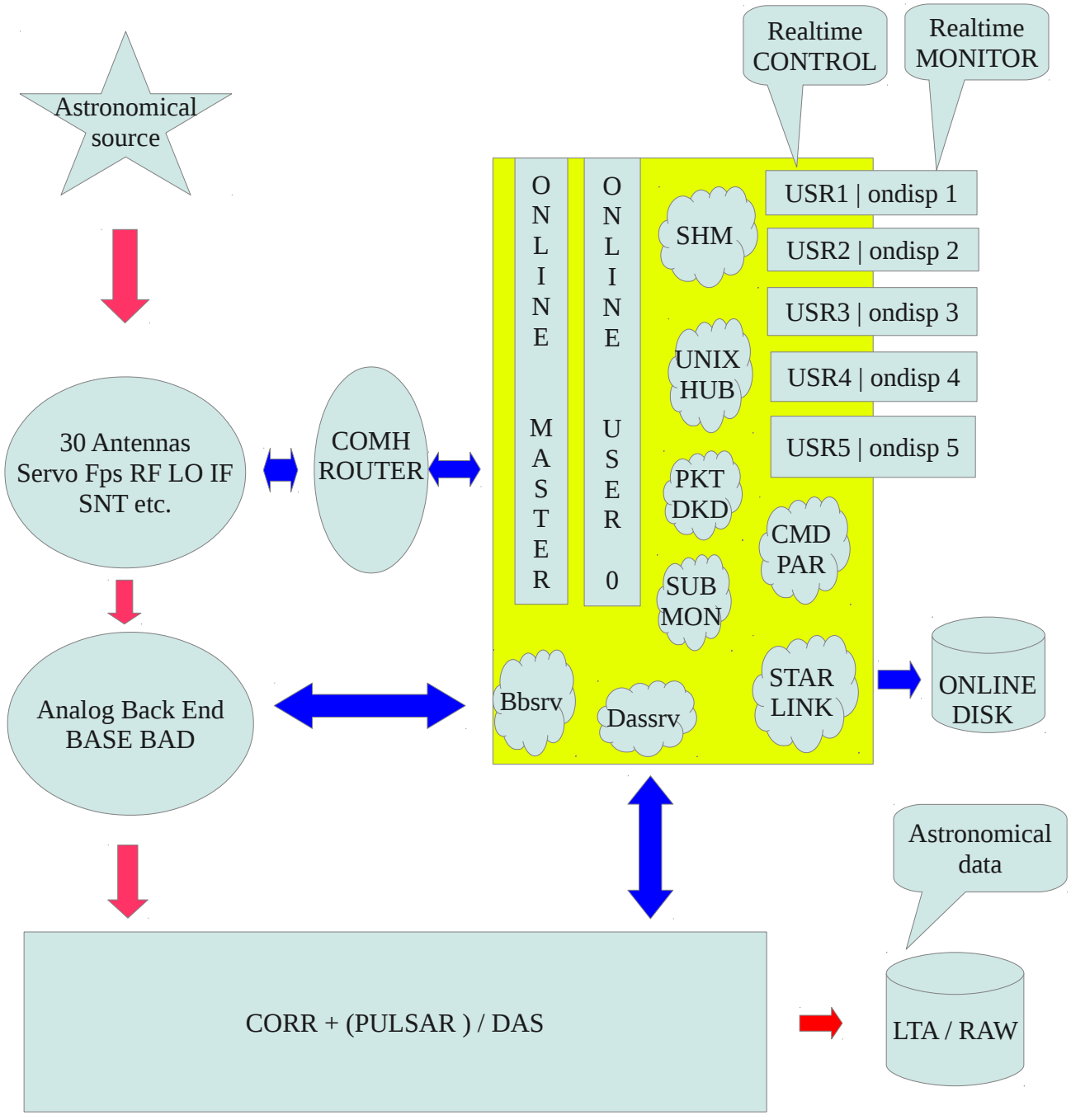
4. BACKEND CONTRL LAYER (BBSRV, DASSRV)
   (DIGITAL & ANALOG BACKEND CONTROL)

5. MONITOREING LAYER (WEB MONITOREING)

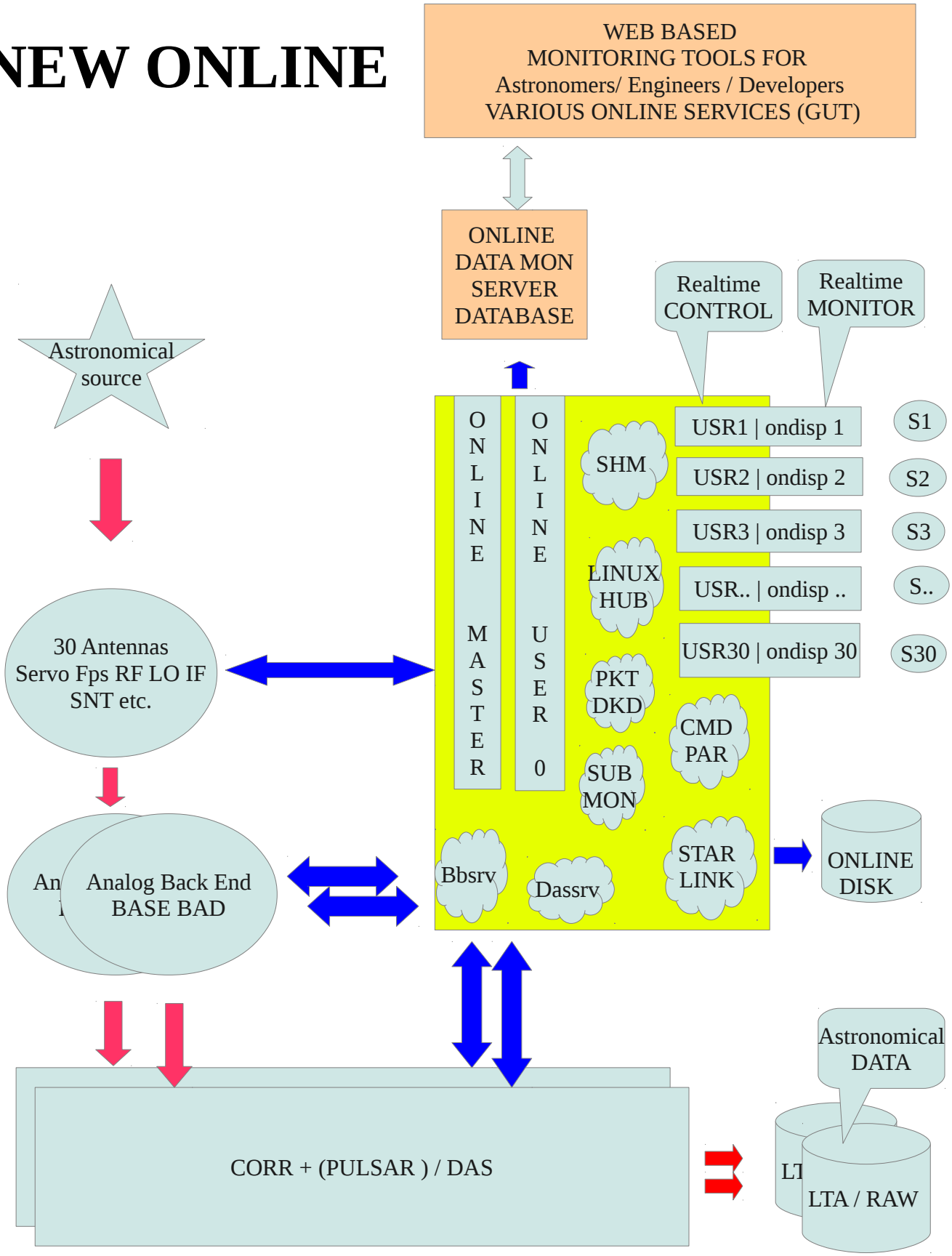
6. OBSERVING HELP LAYER (GUT)

7. DIGITAL BACKEND MONITORING LAYER
   (MATMON, Phases, band shapes, rfi etc.)

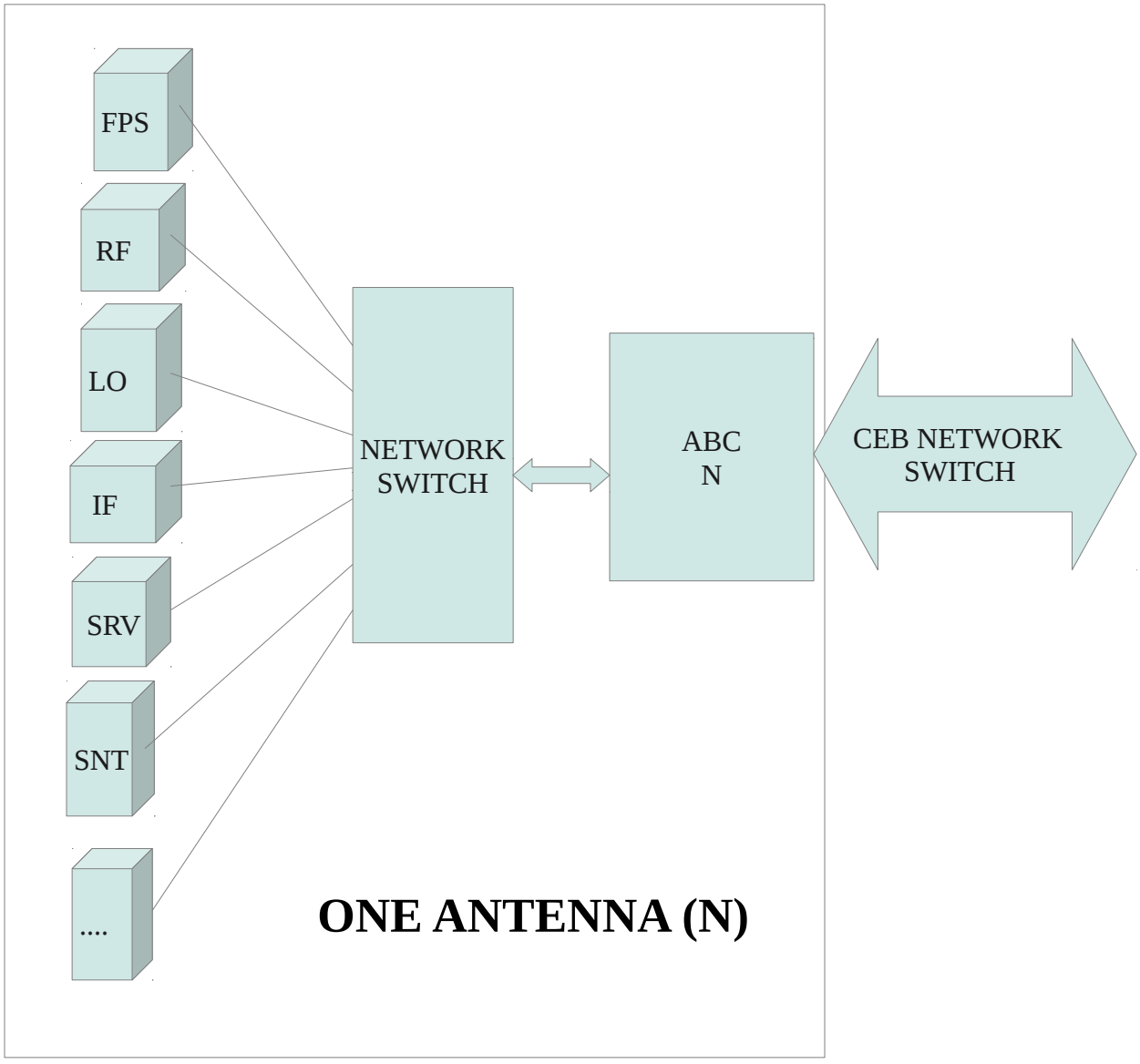
OLD ONLINE


Realtime CONTROL
Realtime MONITOR
Astronomical source
ONLINE MASTER
ONLINE USER 0
USR1 | ondisp 1
USR2 | ondisp 2
USR3 | ondisp 3
USR4 | ondisp 4
USR5 | ondisp 5
SHM
UNIX HUB
PKT DKD
CMD PAR
SUB MON
STAR LINK
Bbsrv
Dassrv
30 Antennas Servo Fps RF LO IF SNT etc.
COMH ROUTER
Analog Back End BASE BAD
ONLINE DISK
Astronomical data
CORR + (PULSAR) / DAS
LTA / RAW

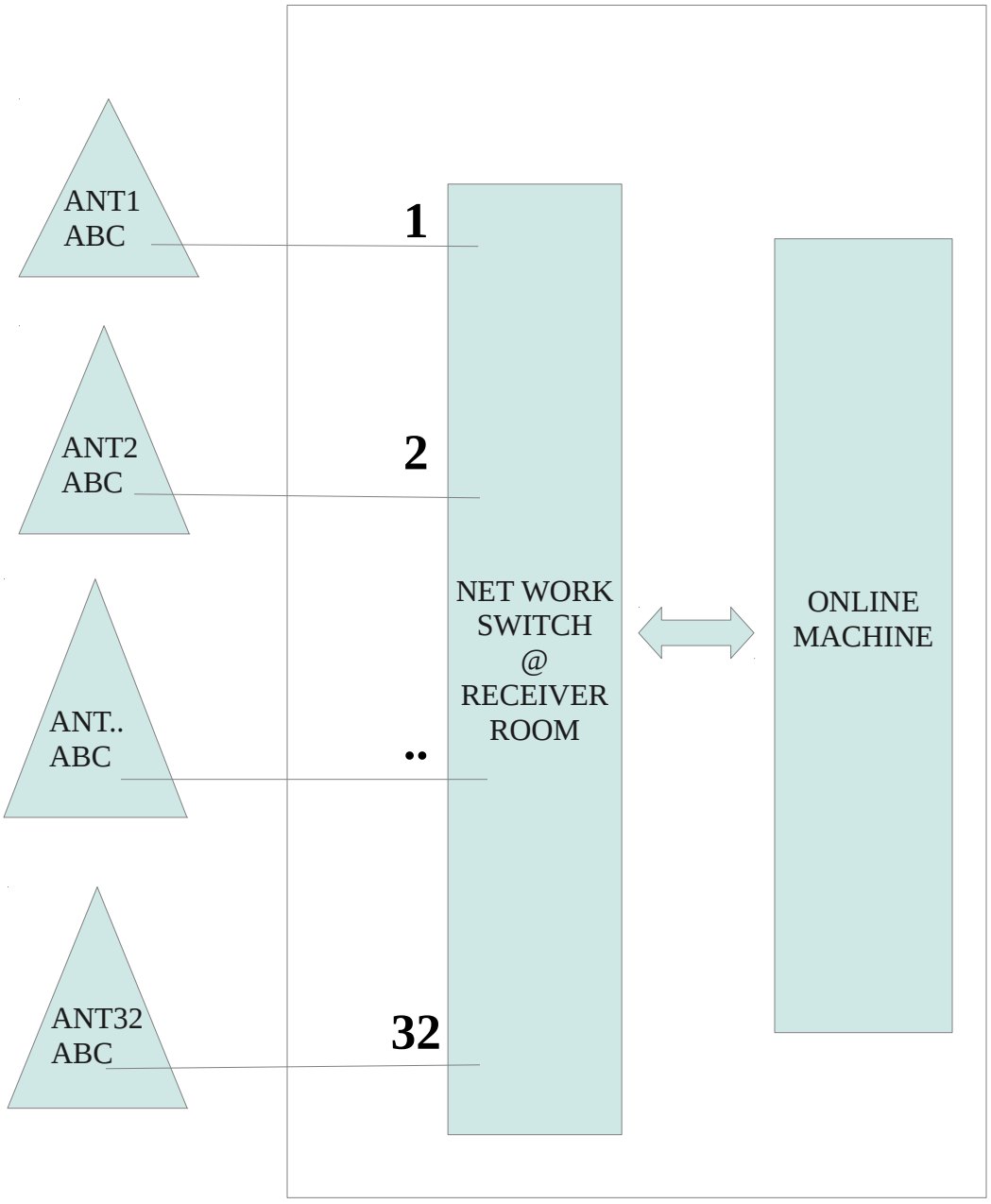
NEW ONLINE


WEB BASED
MONITORING TOOLS FOR
Astronomers/ Engineers / Developers
VARIOUS ONLINE SERVICES (GUT)
ONLINE
DATA MON
SERVER
DATABASE
Realtime
CONTROL
Realtime
MONITOR
Astronomical
source
ONLINE MASTER
ONLINE USER 0
SHM
LINUX
HUB
PKT
DKD
SUB
MON
CMD
PAR
STAR
LINK
Bbsrv
Dassrv
USR1 | ondisp 1
USR2 | ondisp 2
USR3 | ondisp 3
USR.. | ondisp ..
USR30 | ondisp 30
S1
S2
S3
S..
S30
30 Antennas
Servo Fps RF LO IF
SNT etc.
Analog Back End
BASE BAD
ONLINE
DISK
CORR + (PULSAR) / DAS
Astronomical
DATA
LTA / RAW

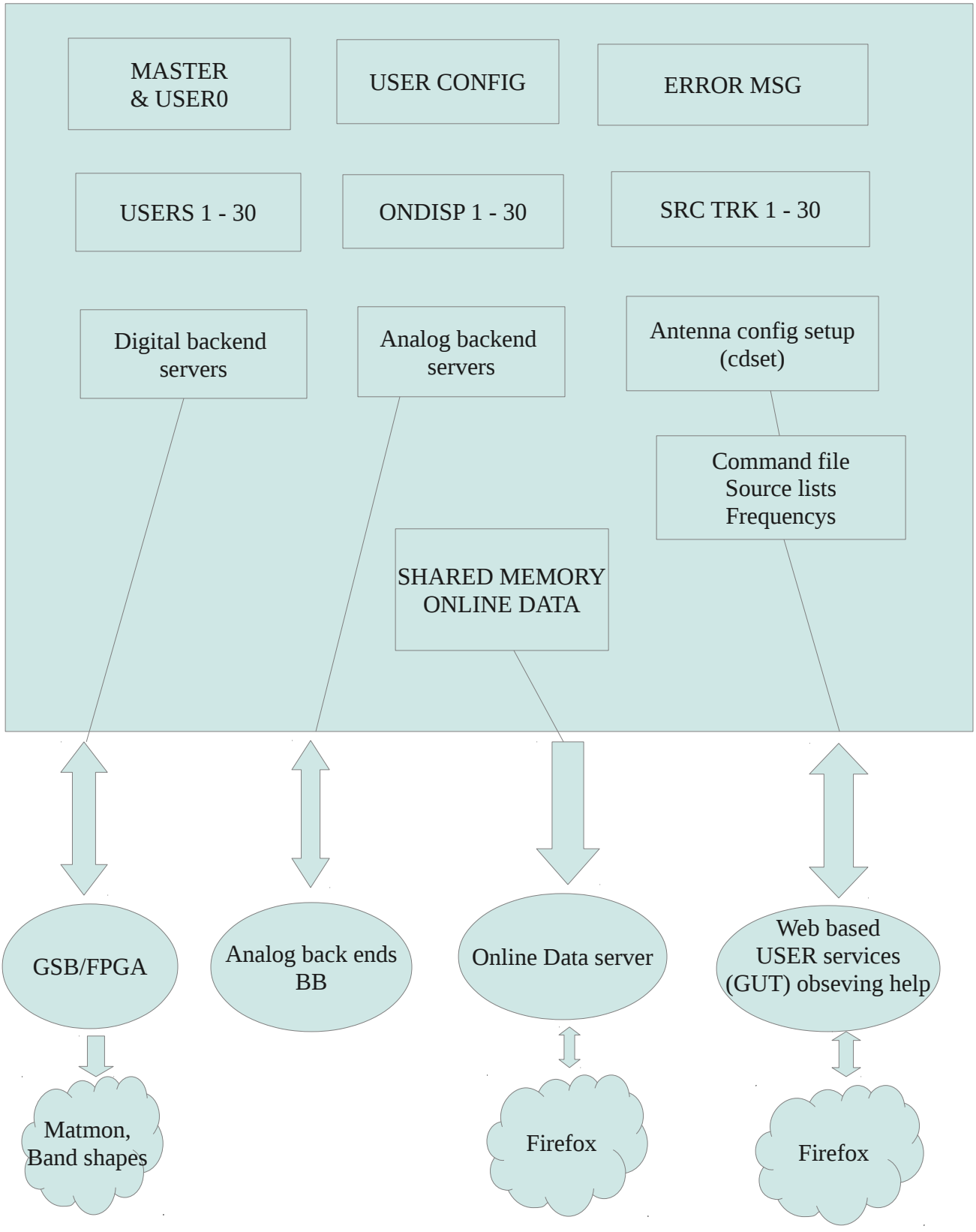
Hardware communication layer
At Antenna base.



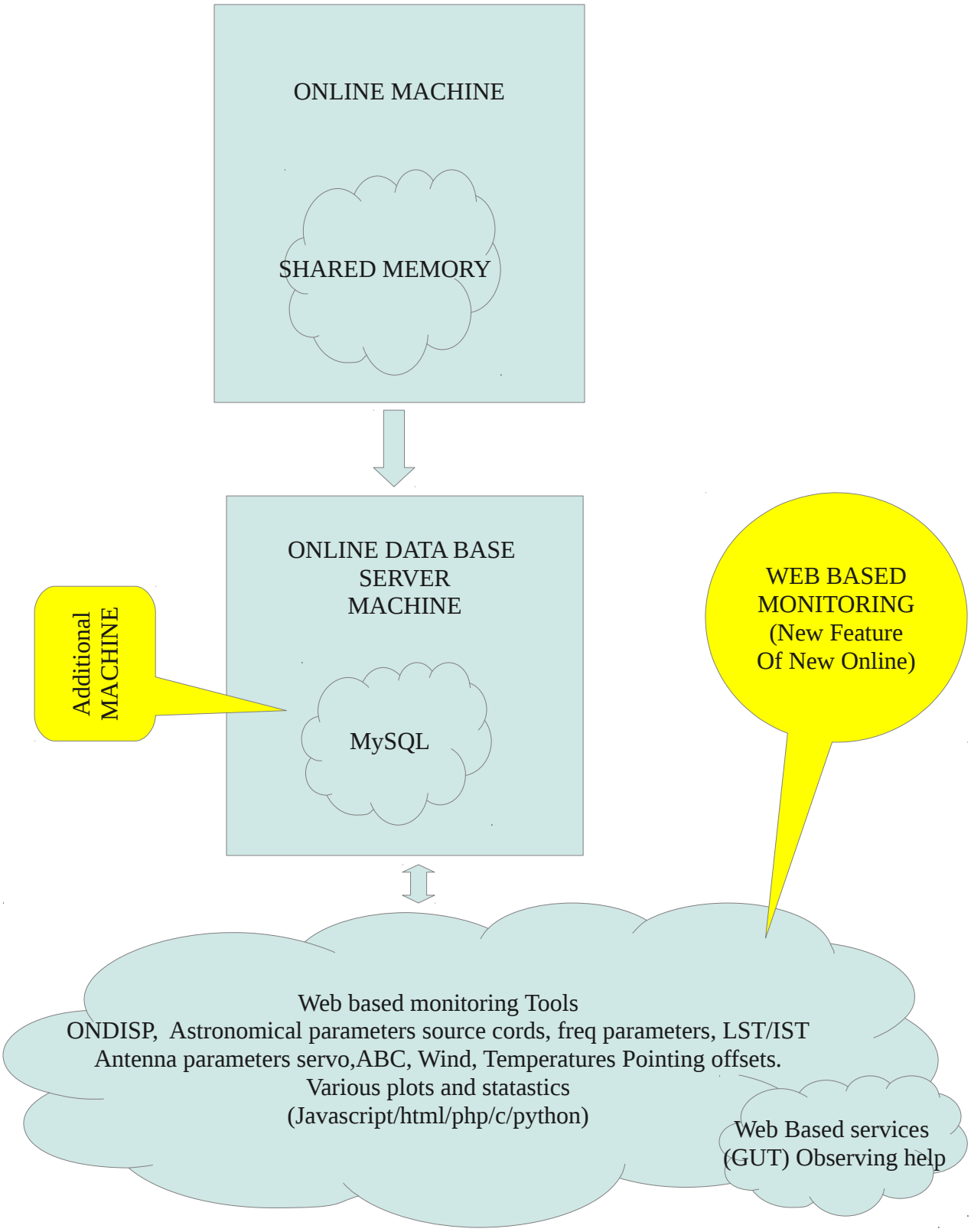
Ethernet Communication layer



USER INTERFACE, CONFIG
BACKENDS, OBSERVING HELP LAYER



ONLINE MONITORING LAYER



(O)LD ONLINE V/S (N)EW ONLINE (POINTS)

1. Communication
O> Online to antenna communication is serial port based.
N> Online to antenna communication will be Ethernet based.

2. Communication hardware
O> Telemetry/COMH hardware is required, ABC is the microprocessor.
N> Telemetry/COMH hardware is not required, ABC is the normal PC. Network switches will be used.

3. Analog back end control
O> Controls only one analog backed (Base band)
N> It will control one or many back ends (old + new base band), without disturbing to each other.

4. Digital back end control
O> it controls only one digital back ends (GSB[INT+PSR])
N> it will control more than one digital back ends (GSB+FPGA), without disturbing to each other.

5. User Interface
O> AIPS shell is used for user input
N> QT will be used for user inputs.

6. Real time monitoring of antenna status.
O> "curses" lib is used for real time monitoring (ONDISP)
N> "QT" will be used for real time monitoring (TELIDISP)

7. Real time monitoring of Antenna position (SERO TRACK)
O> GNUPLOT is used to show the antenna positions
N> "QT + libs" will be used.

8. Control Machine (Single machine)
O> SUN micro system machine is required for the online.
N> Any powerful general purpose machine with LINUX.

9. Online Coding
O> Online coding is FORTRAN+ C based
N> C/C++ based.

10. Human control
O> single operator controls the entire operation of GMRT.
N> yes.

11. User Inputs / Multiple sub arrays
O> only 5 sub arrays can be configured.
N> max 32 sub arrays can be configured.

12. Online data monitoring
O> data monitoring server is not available, one has to rush to control-room to see the data.
N> data monitoring server will handle all the monitoring, one can access online data from the web, no need to rush to control-room.

13. Multiple sub array configurations
O> it is complicated process.
N> it should be simple like GUI with authentication.

14. Hard rule for adding and removing antenna
O> One can not remove or add the antenna from sub array while the scan is running.
N> It should be simple like GUI with authentication

15. Online reboot time
O> It takes minimum 15 minutes to restart.
N> It should be faster.

16. Parallel commands
O> parallel commands to the individual or same antenna is not possible
N> It should handle parallel commands to the individual antennas or same antenna through different users.

17. Power equalize
O> sequential process it takes lot of time
N> process will be parallel, it will be very fast.

18. Loading pointing offsets
O> sequential process it takes lot of time.
N> process will be parallel, it will take very less time.

19. Interrupt to the DAS chain
O> Once DAS chain is interrupted from the online side one has to restart the CORR.
N> It should reconnect to the CORR without any problem.

20. Handling the multiple digital back ends
O> handling multiple digital back ends is a complex process, second back end has to depend on the first backed.
N> Multiple backed should be handled interdependently with passing arguments to the strtndas and stpndas commands.

21. Intelligence in command file.
O> very little intelligence.
N> command file should have the enough intelligence to Handel the following situations.

As soon as the source is set skip the scan and take next action.
Wait till the source is not up.
“if else” and “goto” some block statements should work.
Wait till the source tracks the source.
It should read, write and execute with system.
It calculations and variables should be allowed.

22. Control over the commands
O> Once the command is issued one can not cancel it.
N> command should be canceled.

23. InitABC
O> It takes more time and required whenever ABC is reset.
N> It will not be there, it is the restart of PC.

24. SET UP after power failure.
O> ABC do not restore anything.
N> All setup will be preserved in ABC, no need to setup it again.
ABC will take care of it.

25. Intelligence in ABC
O> not much intelligence
N> enough intelligence to take all kinds of actions like parking of antenna during windy season or when no communication from control-room in case of OFC cut.

26. multi sub array pointing.
O> very tough
N> possible

27. Loading pointing model offsets.
O> it takes ~ 3minutes to load or remove the model.
N> it will be more faster (few seconds only)

28. STABCT commands
O> it is required to synchronize the online-abc-servo time
N> Not required frequently can be avoided, new servo has a good clock.

29. Global command file in case of multisubarry.
**O> In can of multisubbary one has manullay issue the same commands separately in to the individual subarrays. **
N> One can use the single command file to handle the both the subarray

30. Multipal command file in multipal subarrays.
O> not possible
N> possible

31. Antenna control
O> subarray contrler and user
N> only user, subarray controler is not required.
One can user Tracking subarrays and Das subarrays.

32. Antenna configurations.
O> needs local programs to generate the HEX code (cdset4 and set4rf)
N> local programs are not required, instead of that one can say
set rf 1280,
set lo 1210,
set if 32 alc on

33. HOLD and STABCT every after 10 minutes.
O> required to remove the antenna brakes.
N> time(sleep) command will be enough intelligent such that it will internally send hold command to the problematic antenna only after certain intervals.

34. IN/OUT TRACK
O> one has to change the track manully.
N> one can change the track auto or manually.

35. Command file and source list.
O> command file and source list are tow separate files, source list has fixed with format.
N> command file and source list can be combined or can be used separately. Source list format will be simple, new online will support to old source list and old command files.

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ONLINE MONITORING TOOLS

OLD ONLINE

Old Online is SUN machine dependent. One has to rush to control-room and look the data or replay the log files. Replay is not possible on any other machine. One has to take the help from operators. Data plotting/displaying utilities are not well developed. Data base server is not available for the present online data. Presently a small amount of online data is transferred to the "KRITHIKA" for web based monitoring.

NEW ONLINE

In New online, online data will be send to data base server and it will be logged in to the data base. One can access this data from the web remotely. No need to rush to control-room. Many utilities will be available to see the data like plotting of various parameter (wind, temperature, pointing offsets, ABC/MCM time outs, servo parameters any error messages etc.) It will also display astronomical parameters (source name , coordinates, frequency parameters, LST/IST scan time corr parameters etc). Data monitoring server will the separate machine and it will not run on online machine. If something going wrong on the data base then online should not get affected. GTAC observations should be running fine even if the data base server is down. Hence the new online will have the two machines 1. Online machine and 2. data base server.

OBSERVING HELP / SERVICE LAYER (GUT)

GUT Will be web based.