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Virgo Channels List Data Base

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1 Introduction

This document describes the list of channels available in Virgo and the mechanism implemented to update online a channels database accessible through a web interface. Section 2 describes the chDB server and the php code that update the channels database. Section 3 is a quick user's manual of the database web interface. Section 4 provides the general naming rules of most of the channels.

2 Channels database

The main idea is to set up a MySQL database which, on one hand, will be updated periodically by an automatic process reading the Virgo data and, on the other hand, will be filled manually for what concerns the description of the content of each channel.

As shown on figure 1, a MySQL database is filled periodically thanks to php scripts and thanks to the chDB.exe server which is activated every 2 minutes by a chDB.sh script. It reads the last raw data file written on disk. From those data under frame format [1], chDB extracts information about each channel and writes it in a XML file: /virgoData/chDB/chlist.php. This file is read by a php script /opt/w3/MonitoringWeb/olweb/html/itf/channelsdb/getChannels.php to fill and update the channels database.

The getChannels.php script runs every 5 minutes, truncates the tblChannels table in the MySQL database, reads through the supplied XML file and inserts the data anew.

The tblChannels table is linked in a one to many relationship with tblChannelDesc and tblChannelSource, which provide user-entered information relating to the description and source of each channel.

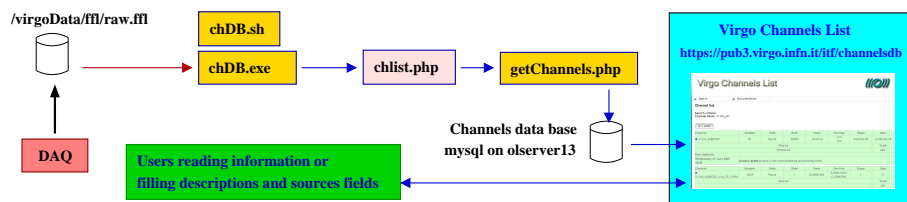


Figure 1: *Virgo online channels list mechanism: a C code read the raw data files and produces a XML file which is read by a php script to update the channels database. A web interface allows then to read the information or to complete it manually with the source and description fields.*

Syntax is: **chDB.exe** [fileName] [xmlfileName (optional)]

where [fileName] is the path and name of the data file to read (default is /virgodata/ffl/raw.ffl)

and [xmlfileName] is the path and name of the XML file to output (default is /virgoData/chDB/chlist.php).

Current version of chDB uses the Fr package. To install the chDB software, just get the directory /virgoApp/chDB/xxx and run the compiling script "makechDB" in mgr

directory. If you have the CMT package, go into cmt directory, then type "cmt config" and "gmake".

To setup all the tools needed by the channels database, you need also the package Channelsdb which is CVS-ed, like chDB.

3 How to use the channels database web interface

The Channels DB MySQL database is located on olserver13 - a host that is only available within the Virgo site network. However, thanks to the sharing of the online area of this machine with pub3 (a host that is available on the other side of the firewall to olserver13), the application is also visible externally too.

To access the channels database content, two locations are thus available:

<https://pub3.ego-gw.it/itf/channelsdb/>

<https://olserver13.virgo.infn.it/itf/channelsdb/>

Through this web interface, you can either list the channels to get information or edit and save the source and description fields of one or several channels (using cut and paste). This interface presents several fields that must be filled by the user to select the list of channels to be displayed:

- **Channel's_name:** If you write here "Pr_B*_DC", you get all the channels whose name begins with Pr_B and finishes with _DC
- **Type:** You can choose between ADC, PROC and SMS. ADC are channels acquired at sampling rates above 1 Hz. SMS are slow monitoring channels acquired at sampling rates below or equal to 1 Hz. PROC are processed channels like the h_20000Hz or outlierMoni_Pr_B1_ACp_whitened. If you select nothing, then all the channels, whatever their type, will be listed.
- **Number:** The sequence number of a channel in the database. You can select a range of sequence number. This is not often useful for the common user.
- **Units:** Select here the units (Volts, Watt, mrad...) of the channels you want to list. If you select nothing, then all the channels, whatever their units, will be listed.
- **Rate:** Select here the sampling rate (in Hz) of the channels you want to list. If you select nothing, then all the channels, whatever their rate, will be listed.
- **Keyword:** If you write "photodiode global control", then all the channels which have those three words in their description field will be listed.
- **Description:** If you select "Channels without description", then all the channels which have not yet a description will be listed .

Then, a list of channels is shown, where, for each channel. First line contains the automatically updated information:

- the channel's name
- the units (Volts, Decibels, mbar, etc...)
- the sampling rate (in Hz)
- the mean value computed over the last second
- the min and max values computed over the last second
- the type of channel (ADC, PROC or SMS)

Next lines contain the manually updated information:

- the source of the channel (Cm Name of the acquiring server or RIO number or name of a contact person)
- the description of the channel (including any additional useful information like anti-alias filter used, input impedance, etc...)

The web interface provides a link to an html documentation containing a summary of this document and currently located in

<http://wwwcascina.virgo.infn.it/DataAnalysis/chDBdoc>

4 Channels naming convention

A first document, written in 2001 [2], described the list of channels available and the naming conventions used in Virgo. Most of what is written below is taken from this document. For detailed information about naming convention, you can still refer to [2].

All the channels in Virgo have a name beginning with V_n , where n is used to indicate different detectors. During VSR1 science run (May-Oct 2008), This prefix was V1. To each subsystem of the Virgo interferometer corresponds a prefix in the channels names. Next fields are subsystem dependent but the generally adopted name convention is the following:

Vn:[System]_[Location/Object]_[Sublocation/subobject]_[signalName]

The following systems are currently available:

Alp	Automatic Locking processes signals
Bs	Beam source signals (Injection system signals)
Ca	Calibration signals
Daq	Data Acquisition signals
Em	Environment monitoring signals
Gc	Global control signals

Gx	Camera signals
Hrec	h reconstruction signals
IMAC	Infrastructure and air conditioning signals
IMMS	Infrastructure and UPS signals
Oo	Output optics signals
Pr	Photodiodes readout signals
Qc	Detector monitoring and data quality signals
Sa	Suspension signals (upper stage)
Sc	Suspension signals (lower stage)
TiM	Timing system signals
To	Tower vacuum system signals
Tu	Tube vacuum system signals

The online processing algorithms produce channels whose prefix is the name of the algorithm (for instance V1:TiMoni_*, V1:NonStatMoni_*, V1:lrmv1_*, V1:outlierMoni_*, V1:VirgoHACR_*, etc...)

The SpectroMoni process produces PROC data channels whose names are like the following example: spectro_X_300_500_625_1250 : spectrum of channel X, averaged over 300 seconds, with 500 mHz of resolution, computed between 625 and 1250 Hz.

The BRMSMoni process computes frequency band rms whose values are in channels X_rms.fmin_fmaxHz, where X is the ADC channel on which the frequency band rms has been computed between fmin and fmax.

Any channel's name in the 50Hz data stream has the suffix ".50Hz" if a resampling was needed and no suffix otherwise.

The channels produced in the trend data stream have the following naming convention: A slow monitoring data channel serName.varName becomes the trend data channel serName_varName.

An ADC data channel adcName has the following trend data channels: adcName_mean, adcName_min, adcName_max, adcName_rms.

4.1 Acronyms used in channels names

You will find below the meaning of acronyms used in the channels names:

ACp	: Demodulated signal in phase
AC	: Acoustic probe
A1	: Alignment
B1	: Beam at dark fringe port of the interferometer, after Output Mode Cleaner
B1p	: Beam at dark fringe port of the interferometer, before Output Mode Cleaner
B1s	: Beam at dark fringe port, reflected by Output Mode Cleaner
B2	: Beam going back to the laser, between IMC and EOM
B5	: Beam from North arm reflected by second face of Beam Splitter (Beam in the Power Recycling Cavity)
B7	: Beam in the West arm cavity

B8 : Beam in the North arm Cavity
BC : ??
BD : Building
BDCE : Central Building
BDNE : North End Building
BDWE : West End Building
BMS : Beam Monitoring System
Bs : Beam system
BS : Beam Splitter (tower/suspension/mirror/probe)
C0 : C0 building
C27 : Crate 27 of photodiodes
Ca : Calibration
CE : Central Building
CR : ??
DARM : Differential arms length control
DC : Continuous part of the signal
DE : Detection
DL : Detection Lab
DL : Down Left
DM : Detector Monitoring
DR : Down Right
EIB : Laser Injection Bench
Em : Environment monitoring
EOM : Electro-Optic Modulator
F7 : Last Filter of the Suspension chain
F0 : First Filter of the Suspension chain
Fbs : Slow Frame Builder
Fbf : Fast Frame Builder
Fbm : Main Frame Builder
FFh : Far Field horizontal
FFv : Far Field vertical
Fmod : Frequency of modulation
Gc : Global control
Gx : Galaxy Server (monitoring of beam or mirror's position)
HU : Humidity
IB : Injection (tower/suspension/bench)
IPSCB: Voltmeter on IPS power line, in DAQ room
IMC : Input Mode Cleaner
IP : Inverted Pendulum
La : Laser
LB : Laser Bench
Li : Spectral line injected on a suspension lower stage
LL : Laser Lab
MA : Magnetic probe
MC : Input Mode Cleaner (tower/suspension/mirror/probe)
MICH : Michelson interferometer (BS-NI-WI) control
ML : Master Laser

MOD : Modulator
M1h : Mirror 1 horizontal motion
M1v : Mirror 1 vertical motion
N2 : North tube section 2
NE : North End (tower/suspension/mirror/probe)
NT : North Tower
NF : Near Field
NI : North Input (tower/suspension/mirror/probe)
NSNS : Neutron stars binary (1.4M, 1.4M)
BHBH : Black holes binary (10M, 10M)
OB : (suspended) Output Bench
OMC : Output Mode Cleaner
Oo : Output optics
PI : Picomotor
PMC : Pre-Mode-Cleaner located on injection bench
POL : Polarized beam
PR : Power Recycling (tower/suspension/mirror/probe)
PRCL : Power Recycling Cavity Length control
PRNE : Pressure in North End tower
PSD : Position Sensing Device
PSDf : Position Sensing Device
PSDi : Position Sensing Device
PSDm : Position Sensing Device
Qa : Quadrant photodiode for alignment
RFC : Reference Cavity
RFCRef: Reference Cavity reflected beam
RM : Reference Mass
SE : Seismic probe
SL : Slave Laser
SR : Signal Recycling (tower/suspension/mirror)
Stol : Raw data storage
SW : Switch (of photodiode for locking input signal)
TE : Temperature
TF : Transfer Function
Ti : Timing system
TO : Tower
TB : Tube
tx : theta x angular motion (around horizontal axis in plane of mirror)
ty : theta y angular motion (around vertical axis)
tz : theta z angular motion (around horizontal axis normal to mirror)
UL : Up Left
UR : Up Right
W2 : West tube section 2
WI : West Input (tower/suspension/mirror/probe)
WE : West End (tower/suspension/mirror/probe)
WNWS : Wind North-South
WT : West Tower

x : horizontal motion in the mirror's plane
y : vertical motion in the mirror's plane
z : longitudinal motion (along the beam direction)
Zeus : lightning detection

References

- [1] Frame Library and frame format: VIR-MAN-LAPP-5400-103 and VIR-067A-08.
See also documentation in /virgoApp/Fr/xxx/doc
- [2] Signals names list: Virgo note VIR-MAN-LAP-5400-114, May 16th 2001