Condition Database
in the COMPASS experiment

- The Condition Database (CDB) and its use in COMPASS.

- COMPASS effort during the development of the CDB package.

- Status of the integration of the CDB package in the Slow Control software (PVSS).

- CDB package in the offline reconstruction software: performance tests (see next talk).

- Further plans.

Andrea Manara
CERN/IT, Universita' di Torino

Condition Database in production at CERN

IT/DB: main developer Stefano Paoli

Based on Objectivity/DB 6.x, but the user interface hides it.
CDB very much evolved from Babar design.

Hierarchical structure: folderset/folder.
- A folderset contains folders and/or other foldersets.
- A folder contains object stored in their validity interval.

An object can be represented as a vector (reals or integers), a STL string or a byte stream.

COMPASS plans to store in the CDB quantities needed for the offline reconstruction of the events:

- Detector calibration constants.
- Detector alignment constants.
- Detector mapping.
- Magnetic field maps.
- Slow Control data.

COMPASS Administrative Tools

Browsing*, reading, sampling, writing.

- cdb_ls

```
drw-r-----      admin  vy    firstDB:/COMPASS
drw-r-----      admin  vy    firstDB:/COMPASS/MWPC
-rw-r-----      MrMwpc vy  firstDB:/COMPASS/MWPC/calib
```

- cdb_read (folder name, reading time)
- cdb_sample (folder name, t_0, t_f, Δt)
- cdb_write_table (folder name, t_0, t_f, filename)
    >>>> username and password required

Tools documentation available at
http::/wwwcompass.cern.ch/compass/software/offline/cdb/
tool.pdf

* GUI browser developed by IT stageaire Cedric Siourakan.

Testing the CDB package

Useful interaction with IT/DB developers during the early stages of the CDB.

- Giving feedback on the implementation of the functionalities mostly needed by COMPASS.
- Developing a suite (C++, Perl) for an automatic testing of new CDB releases.

Test documentation available at:
http::/wwwcompass.cern.ch/compass/software/offline/cdb/cdb_test01.pdf

Status of the integration of the CDB package with the Slow Control software (PVSS)

- PVSS overview.
- Description of the interface for transferring data from PVSS to the CDB.
- Discussion of the results from tests using mock data.
- Extrapolations to what is expected in COMPASS.

The PVSS software

PVSS is a SCADA software.
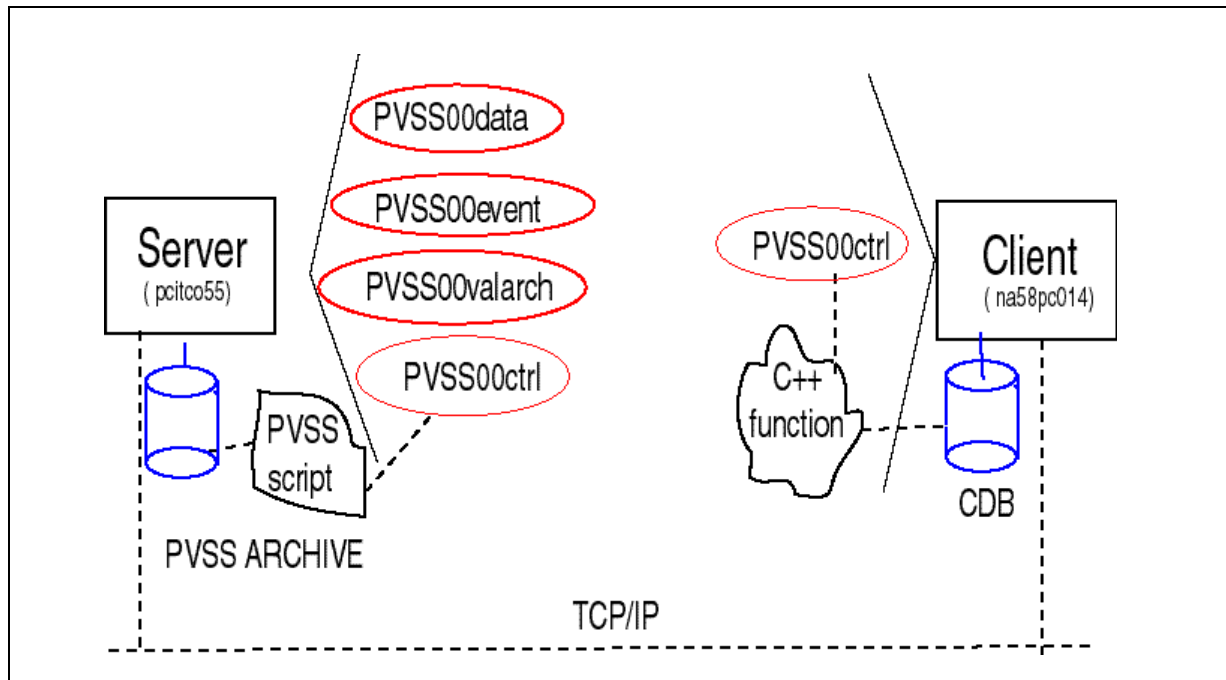Client-server architecture.
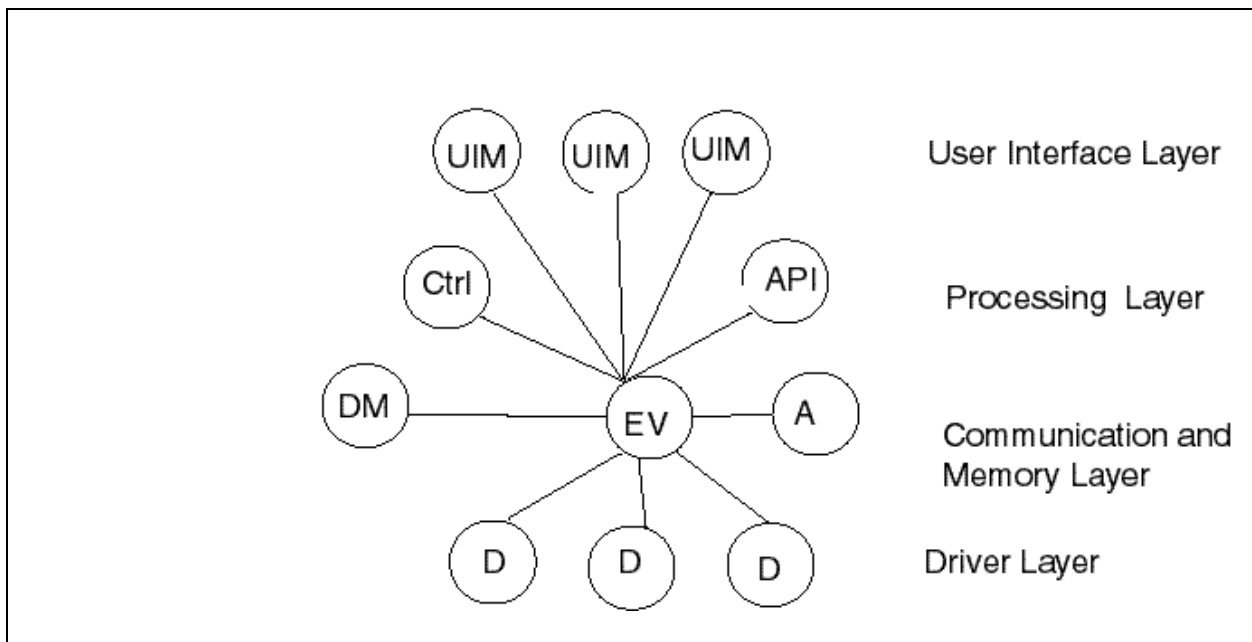
Slow Control variables >>>> datapoints.

For example: temperature sensor >>>> simple datapoint with
a value and a time-stamp.

Slow Control data archived in PVSS internal database.

Need easy access to Slow Control data for the offline analysis
>>>> use Condition Database.
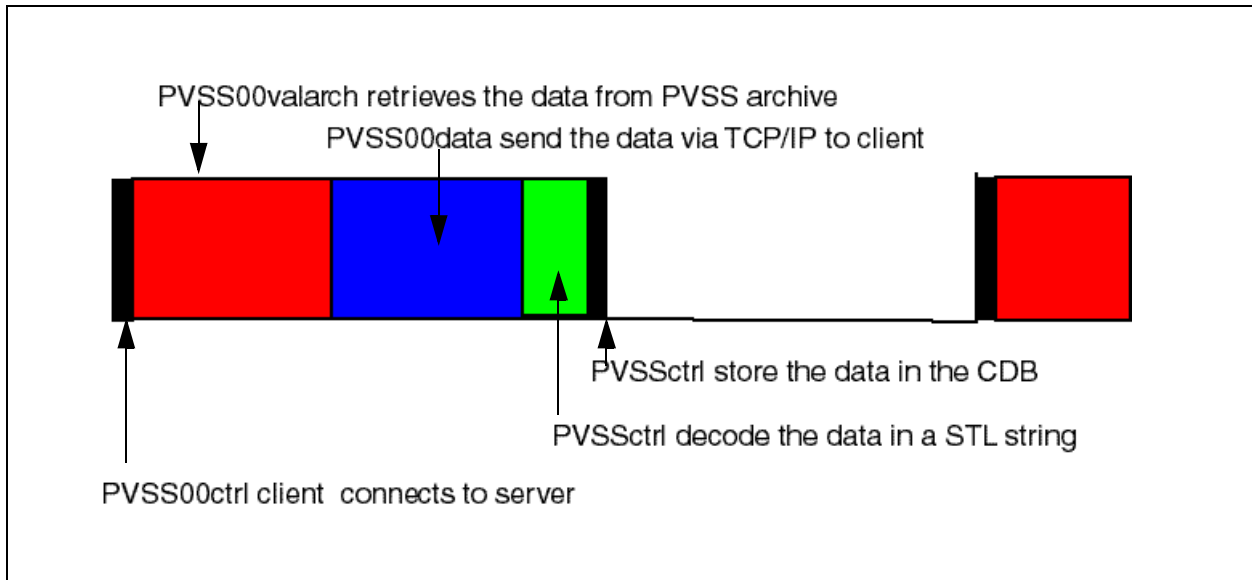
Test system for PVSS-CDB communication.

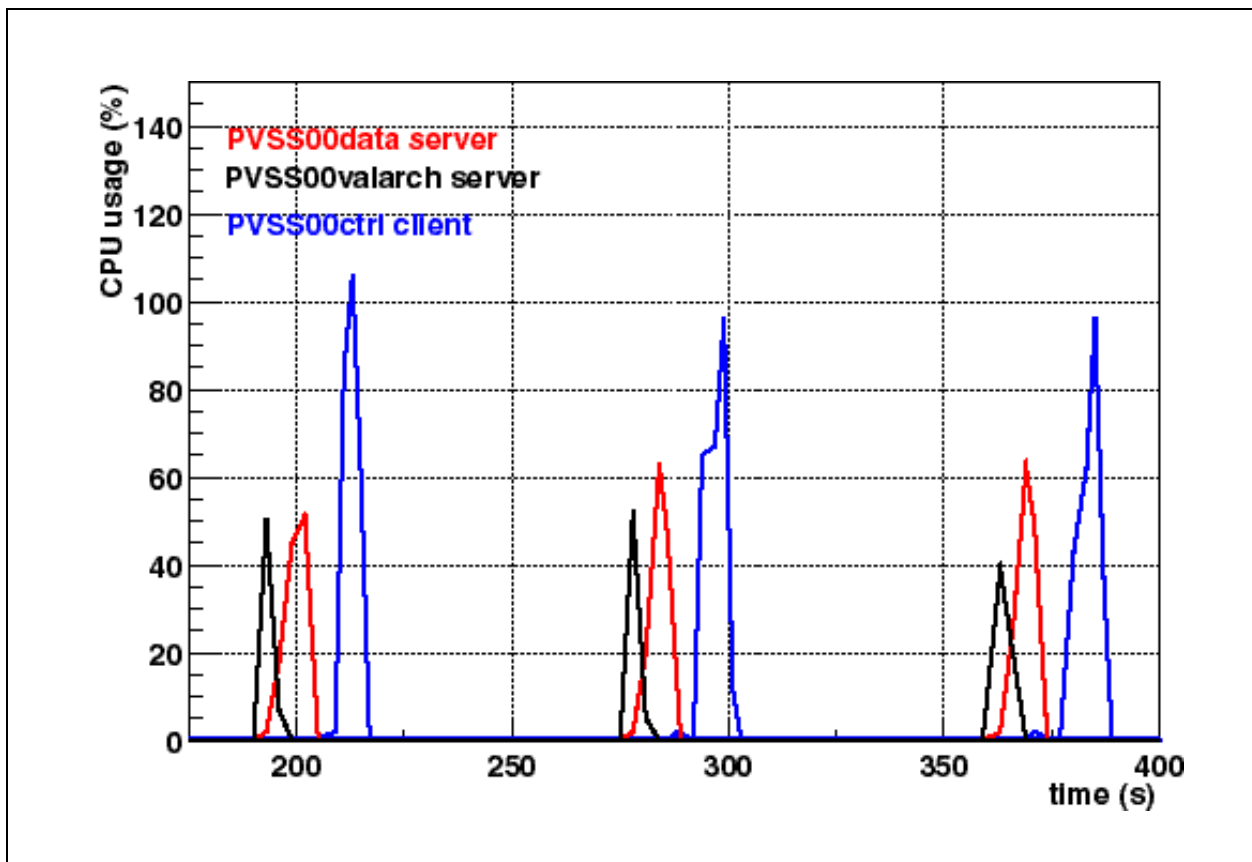## System features:

PC pcitco55: Pentium III, 800 MHz, 512 MB
PC na58pc014: Pentium III, 600 MHz, 128 MB
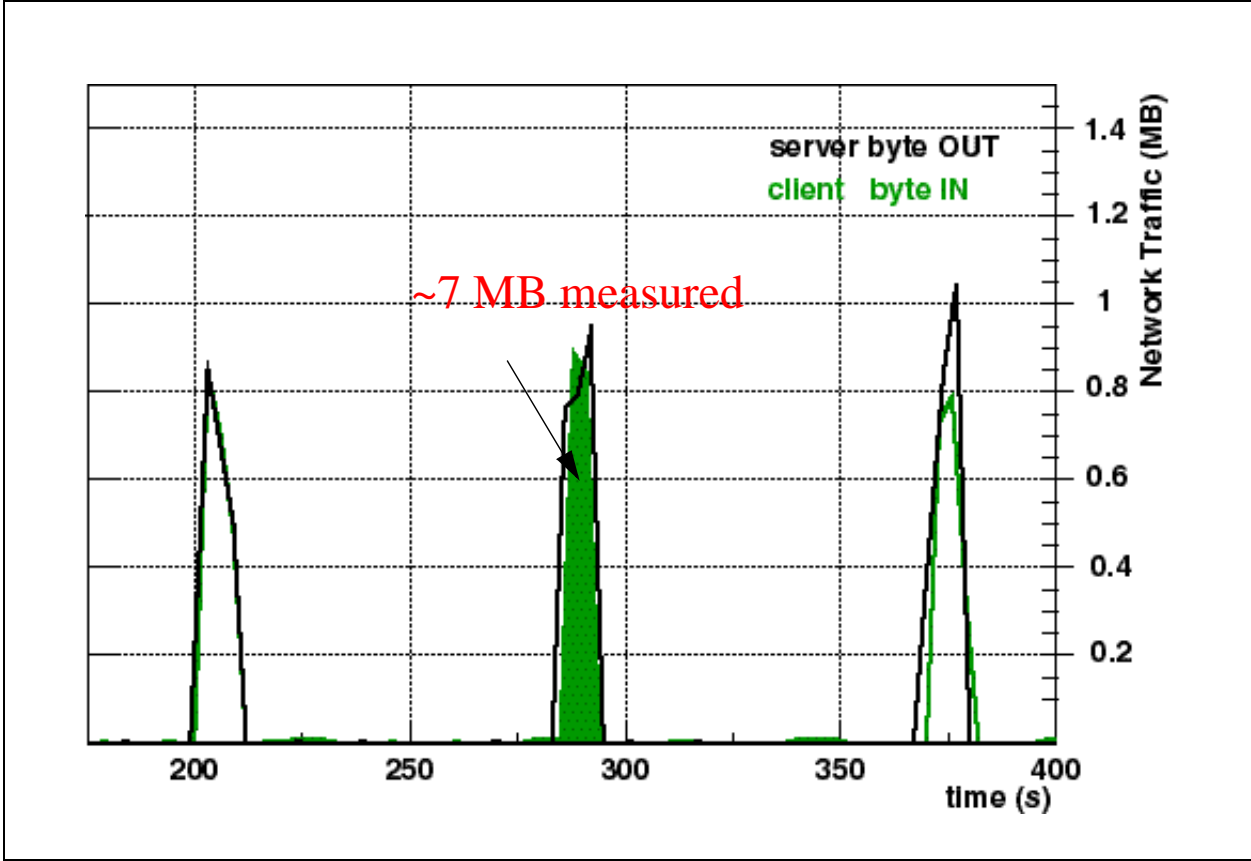
Network: normal ethernet 1 MB/s

One cycle of the system

PVSS00valarch retrieves the data from PVSS archive

PVSS00data send the data via TCP/IP to client

PVSSctrl store the data in the CDB

PVSSctrl decode the data in a STL string

PVSS00ctrl client connects to server

Measurements of CPU usage (/proc/pid/status)

Measurements of network traffic (/proc/net/dev)

PVSS Archive queried in a 40 minutes window each cycle.

> 1000 datapoint
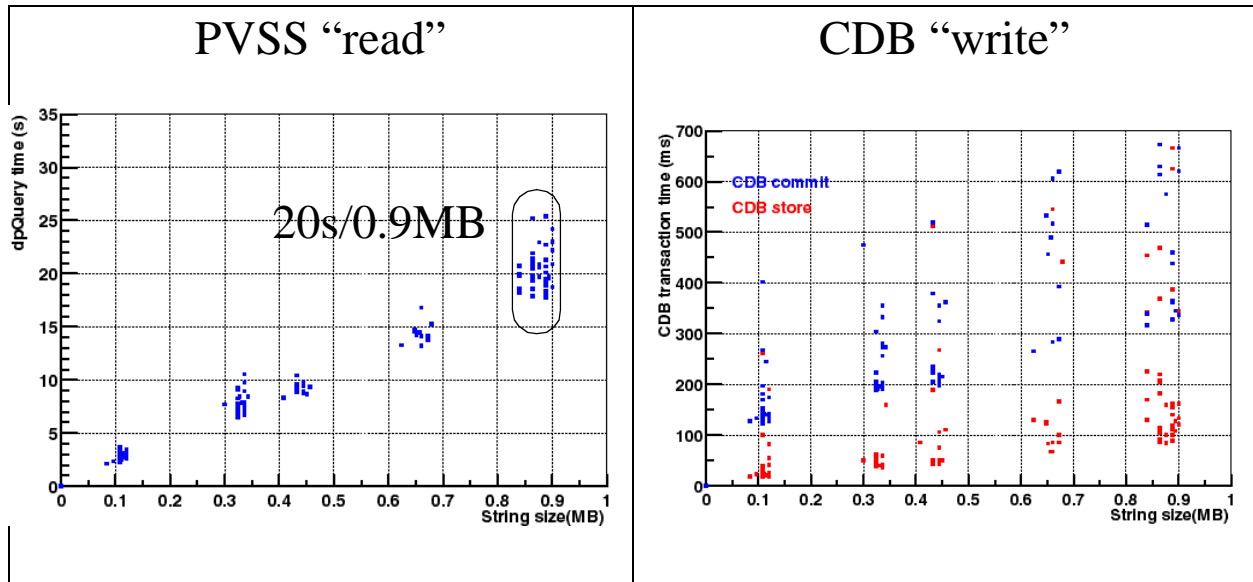> updated each 15" >>>>>>160 new value/datapoint per cycle

PVSS structure (dyn-dyn-anytype)

> dcs1:Andrea_11_33.value Type: 100 Sys: 1 Dp: 10154 El: 2 Conf: 0 Det:0 Attr: 0
> Fri May 25 10:05:37 2001 498
> 3.5

8 byte

~30 byte

4 byte

1000 datapoint *
160 updates/datapoint *
42 byte/updates

~7 MB expected

For storage in Objectivity >> STL string   (~7MB >> ~0.9 MB)

PVSS "read"	CDB "write"

For ~0.9 MB string need 20 s :   ~10 s SQL query   (PVSS)
                                                  ~10 s network ->Fast Ethernet

Upper limit: 10s for 7MB of data transfert.

Expectations for COMPASS

assumed :
- 20K channels read out from PVSS (simple datapoints)
- new values stored in the archive any 60 second
  (42 (bytes\ch) * 20k ch)/60s =~ 14 kB/s
  14kB/s *(3600s) =~ 50 MB (data to transfer/hour)

Assuming to retrieve data from PVSS archive each hour:
T = (10s/7MB)*50 MB =72 s or ~ 1min.
>>> System which works for 1 min. and sleep 59 min.

Conclusion

Integration of the CDB in the COMPASS software framework well advanced.

Prototype interface between Slow Control and CDB has been developed.
Tests with Fast Ethernet and real Slow Control data needed before a production release.

Thanks to H. Milcent.