

**Database for construction  
and tests of End Cap  
Muon chambers.**

**Richard Breedon, Michael Case**

University of California (Davis)

**Valeri Sytnik**

University of California (Riverside)

**Igor Vorobiev**

Carnegie Mellon University

Presented by **I.Vorobiev**

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## Systems considered:

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- CRISTAL (Objectivity)
- ROOT
- EDMS
- ORACLE
- MySQL
- PostgreSQL

**The best choice:**

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**ORACLE at CERN**



Oracle was selected by CERN in 80-s.

Long time available and well developed system.

Very good support.

## Many tools

*(like SQL, SQL\*Plus, PL/SQL, precompilers (Pro\*FORTRAN, Pro\*C/C++ ...), JDBC, OAS, iAS, Oracle XML Developer Kit, ...)*

Was designed as **RDBMS**

- Relational Database Management System.

Information - in **Tables**



Since version 8 - **new features.**

Unstructured data - **LOB** (Large Objects (up to 4 Gbytes)):

- ❑ **BLOB** (Binary Large Objects)
- ❑ **CLOB** (Character Large Objects)
- ❑ **BFILE** (Reference to a file)

**Internet access** – > **Oracle HTTP Server.**

**BLOB + Internet access**



**Upload and download files.**

New coming version 9i - object oriented

Currently in use:

**Oracle 8i**

**Oracle 9i Application Server**



# ORACLE at CERN

## Public Services:

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**Central Database - General purpose environment**

**Development Database - Test and deployment of new applications**

**Case Database - Designer/2000 environment**

## Private Services:

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**ALARM Oracle database**

**CHORUS Oracle database**

**CRYOGENICS Oracle database**

**EDMS Oracle database**

**IT/CS Oracle database**

**LEP logging Oracle database**

**LEP measurements Oracle database**

**REMEDY Oracle database**

**Radio Frequency Oracle database**

**SL division development Oracle database**

**SPS measurements Oracle database**

**Tape Management System Oracle database**



## Sub Databases

- 1) Anode boards tests.
- 2) FAST site tests (Final Assembly and System Tests).
- 3) ALCT and CLCT/TMB tests.
- 4) CERN site tests.
- 5) Electronic boards tracking for CSC assembly (MySQL)

## Organization

Each sub DB has separate account in CERN Oracle Central Database.

## Interconnection

Mutual access by granting rights.



1. Interactive: **SQL\*PLUS.**

**SQL, PL/SQL stored procedures.**

2. Two tiers: client - server.

**Client:**

**Pro\*FORTRAN, Pro\*C/C++**

**ODBC**

**JDBC**

3. Three tiers: **Oracle iAS (internet Application Server).**

**Client:**

**Calls PL/SQL stored procedures by**

**URL addresses**



Access through **Two tiers model**.

CSC test results are collected and viewed at FAST sites with **Test Manager**. Approved data is sent to central database.

- ❑ Database structure (tables in Oracle) is created by **independent C++ program**.
- ❑ Data is sent to Oracle through **ODBC driver**, installed at each FAST site.
- ❑ Graphic files are sent to the **Web server**. Links to these files are stored in the database tables.
- ❑ Data from database is accessed **via Web with Java applets and JDBC**.





# FAST sites - Test Manager

ME	Chamber #	Assembly	Status	Action
ME1.2	Chamber # 1	Assembly	OK	Start test # 1
ME1.3	Chamber # 2	Water leak test	OK	Start test # 2
ME2.1	Chamber # 3	LV test	OK	Start test # 3
ME3.1	Chamber # 4	ALCT test	Unknown	Start test # 4
ME234.2	Chamber # 5	AFEB Noise test (noise pulses)	Unknown	Start test # 5
TEST	Chamber # 6	AFEB Connectivity & Alive test	OK	Start test # 6
	Chamber # 7	AFEB Threshold and Analog Noise test	Unknown	Start test # 7
	Chamber # 8	AFEB Time Delay verification	Unknown	Start test # 8
	Chamber # 9	CFEB Noise test	OK	Start test # 9
	Chamber # 10	CFEB Connectivity and Alive test	OK	Start test # 10
	Chamber # 11	CFEB calibration	OK	Start test # 11
	Chamber # 12	Comparator noise tests	Unknown	Start test # 12
	Chamber # 13	Comparator threshold tests	Unknown	Start test # 13
	Chamber # 14	Left/Right Comparator tests	Unknown	Start test # 14
	Chamber # 15	HV-ON Current and Cabling test	Unknown	Start test # 15
	Chamber # 16	HV-ON CFEB Noise test	Unknown	Start test # 16
	Chamber # 17	Chamber gain map (with cosmics)	Failed	Start test # 17
	Chamber # 18	ALCT self-trigger on cosmics tests	Unknown	Start test # 18
	Chamber # 19	CLCT self-trigger on cosmics tests	Unknown	Start test # 19
	Chamber # 20	High-statistics cosmics test	Unknown	Start test # 20
	Chamber # 21	Performance vs HV test	Unknown	Start test # 21
	Chamber # 22			
	Chamber # 23			
	Chamber # 24			

test # 11
Instructions for FAST Site TEST # 11 -- Cathode Calibration

**Instruction**

HW is Ready

Init Test

Go Test

---

**Analysis**

Close

get all messages

10

100

500

1000

2000

5000

Write to datafile

Accept

Fail

Rm from DBase

Uses CFEB on-board test pulse generator to apply test pulses to one strip at a time in each CFEB and layer (5 x 6 strips are pulsed simultaneously). Uses 22 amplitudes. Does a linear fit to the first 15 points, and checks gain, non-linearity, shape quality (for now, the ratio of minimum to maximum ADC samples) and crosstalk to adjacent strips.

Run Control Parameters

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Readout Hardware	
Write file	cscdata
Max Events in Run:	13440 events
Setup Files:	Auto-stop
Module Config	110
Cable Map	110
Trigger Setup	110
AFEB Config	110
Trigger Type:	CAMAC LAM
Software Trigger:	anytime
	on Constant 10 Hz

Instructions

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Set up to read cathode (DDU) only. Hardware is like test 9. Configuration differences (all in the module\_config) are:

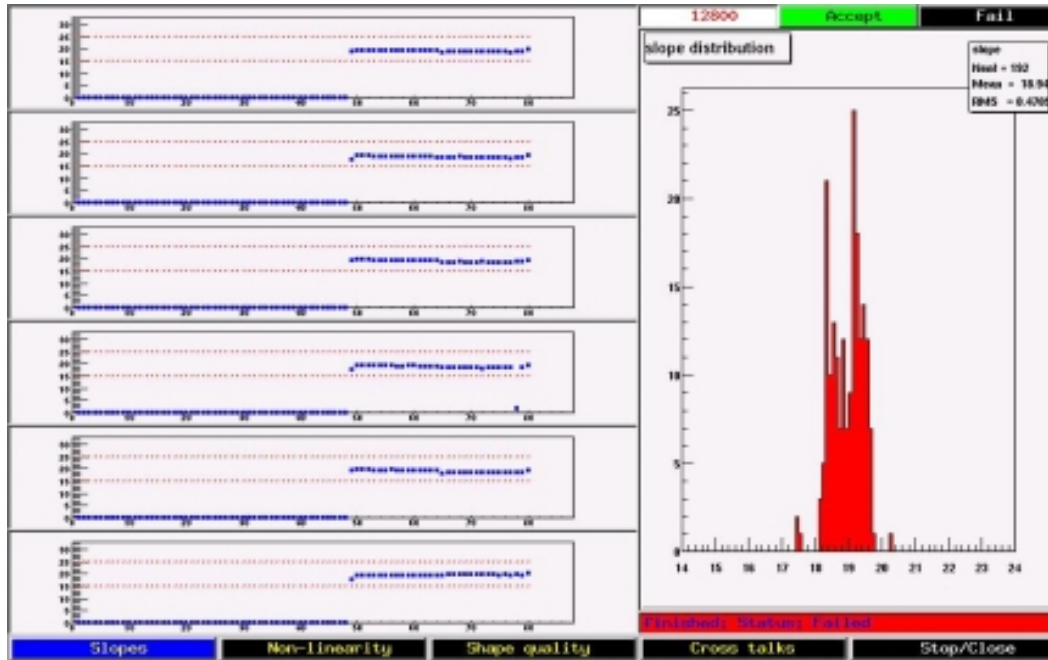
1. CCB config is changed so that it ignores the pretrigger signal it receives from the DAQ, and therefore no LCT gets sent to the Fake Trigger Card, and no L1Acc gets sent out by the CCB.
2. CCAL setup number is different.
3. Max events should be set to be equal to # strips \* # amplitudes + # pulses per amplitude. If in doubt about this number (it depends on which setup you use), do an "Init" and there will be a message telling you what the right number of events is.

Set the NIM logic so only the software trigger is enabled (or turn off scintillator HV). High Voltage should be OFF. Watch the strips in event display.

Test Manager interface and example of test



# FAST sites - Test Manager



Sample plot of test results



# FAST sites - data flow

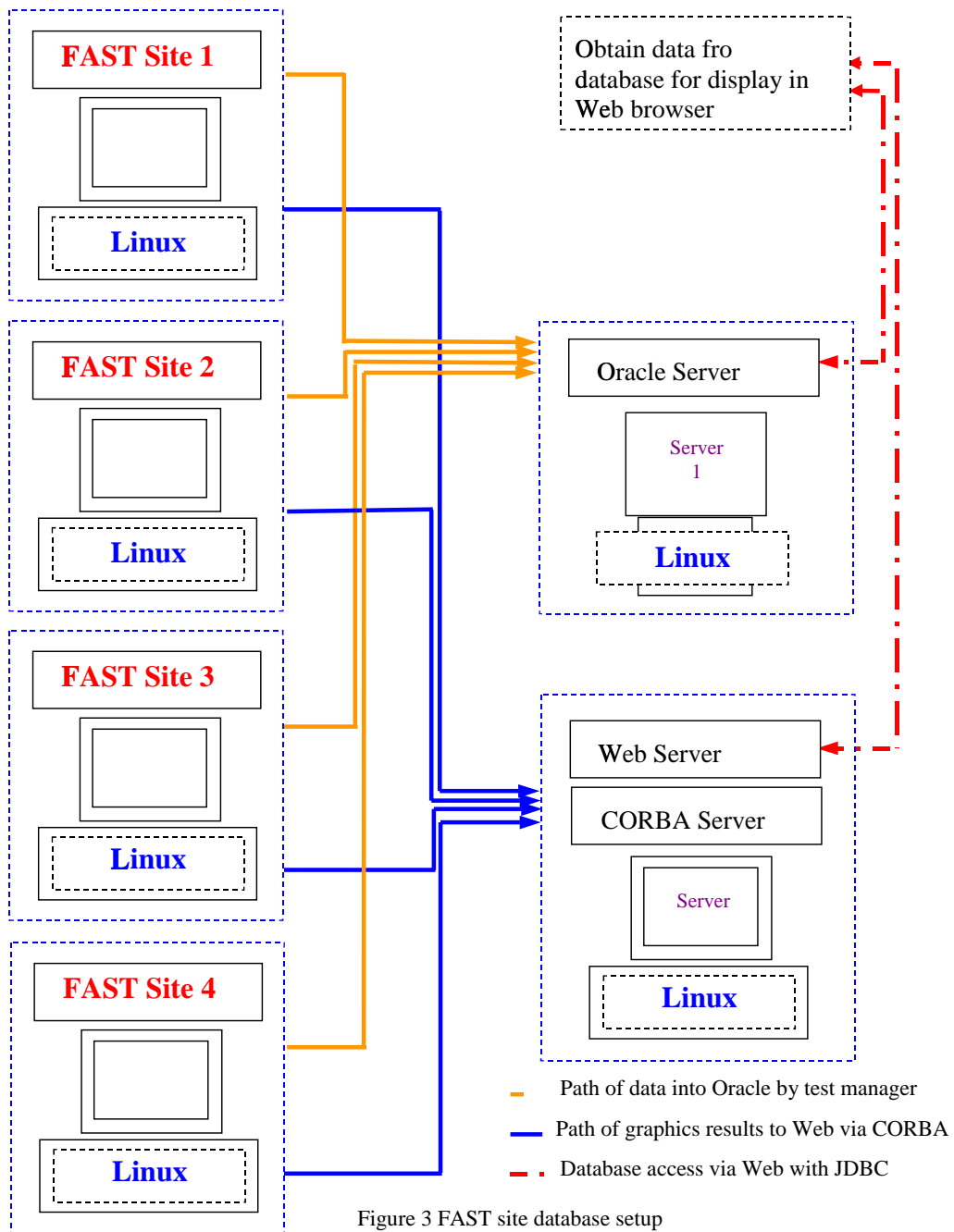
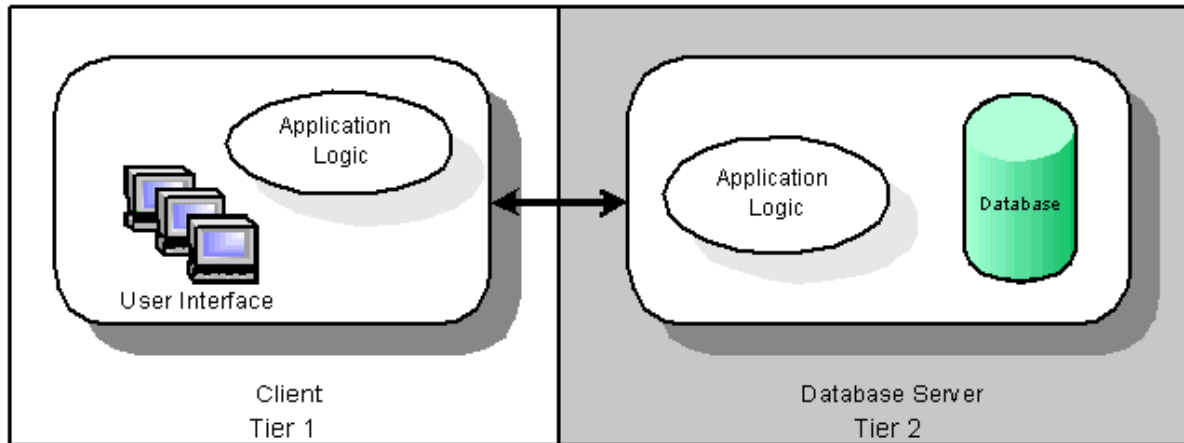


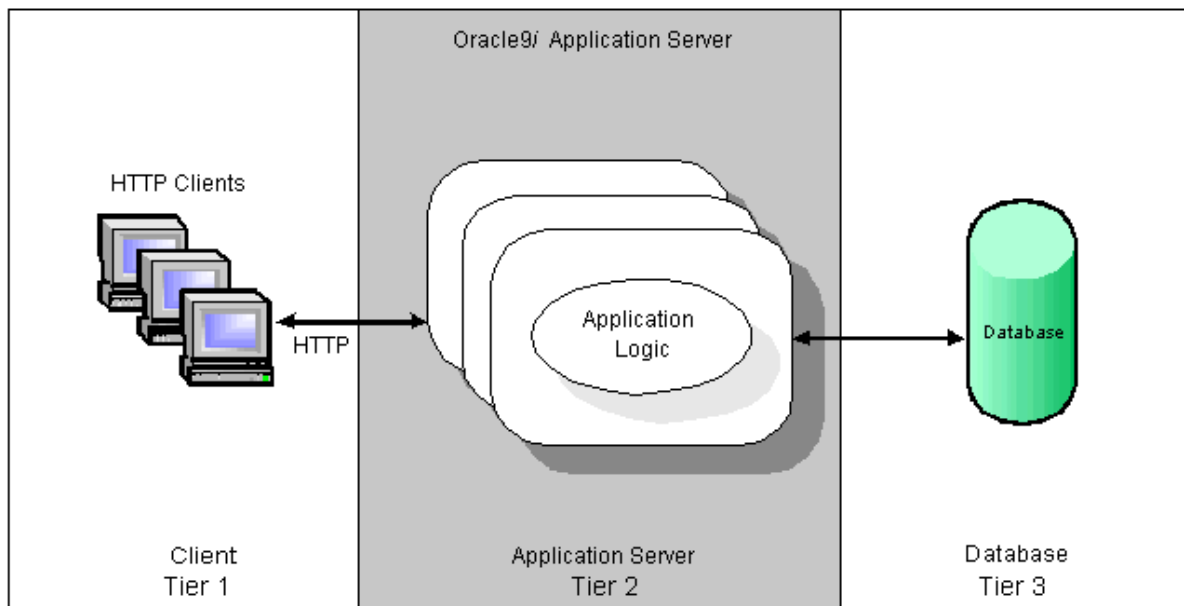
Figure 3 FAST site database setup



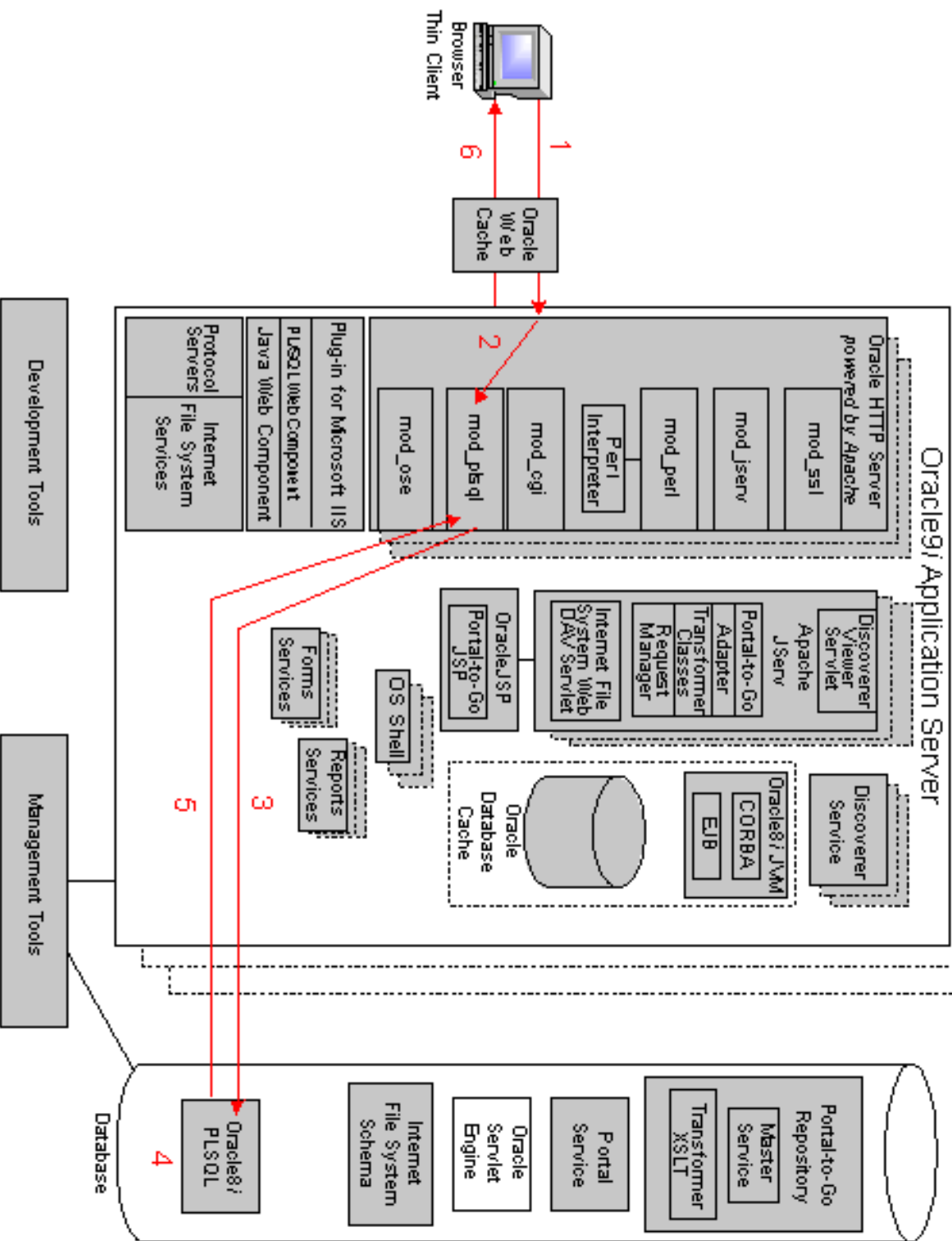
## Two-Tier Computing Model



## Three-tier Oracle9i Application Server Architecture



# Oracle9i Application Server





1. The Oracle HTTP Server receives a PL/SQL Server Page request, through Oracle Web Cache, from a client browser.
2. The Oracle HTTP Server routes the request to mod\_plsql.
3. The request is forwarded by mod\_plsql to Oracle8i PLSQL. By using the configuration information stored in DAD (Database Access Descriptor), mod\_plsql connects to the database, prepares the call parameters, and invokes the PL/SQL procedure in the database.
4. The PL/SQL procedure generates an HTML page using data and stored procedures accessed from the database.
5. The response is returned to mod\_plsql.
6. The Oracle HTTP Server sends the response, through Oracle Web Cache, to the client browser.



ORACLE



Accessed from **PL/SQL** stored procedures



Accessed from **HTTP Server** (iAS)



**URL addresses:**

[http://oraweb03.cern.ch:9000/pls/cms\\_anode\\_boards.dev/display.board](http://oraweb03.cern.ch:9000/pls/cms_anode_boards.dev/display.board)

[http://oraweb03.cern.ch:9000/pls/cms\\_anode\\_boards.dev/board\\_files.board\\_list?p\\_board\\_num=20001](http://oraweb03.cern.ch:9000/pls/cms_anode_boards.dev/board_files.board_list?p_board_num=20001)

[http://oraweb03.cern.ch:9000/pls/cms\\_anode\\_boards.dev/board\\_files.board\\_select](http://oraweb03.cern.ch:9000/pls/cms_anode_boards.dev/board_files.board_select)

**PL/SQL Web Toolkit** - facility to create  
HTML pages.

Packages:

**http, htf** - generate HTML tags

**owa** - subprograms and functions



Access through **Oracle9i Application Server**.

Main mode: **saving files**.

Files contain measurements and results of analysis.

Each board - few files (**text (numbers) + pictures**).

Pictures can be of any format: jpeg, gif, ps, compressed ps.

HTML page: **select board number**



**list of files for requested board**

Click on file name  $\Rightarrow$  **view**

Shift-click  $\Rightarrow$  **save in external file**

**Main results and status of boards - in tables.**



# Netscape access

Netscape: List of board files

File Edit View Go Communicator

Back Forward Reload Home Search Netscape Print Security Stop

Bookmarks Location:

The board selected is => 20002

## Board measurements

File	Size	Type	Date of file	Board	Run	Condition
<a href="#">E11895/mt100001_20002_1.dat</a>	3384	text/plain	14-MAY-2001 12:55:07	20002	100001	1
<a href="#">E31023/rt100001_20002_1.dat</a>	2382	text/plain	14-MAY-2001 12:59:06	20002	100001	1
<a href="#">E5196/hh100001_20002_1.dat</a>	2273	text/plain	13-MAY-2001 21:41:46	20002	100001	1
<a href="#">E10164/hh100001_20002_2.dat</a>	2263	text/plain	13-MAY-2001 21:41:53	20002	100001	2
<a href="#">E10648/hh100001_20002_3.dat</a>	2125	text/plain	13-MAY-2001 21:42:03	20002	100001	3
<a href="#">E14282/hh100001_20002_4.dat</a>	2214	text/plain	13-MAY-2001 21:42:15	20002	100001	4

## Board test results

File	Size	Type	Date of file	Board	Run
<a href="#">E20438/mt100001_20002.out</a>	772	text/plain	14-MAY-2001 17:02:41	20002	100001
<a href="#">E12618/rt100001_20002.out</a>	564	text/plain	14-MAY-2001 17:03:58	20002	100001
<a href="#">E12948/hh100001_20002.out</a>	2145	text/plain	14-MAY-2001 17:15:04	20002	100001

## Pictures

File	Size	Type	Date of file	Board	Run
<a href="#">E25338/rt100001_20002.ps.gz</a>	30711	application/postscript	14-MAY-2001 17:28:11	20002	100001
<a href="#">E4713/hh100001_20002.ps.gz</a>	63640	application/postscript	14-MAY-2001 17:30:31	20002	100001

Board to select:

Database for construction and tests of End Cap Muon chambers. (page 17)



# Netscape access

Netscape:														
File	Edit	View	Go	Communicator	Home	Search	Netscape	Print	Security	Stop	Help			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0	0	0
300	429	0	0	0	0	0	0	0	0	200	0	0	0	0
400	426	308	445	405	414	372	199	424	151	445	329	427	427	0
500	256	378	245	314	371	305	378	314	351	246	371	304	304	0
600	183	221	196	220	204	196	250	213	243	178	228	217	217	0
700	176	168	179	181	179	165	196	179	186	150	161	193	193	0
800	156	142	166	156	159	150	151	167	168	153	150	174	174	0
900	179	145	160	172	154	142	151	170	152	148	123	187	187	0
1000	162	136	153	164	151	150	139	168	139	147	138	178	178	0
1100	155	138	156	151	157	148	138	168	142	148	132	175	175	0
1200	137	132	128	142	139	133	135	143	132	124	130	167	167	0
1300	125	120	121	121	140	118	120	132	119	119	106	152	152	0
1400	111	101	105	111	135	101	111	120	122	106	114	139	139	0
1500	97	95	86	110	109	101	102	108	108	96	99	136	136	0
1600	89	91	88	90	104	89	95	105	94	89	90	120	120	0
1700	87	85	81	91	96	89	96	94	97	82	78	107	107	0
1800	88	77	80	83	93	87	92	87	86	80	79	102	102	0
1900	78	77	73	78	85	85	85	82	78	80	71	107	107	0
2000	69	69	69	76	84	81	78	77	84	74	73	98	98	0
2100	76	63	65	72	88	88	80	76	72	71	72	87	87	0
2200	65	66	62	70	77	82	80	76	75	64	69	92	92	0
2300	67	59	61	66	74	71	75	68	69	69	66	83	83	0
2400	64	59	62	62	78	73	74	64	70	64	61	81	81	0
2500	64	59	59	62	74	76	77	65	67	62	63	79	79	0
2600	65	55	58	59	73	73	74	62	64	64	60	73	73	0
2700	59	55	56	58	75	72	72	59	65	61	63	77	77	0
2800	60	50	53	56	72	69	75	56	58	63	57	68	68	0
2900	55	52	51	56	70	71	59	56	59	60	56	68	68	0
3000	59	55	55	56	74	68	68	54	55	59	57	62	62	0
3100	55	54	52	53	66	62	65	53	54	60	54	61	61	0
3200	52	52	48	52	66	67	68	49	56	56	49	66	66	0
3300	51	52	47	49	71	63	69	49	53	54	50	62	62	0
3400	51	52	47	50	65	63	65	49	56	57	50	62	62	0
3500	50	53	47	52	64	63	70	49	56	55	49	61	61	0
3600	50	51	45	49	66	64	64	50	51	58	50	59	59	0
3700	49	48	48	48	66	58	67	46	52	53	45	61	61	0
3800	48	51	45	46	68	64	66	46	53	51	45	61	61	0
3900	47	51	44	48	62	60	65	42	53	53	48	57	57	0
4000	46	46	48	47	66	57	67	44	52	52	46	59	59	0



# Netscape access

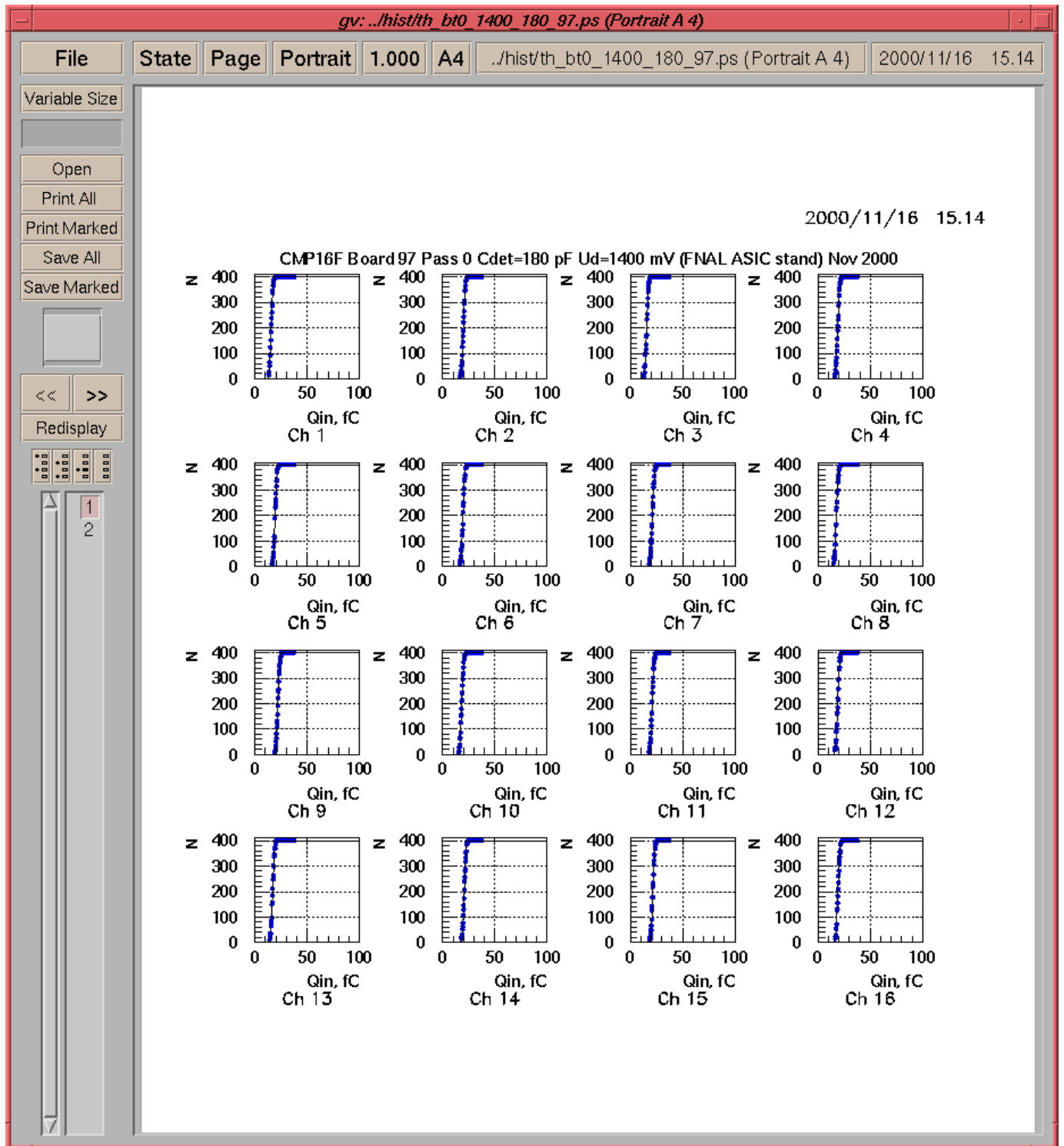
The screenshot shows a Netscape browser window with the following interface elements:

- Menu bar: File, Edit, View, Go, Communicator, Help
- Toolbar: Back, Forward, Reload, Home, Search, Netscape, Print, Security, Stop
- Address bar: Location: [http://oraweb03:9000/pls/cms\\_anode\\_boards/docs/F12618/](http://oraweb03:9000/pls/cms_anode_boards/docs/F12618/)
- Main content area: A table of data with 17 rows and 7 columns.
- Status bar: 100% zoom, and various system icons.

20002	3	0				
1400	180	23	101.4	100	50	180 16
1	2.20	0.80	0.60	1.63		
2	1.69	0.70	0.56	1.21		
3	1.69	0.70	0.58	1.16		
4	1.84	0.79	0.58	1.31		
5	1.77	0.78	0.55	1.29		
6	1.61	0.76	0.68	0.96		
7	1.54	0.73	0.56	1.07		
8	2.04	0.90	0.64	1.50		
9	1.67	0.73	0.54	1.19		
10	1.58	0.70	0.51	1.10		
11	1.54	0.73	0.62	0.99		
12	1.97	0.97	0.63	1.45		
13	1.56	0.86	0.68	0.90		
14	1.59	0.73	0.60	1.04		
15	1.72	0.83	0.68	1.07		
16	1.77	0.84	0.71	1.21		



# Netscape access





**LWP** - Library for WWW access in Perl.

```
$ua = new LWP::UserAgent;  
$response = $ua->request(...URL...);  
$response->content
```

**JAVA** - class URL to access URL-address

To upload files:

Server in C



Calls **Perl script**

or

**JAVA**



### **Files - universal and flexible mean to save information.**

- ❑ *High portability.*
- ❑ *File is associated with necessary number of keys (easy searchable).*
- ❑ *Contains numbers of any kind and text.*
- ❑ *Accessible everywhere through internet (URL address).*
- ❑ *Can be viewed, saved on disk, printed.*
- ❑ *Can be decoded inside a program and numbers (and text) can be used for analysis.*



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