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Integration and Use of a Beamline History Database



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Outline



- Motivation
- Global View
- Actual Status
- The Future
- Conclusion



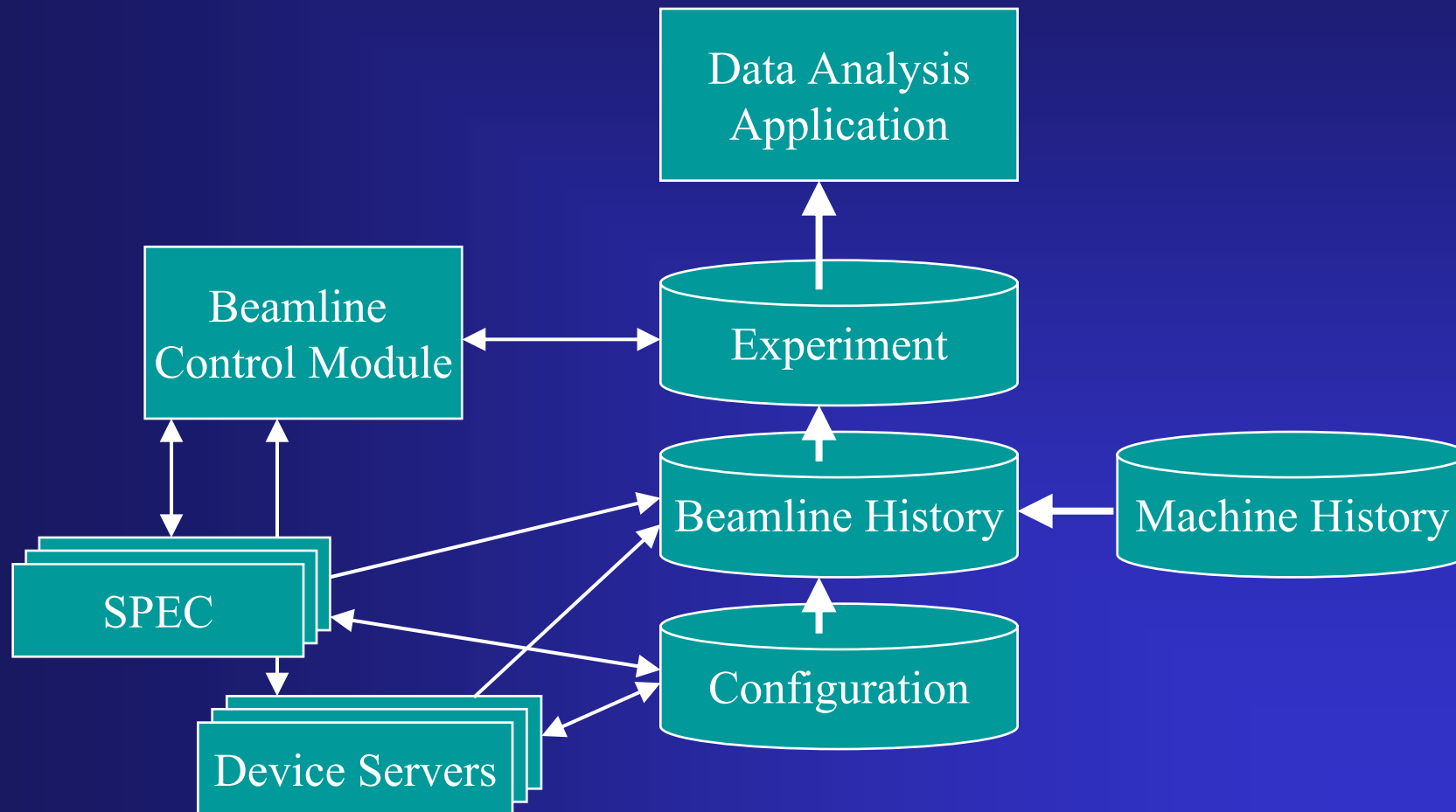
Motivation



- Store all the beamline history in a central place
- Be able to trace and correlate events in time
- Store and restore beamline configurations
- Correlate experiment data with beamline or storage ring events



Global View





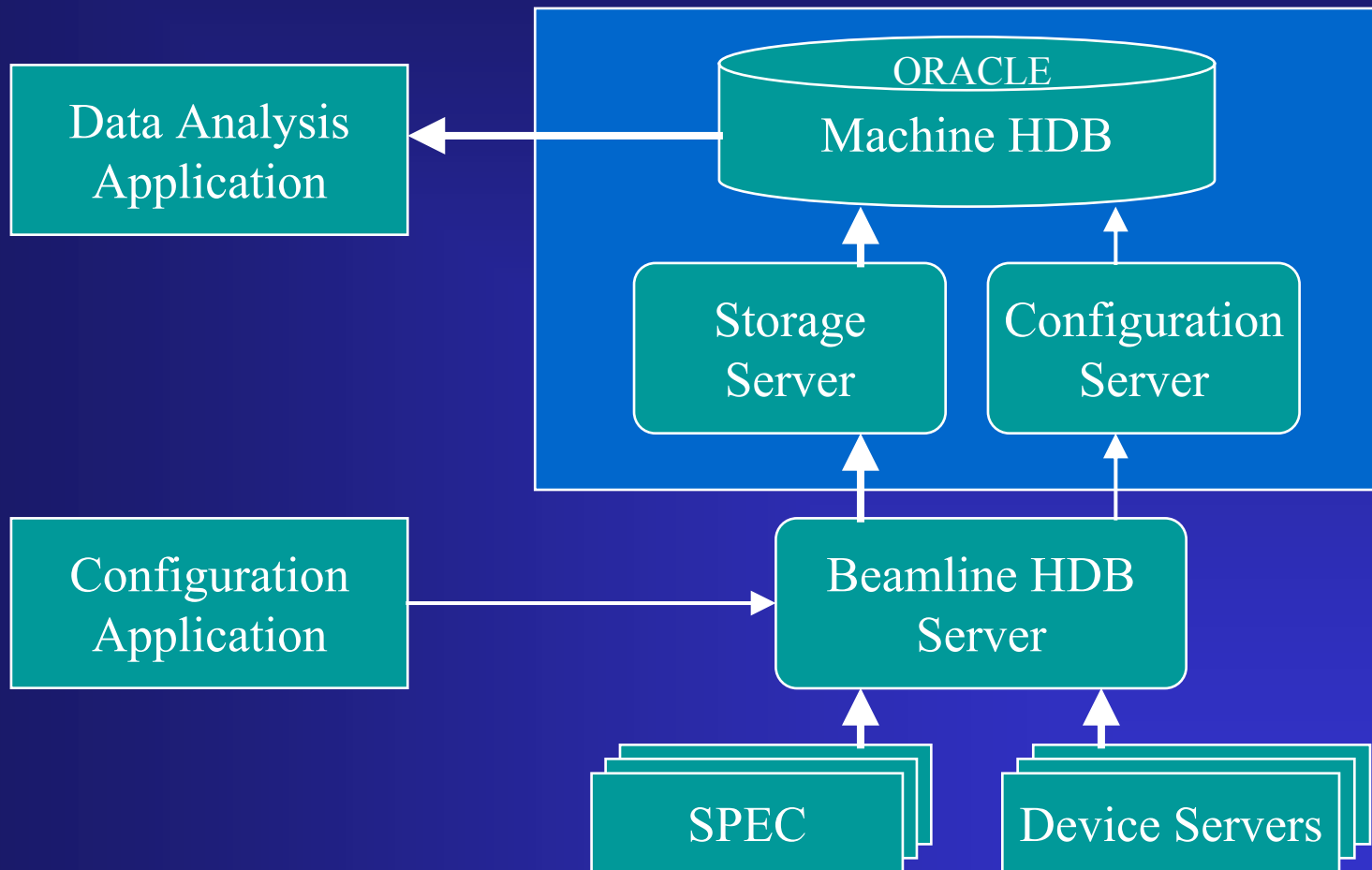
Global View



- Storage of scalar data in time
- Storage of scan data (synchronized data)
 - Scan description
 - Grouped scan spectra
- Storage of snapshot data
 - Snapshot description and identifier
 - Snapshot data



Actual Status





Actual Status



- Data storage from different data sources
 - TACO, TANGO, SPEC
- Dynamic database configuration and storage
- Complete data extraction API in C and data analysis application
- Only storage of scalar data values in time



Actual Status



The screenshot shows the Jive 2.3 application window. The title bar reads "Jive 2.3". The menu bar contains "File" and "Edit". The main window title is "DEVICE:sys/hdb/store-slow PROPERTY:Attribute_list".

The left pane displays a tree view of the device structure:

- id23
 - sys
 - daemon
 - database
 - dc_rd_2
 - dc_rd_8
 - dc_wr_2
 - dc_wr_8
 - hdb
 - store-fast
 - store-slow
 - poll_old_factor
 - poll_ring_depth
 - logging_level
 - current_logging_level
 - logging_target
 - current_logging_target
 - logging_rft
 - PROPERTY
 - polled_cmd
 - Attribute_list
 - Hdb_create_device
 - Hdb_push_device
 - ATTRIBUTE
 - COMMAND

Property value [12 items]

- id23/pen/11/pres:50%
- id23/pen/21/pres:50%
- id23/pen/31/pres:50%
- id23/pen/41/pres:50%
- id23/pen/51/pres:50%
- id23/pen/61/pres:50%
- id23/Mono_1/wago/monot_1:0.2
- id23/Mono_1/wago/monot_2:0.2
- id23/Wbeam_1/wago/pst_1:0.2
- id23/Wbeam_1/wago/pst_2:0.2
- id23/Wbeam_1/wago/pst_3:0.2
- id23/Wbeam_1/wago/pst_4:0.2

Buttons: Apply change, Refresh, Show details



Actual Status



[HDB Query] Static monitoring

| HDB Name | User Alias |
|----------|--------------|
| DOMAIN | FAMILY |
| id08 | eh3_motor |
| id12a | eh3_pindiode |
| id13 | eh3_slit |
| id14 | eh3_table |
| id19 | microdiff |
| id20 | oh1 |
| id21 | pen |

| MEMBER | SIGNAL NAME | SIGNAL ALIAS |
|--------|-------------|----------------------------|
| exp | pitch | "NONE" |
| | roll | ALARM_MA_BEAM |
| | yaw | AMBX_AUTO_ID22 |
| | yc | Air_c_unit10_ref_temp_cel: |
| | zc | Air_c_unit10_sup_temp_cel: |
| | | Air_c_unit11_ref_temp_cel: |

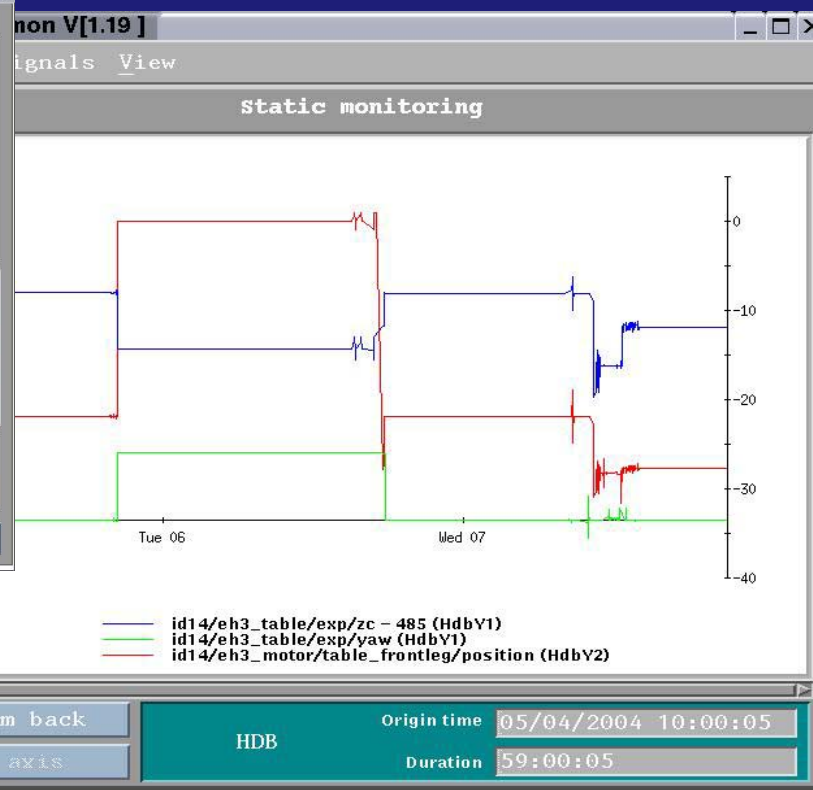
SELECTED SIGNALS

id14/eh3_table/exp/zc
id14/eh3_table/exp/pitch
id14/eh3_motor/table_frontleg/position
id14/eh3_table/exp/yaw

START: 05/04/2004 10:11:42 Last week Asynchronous No table

STOP: 07/04/2004 21:11:42 Select TCL Clear TCL

Perform search Dismiss



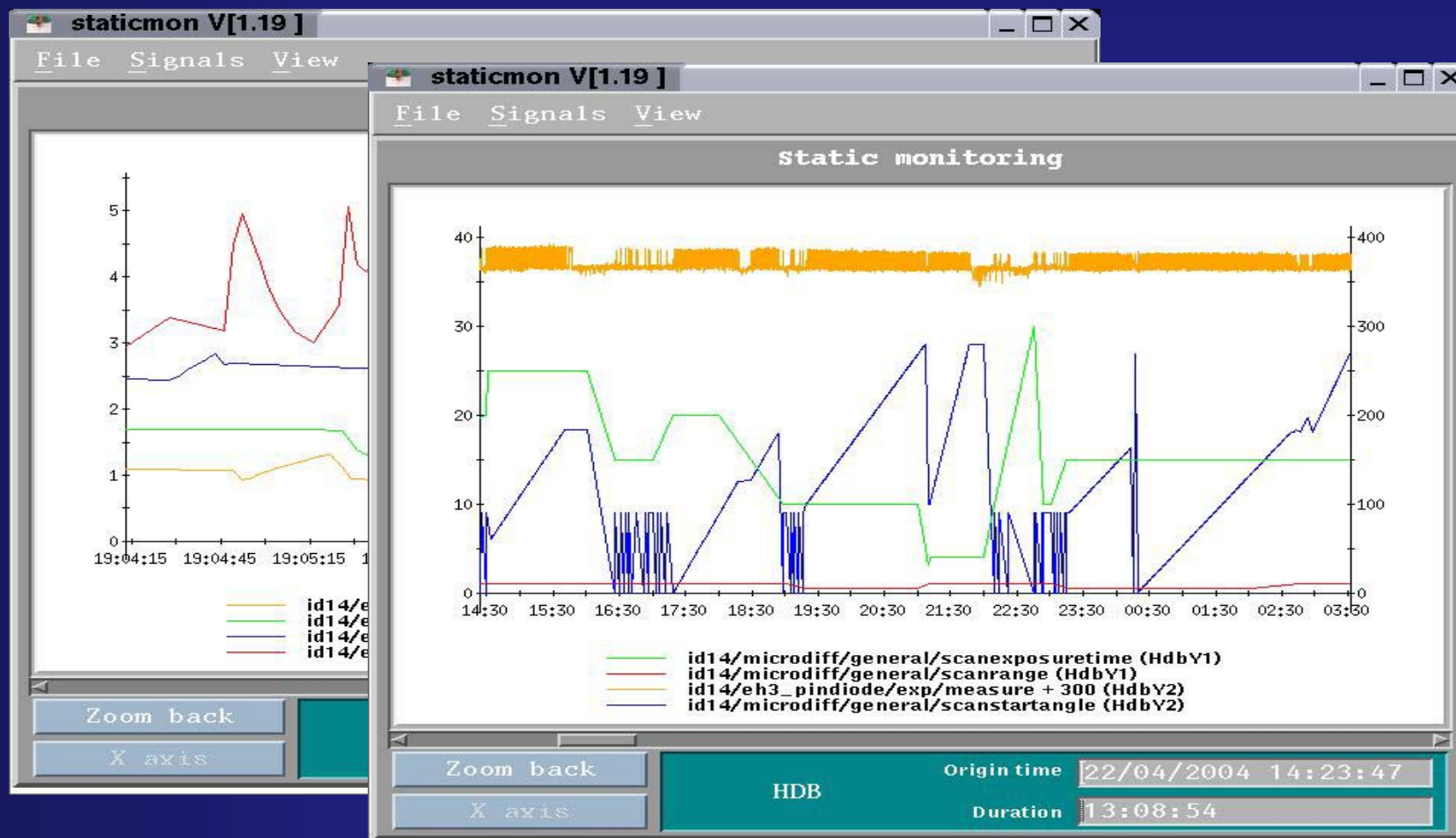
Static monitoring [HDB table]

| | id14/eh3_table/exp/zc | id14/eh3_table/exp/pitch | id14/eh3_motor/table_frontleg/position | id14/ |
|---------------------|-----------------------|--------------------------|--|------------|
| 05/04/2004 20:01:33 | | 16.0784 | | |
| 05/04/2004 20:01:35 | 504.809 | | -21.8701 | |
| 05/04/2004 20:01:37 | 504.809 | 16.065 | | |
| 05/04/2004 20:01:38 | | | -21.861 | |
| 05/04/2004 20:01:40 | | 16.055 | | |
| 05/04/2004 20:01:41 | 504.809 | | -21.8536 | |
| 05/04/2004 20:01:53 | | | -21.8701 | |
| 05/04/2004 20:01:56 | 504.809 | 16.075 | -21.9033 | |
| 05/04/2004 20:01:58 | 504.809 | 16.085 | | |
| 05/04/2004 20:02:49 | | | | 0.00600601 |
| 05/04/2004 20:02:52 | | | | -0.013994 |
| 05/04/2004 20:02:55 | | | | -0.024024 |
| 05/04/2004 20:02:58 | | | | -0.054024 |
| 05/04/2004 20:03:07 | | | | -0.024024 |

Save file Run TCL Auto size Dismiss



Actual Status



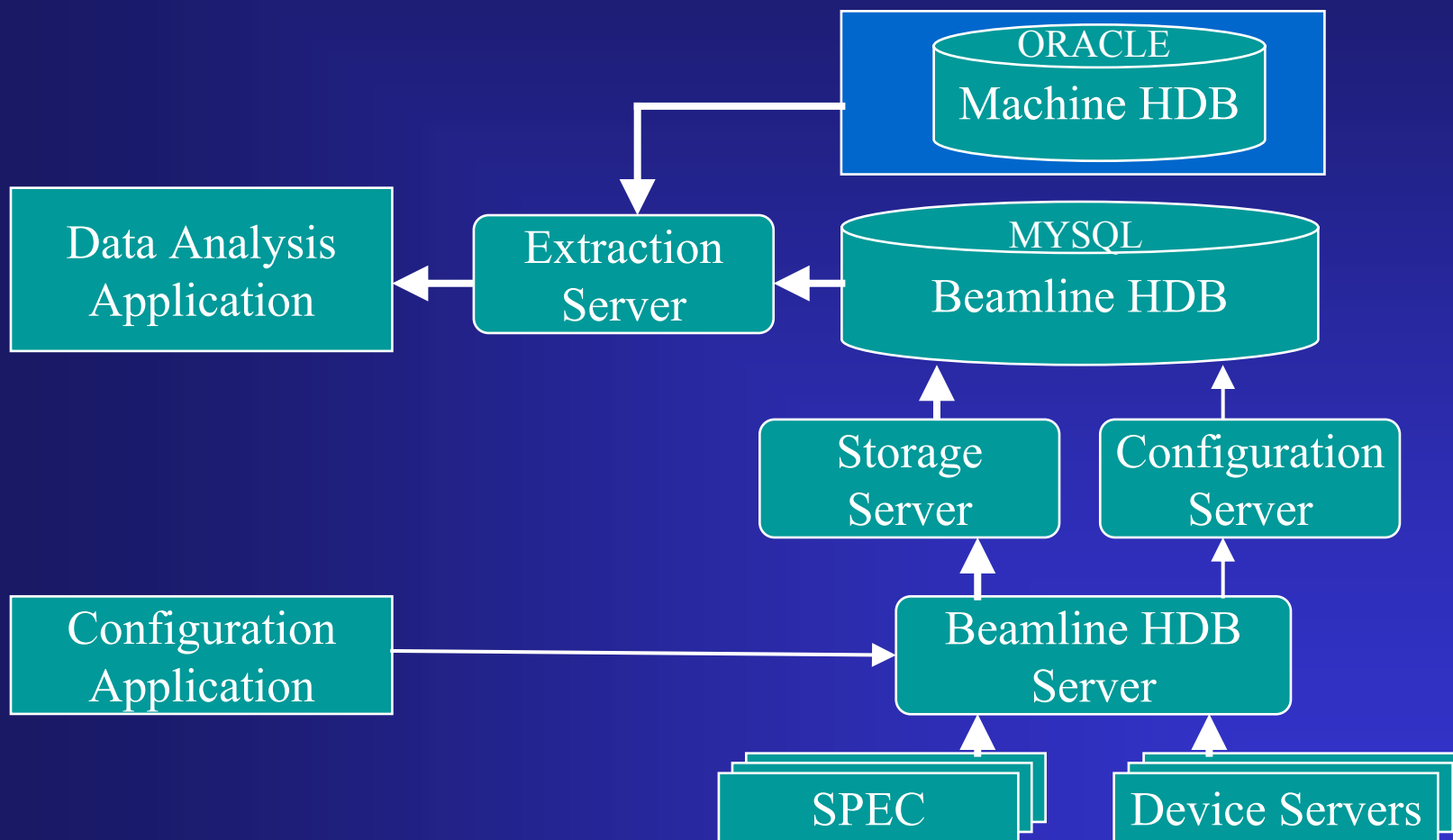
4.5.2004

BioXHit Workshop

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The Future





The Future



- History database installed locally on the beamline
- Joint development with SOLEIL for the TANGO history database
- Data extraction server allows clients to be written in multiple languages
- Storage of scan and snapshot data



How to Use HDB



- To trace and correlate beamline and machine events by the scientist
- In connection with the experiment database to trace beamline or machine events which happened during an experiment
- Saving and restoring experiment conditions or beamline configurations for fast experiment preparation
- To find automation problems by analyzing numerous events of the same type



Conclusion



- A history database as centralized data archive is a necessary part of a beamline
- Performant database browsing and data analysis tools are an important part of a history database project
- Interaction with an experiment database is important to correlate experiment data with beamline events