RESOURCES
SOFTWARE AND TECHNOLOGIES
STATUS OF DATA IN DB
ACTIONS AND RECOMMENDATIONS

OPERA DATABASE EXPORT AND PRESERVATION

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RESOURCES

Physical machine received at CCIN2P3 with 2 TB disk

- Dedicated to OPERA for 2016/2017 for Oracle DB dump

- Not part of Linux batch clusters

Account activated at CERN for data preservation

- Access to EOS (disk) and CASTOR (tape) granted

- Some discussion ongoing for best data transmission technology
    - scp, rsync easy to use, require some scripting to assess transfer is OK
    - xrdcp – not sure if it can be used on the Lyon machine
    - WLCG (GRID-based) – would need EGI authentication

SOFTWARE AND TECHNOLOGIES

OracleDumpManager (.NET/Mono exe)

Set of bash scripts

Full chain activated with a single command or event list

Input format:

EVENT	BRICK	EVTYPE	PRIORITY	ID_FEEDBACK	PRONGS
10240014359	1123062	NC	1	1000010011679071	5
10310004085	1050094	CC	1	1000010013001023	1
10209046135	1134018	NC	1	1000010012731215	1
10270007687	1046052	CC	1	1000010013000435	2
10233027637	1138277	CC	1	1000010013003253	1
10317043625	1120844	CC	1	1000010012735188	2
10232004243	1054025	CC	1	1000010013001144	6
10316032251	1152030	CC	1	1000010013022657	5
10284013149	1028243	CC	1	1000010015819976	2
10180044583	1063291	CC	1	1000010012110182	3
10144050777	1107570	CC	1	1000010004782325	8
10120018681	1009831	CC	1	1000010006911467	3
10133066579	1138613	NC	1	1000010012731276	7

SOFTWARE AND TECHNOLOGIES

Each event is completely contained in a single directory

Create dump directory exp_evXXXXXXXXX_bkYYYYYYYYYY

Extract event-related electronic data

Extract brick-related data (ALL – will cause duplication for multi-events)

Extract feedback views for LAST feedback for that event

Convert to ASCII (in parallel with extraction of next event – generate directory with name ascii_exp_evXXXXXXXXXX_bkYYYYYYYYYY)

Copy over Internet (after ASCII, in parallel with extraction of next event)

All actions are logged and extraction log is saved
Single corrupt rows or fields are documented and skipped

SOFTWARE AND TECHNOLOGIES

Extraction test facts & figures

Binary file size: 69 GB

ASCII file size: 96 GB

Extraction time: 700 min

ASCII Conversion time: 1000 min

Network transfer time: computed from transfer speed – 2283s at 0.56 Gbps (measured)

Approximately **553** days to copy the whole DB

Parallel extraction will be needed

STATUS OF DATA IN DB

The following slides contain queries that have been generated on purpose to run on the **opera** account of the Central DB

Local Database administrators are **encouraged** to use these queries to recover details on a brick-by-brick and event-by-event basis

The materialized views named

DBEX_............

are recomputed **daily** and available for you to check the status of your laboratory, accessible from your local **operapub** account, e.g.:

```
select * from opera.dbex_invalid_datasets@opfra where laboratory = 'SALERNO'
```

STATUS OF DATA IN DB

CS publication statistics

DBEX_CS_PUBLICATION_STATUS

RUNYEAR	LAB	ASSIGNED	FLAGSRECEIVED	DATARECEIVED
2007	LNGS	1	1	0
2007	Nagoya	4	3	0
2008	LNGS	1406	1359	805
2008	Nagoya	1330	1301	654
2009	LNGS	2794	2735	1563
2009	Nagoya	2962	2869	1436
2010	LNGS	3069	2894	1553
2010	Nagoya	2987	2887	1544
2011	LNGS	3561	3336	1297
2011	Nagoya	3303	3164	1603
2012	LNGS	2513	2373	986
2012	Nagoya	2447	2345	954

STATUS OF DATA IN DB

CS results published, missing candidates
DBEX_CS_RESULTS_MISSCANDS

select id_cs_eventbrick, result_status, sum(nvl2(id, 1, 0)) as ncands,
tb_brick_assign.cs_assign from
(select id_cs_eventbrick, result_status, id from tb_cs_results
left join tb_cs_candidates on id_eventbrick = id_cs_eventbrick)
inner join tb_brick_assign on tb_brick_assign.id_eventbrick = id_cs_eventbrick
group by id_cs_eventbrick, result_status, cs_assign)

RESULT_STATUS	CS_ASSIGN	CSDOUBLETS	CSWITHCANDS
B2B_FASTUNPACK	JP	8	0
B2B_FASTUNPACK	UE	8	0
B2B_NOSCAN	UE	2	0
BACK_TO_DETECTOR	JP	2558	28
BACK_TO_DETECTOR	UE	3721	112
BACK_TO_DETECTOR_NO_CS	JP	2525	1
BACK_TO_DETECTOR_NO_CS	UE	2445	25
BLACK_CS_DEVELOP	JP	159	10
BLACK_CS_DEVELOP	UE	351	0
CS_CAND_OK_DEVELOP	JP	6632	5951
CS_CAND_OK_DEVELOP	UE	5745	5699
CS_CAND_OK_FAST_UNPACK	JP	315	67
CS_CAND_OK_FAST_UNPACK	UE	43	40
NO_COSMIC_RAYS_DEVELOP	JP	414	141
NO_COSMIC_RAYS_DEVELOP	UE	454	414
WRONG_CS_HANDLING_DEVELOP	UE	33	11

JP: many CS without candidates
UE: in some cases another CS was flagged with results to trigger re-extraction

Brick data consistency checks

Question: do we have scanning/feedback data for events that are at least connected?

Main query

```sql
select laboratory, event, brick, result_status, idcs, located, deadmaterial, passing, ds_any_done,
decode(sum(nvl2(sb1.id, 1, 0)),0,0,1) as issb, decode(sum(nvl2(vo2.id, 1, 0)),0,0,1) as isvol,
decode(sum(nvl2(re3.id, 1, 0)),0,0,1) as isrec from
(select laboratory, event, brick, result_status, idcs, located, deadmaterial, passing, ds_any_done, id as idop from
 (select laboratory, event, brick, result_status, idcs, located, deadmaterial, passing, ds_any_done from
xv_event_location_detail where started > 0 and connected > 0)
 left join tb_proc_operations on id_parent_operation is null and id_eventbrick = brick
)
left join tb_scanback_paths sb1 on sb1.id_processoperation = idop
left join tb_volumes vo2 on vo2.id_processoperation = idop
left join tb_reconstructions re3 on re3.id_processoperation = idop
group by laboratory, event, brick, result_status, idcs, located, deadmaterial, passing, ds_any_done
```

STATUS OF DATA IN DB

Located events, no volume data available

DBEX_LOCATED_NOTSDATA `(located > 0 and deadmaterial = 0 and isvol = 0)`

LABORATORY	BRICKS
ANKARA	21
BARI	59
BERN	952
BOLOGNA-PADOVA	127
DUBNA	32
FRASCATI	21
LEBEDEV	27
NAGOYA	359
NAPOLI	523
ROMA	12
SALERNO	67
SINP-MSU	8

Some «located» events are not «decaysearched» hence not published yet, but that's not all

OPERA DB EXPORT & PRESERVATION

STATUS OF DATA IN DB

Decaysearched events, no volume data available

DBEX_DECAYSEARCH_NOTSDATA `(located > 0 and ds_any_done > 0 and isvol = 0)`

LABORATORY	BRICKS
ANKARA	13
BARI	28
BERN	890
BOLOGNA-PADOVA	92
DUBNA	28
FRASCATI	20
LEBEDEV	20
NAGOYA	127
NAPOLI	480
ROMA	7
SALERNO	21
SINP-MSU	3

Publication not done or incomplete transfer

STATUS OF DATA IN DB

Decaysearched events, no feedback

DBEX_DECAYSEARCH_NOFEEDBACK `(located > 0 and ds_any_done > 0 and isrec = 0)`

LABORATORY	BRICKS
ANKARA	5
BARI	8
BERN	428
BOLOGNA-PADOVA	30
DUBNA	3
FRASCATI	9
LEBEDEV	4
NAGOYA	121
NAPOLI	24
SALERNO	3

Publication not done or incomplete transfer

STATUS OF DATA IN DB

Bricks with no data at all

DBEX_BRICKS_NODATA `(issb = 0 and isvol = 0 and isrec = 0)`

LABORATORY	BRICKS
ANKARA	14
BARI	108
BERN	703
BOLOGNA-PADOVA	148
DUBNA	19
FRASCATI	18
LEBEDEV	16
NAGOYA	1659
NAPOLI	232
ROMA	18
SALERNO	147
SINP-MSU	22

Data not strictly needed but we should have a policy defined

STATUS OF DATA IN DB

Decaysearched events, no data

DBEX_DECAYSEARCH_NODATA `(ds_any_done > 0 and issb = 0 and isvol = 0 and isrec = 0)`

LABORATORY	BRICKS
ANKARA	5
BARI	8
BERN	361
BOLOGNA-PADOVA	8
DUBNA	3
FRASCATI	6
LEBEDEV	4
NAGOYA	112
NAPOLI	23
SALERNO	2

Publication not done or incomplete transfer

STATUS OF DATA IN DB

Passing-through/edgeout bricks, no scanning data

DBEX_PASSING_NOSCANDATA (passing > 0 and issb = 0 and isvol = 0)

LABORATORY	BRICKS
ANKARA	11
BARI	5
BOLOGNA-PADOVA	8
DUBNA	6
FRASCATI	3
LEBEDEV	7
NAGOYA	174
NAPOLI	45
ROMA	5
SINP-MSU	6

Publication not done or incomplete transfer

STATUS OF DATA IN DB

Passing-through/edgeout bricks, no feedback data

DBEX_PASSING_NOFEEDBACK (passing > 0 and isrec = 0)

LABORATORY	BRICKS
BOLOGNA-PADOVA	5
DUBNA	2
LEBEDEV	2
NAGOYA	174
NAPOLI	14
ROMA	4
SINP-MSU	9

Publication not done or incomplete transfer

STATUS OF DATA IN DB

Apparently export-ready events

DBEX_EXPORT_READY_CHECK1 `(ds_any_done > 0 and isvol > 0 and isrec > 0)`

LABORATORY	BRICKS
ANKARA	22
BARI	289
BERN	311
BOLOGNA-PADOVA	317
FRASCATI	42
LEBEDEV	6
NAGOYA	2944
NAPOLI	196
ROMA	62
SALERNO	478
SINP-MSU	15

This check alone is not sufficient, see more in the next slides

STATUS OF DATA IN DB

Probably export-ready events

DBEX_EXPORT_READY_CHECK2 `(DS primary vertex location is contained in a TS volume at least 5×5 mm$^2$)`

LABORATORY	DECAYSEARCHED	TSAVAILABLE
ANKARA	35	15
BARI	317	278
BERN	1262	108
BOLOGNA-PADOVA	428	279
DUBNA	28	0
FRASCATI	64	16
LEBEDEV	26	0
NAGOYA	3080	2887
NAPOLI	677	72
ROMA	69	59
SALERNO	500	463
SINP-MSU	18	5

```
select laboratory, ev, brick, result_status, idcs, 1 as ds_any_done, decode(sum(case when maxz is null then 0 when maxz > posz and minz < posz then 1 else 0 end),0,0,1) as hasvol from
(select laboratory, ev, brick, result_status, idcs, lastidr, id_vertex, posx, posy, posz, id_volume, max(Z) as maxz, min(Z) as minz from
(select laboratory, ev, brick, result_status, idcs, idr as lastidr from
(select laboratory, event+0 ev, brick, result_status, idcs, located, deadmaterial, passing, ds_any_done from xv_event_location_detail where ds_any_done > 0)
left join (select id_eventbrick, event+0 as event, max(id_reconstruction) as idr from vw_feedback_reconstructions group by id_eventbrick, event) on id_eventbrick = brick and event+0 = ev)
left join vw_feedback_vertices vx on vx.id_eventbrick = brick and id_reconstruction = lastidr and isprimary = 'Y'
left join tb_volume_slices sl on sl.id_eventbrick = brick and minx < posx and maxx > posx and miny < posy and maxy > posy and (maxx - minx) * (maxy - miny) > 25e6
left join tb_plates pl on pl.id_eventbrick = brick and pl.id = id_plate
group by laboratory, ev, brick, result_status, idcs, lastidr, id_vertex, posx, posy, posz, id_volume
) group by laboratory, ev, brick, result_status, idcs
```

Also this check is not sufficient, see more in the next slides

OPERA DB EXPORT & PRESERVATION

STATUS OF DATA IN DB

Special events (by DB tags)
2 τ, 24 charm

1041378
1046908

1014653
1020518
1027222
1034730
1035653
1037545
1044354
1048057
1059278
1065097
1066404
1073614
1077152
1078815
1079117
1082561
1085405
1107689
1110205
1118858
1127653
1140875
1142664
1150444

??

STATUS OF DATA IN DB

ν_e statistics

LABORATORY	RUNYEAR	TRIGGERED	STARTED	SCANNED	ANALYSED	DATASETS
BERN	2008	1	1	1	1	0
BOLOGNA-PADOVA	2008	3	3	3	3	2
NAGOYA	2008	6	0	0	0	0
NAPOLI	2008	3	3	3	3	0
BARI	2009	3	2	2	2	0
BERN	2009	5	5	5	5	0
BOLOGNA-PADOVA	2009	2	2	2	2	2
NAGOYA	2009	25	0	0	0	0
NAPOLI	2009	6	5	5	5	0
BARI	2010	2	2	2	2	0
BERN	2010	6	6	6	6	0
BOLOGNA-PADOVA	2010	3	3	3	3	3
DUBNA	2010	1	1	1	1	0
FRASCATI	2010	1	1	1	1	0
NAGOYA	2010	23	18	18	18	0
NAPOLI	2010	4	4	4	4	0
ROMA	2010	1	0	0	0	0
SALERNO	2010	4	4	4	4	1
BARI	2011	3	3	3	3	0
BERN	2011	9	9	9	9	0
BOLOGNA-PADOVA	2011	2	2	2	2	2
FRASCATI	2011	6	6	6	6	0
NAGOYA	2011	19	15	15	15	0
NAPOLI	2011	6	6	6	6	0
SALERNO	2011	1	1	1	1	0
BARI	2012	1	1	1	1	0
BERN	2012	11	11	11	11	0
BOLOGNA-PADOVA	2012	4	4	4	4	4
DUBNA	2012	1	1	1	1	0
NAGOYA	2012	11	5	5	5	0
NAPOLI	2012	9	9	9	9	0

133 completed events, not all ν_e's – missing datasets

STATUS OF DATA IN DB

Incomplete data transfers
DBEX_INVALID_DATASETS

LABORATORY	DATASETS
ANKARA	27
BARI	8
BERN	11
BOLOGNA-PADOVA	37
DUBNA	6
LYON	2
LNGS	13
ROMA	18
SALERNO	22
SINP-MSU	13

Interrupted transfer - data need to be deleted and published again

OPERA DB EXPORT & PRESERVATION

ACTIONS AND RECOMMENDATIONS

Out of 6486 events declared "decaysearched", we have no more than 4177 (64%) in the DB

If we manage to have all events, DB size will scale up to 86 TB, and export time will increase

It is later than we expected!

Indeed these estimates are optimistic because I cannot check correctness of data (and we know that at least flags are missing), only presence of "reasonable" datasets

I cannot check each event one-by-one, local responsibles **can**

This remains the responsibility of each scanning laboratory

ACTIONS AND RECOMMENDATIONS

Local scanning responsibles should check data – DB views are there to help you!

Flag events

Passing CHECK1 AND CHECK2 means that at least an event "looks correct" – but check physics flags (tau, charm, nue) in feedback

I cannot know how you found each event – local scanning responsibles have to decide whether to provide Scanback/TrackFollow/ScanForth in **addition** to **TotalScan** and **Feedback** (which are the minimum requirements for publication)

Complete publication

Retransmit interrupted data sets