

Oracle DBA Utils

must have, must know goodies from Oracle
and independent experts
part I

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- Oracle Database OCP 8i/9i/10g/11g,
- Oracle Application Server OCP 9i/10g
- IBM DB2 Database Administrator

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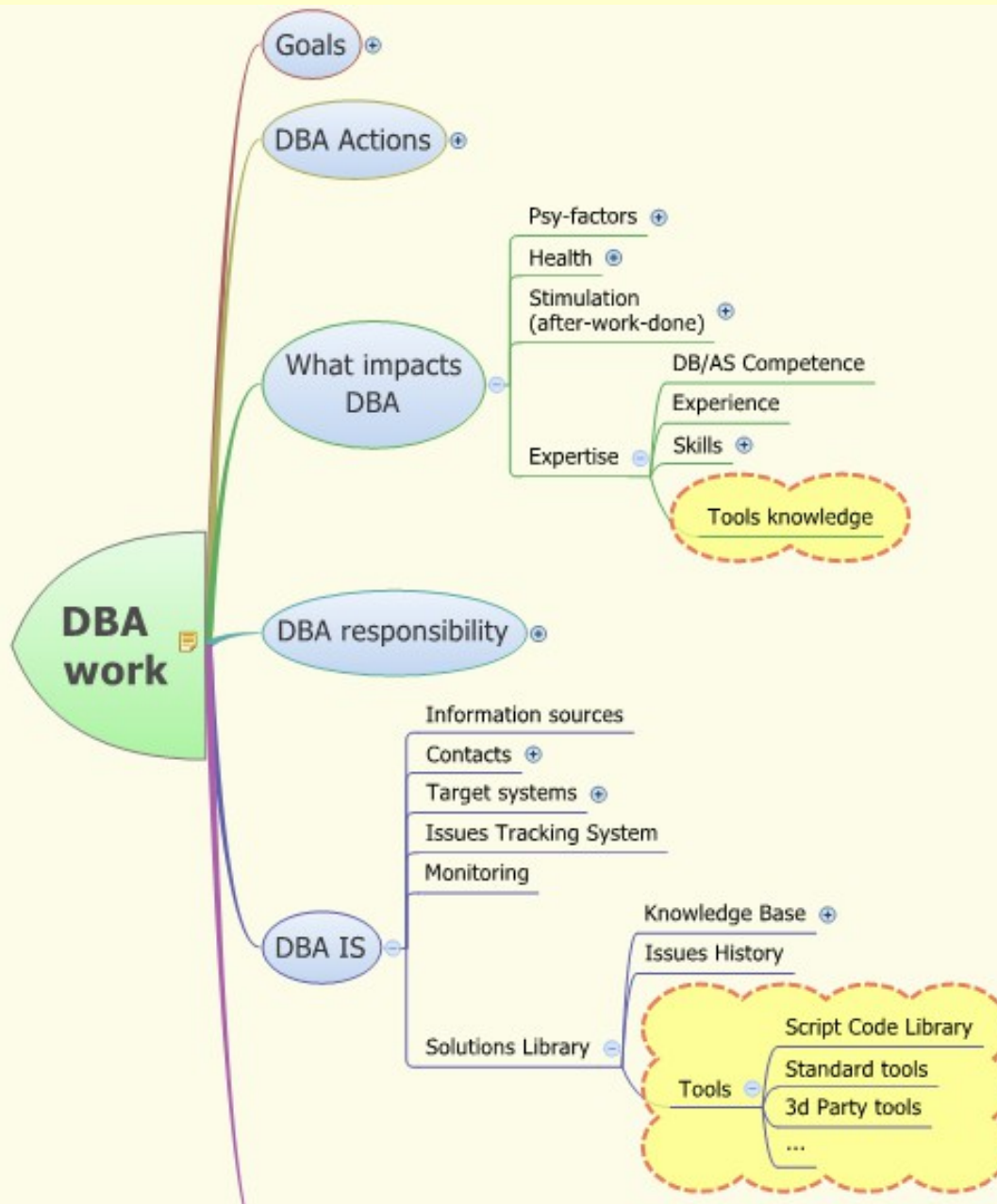
Agenda

- Oracle DBA Tools - overview
- Part I - Performance Tuning Tools (PTT)
 - for DB instance
 - for Session
 - for SQL
- PTT References
- Bonus track: SpaceStat 0.55
- Q + A

Oracle DBA Tools

overview

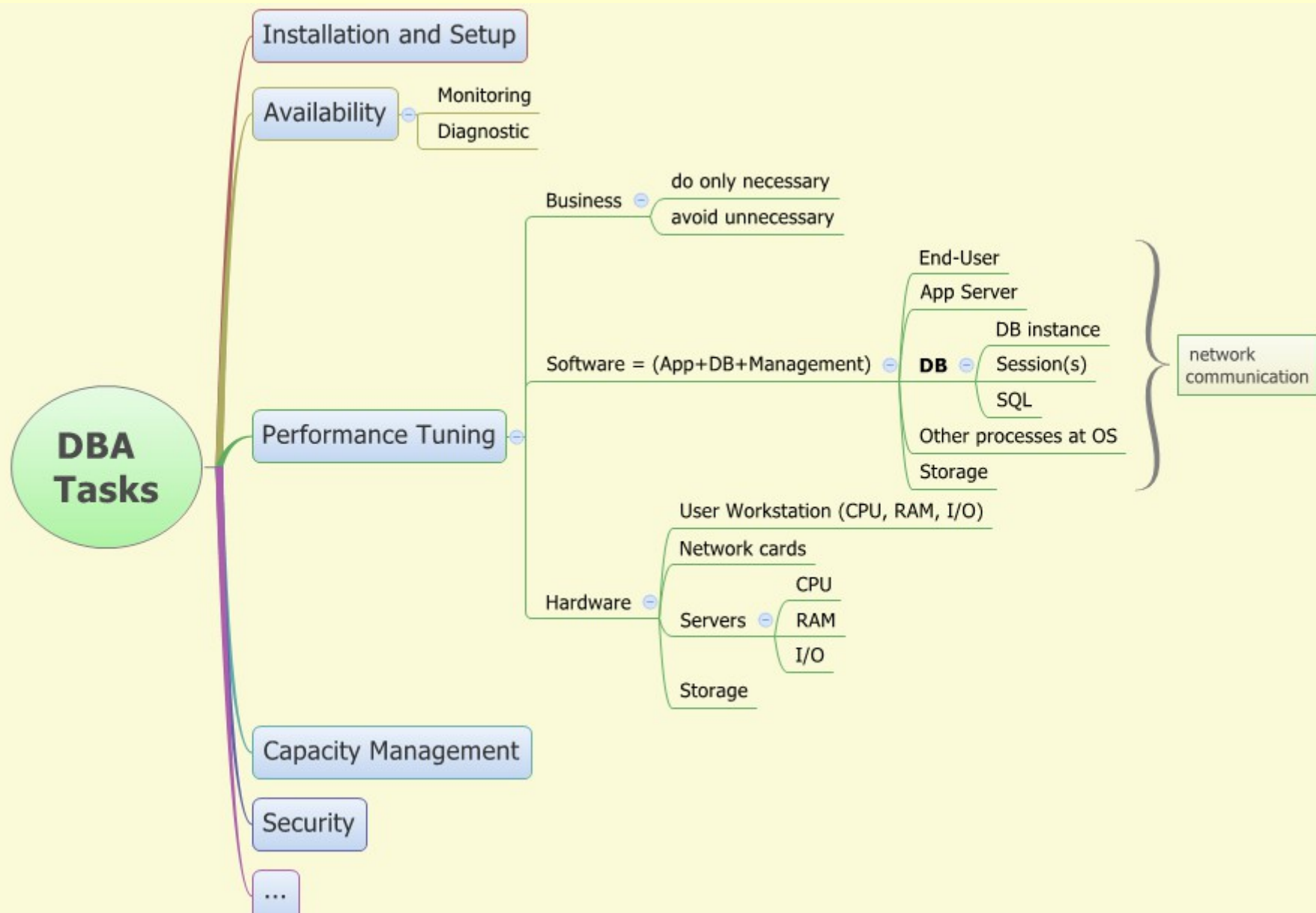
Why it is important



Information sources

- <http://www.oracle.com/>
 - Official white papers = marketing – **how customer should see it**
 - Product documentation = technical – **how it should work**, better since 10g
- My Oracle Support (MOS) – aka “Metalink” - <http://support.oracle.com/>
 - technical – **how it really works**
 - Patches, Scripts library, knowledge base, bugs and real cases solutions
 - Looks like garbage collector
 - › many similar documents available
 - › For ALL Oracle products, but filters available
 - Style improved last years
 - Many internal documents and tools uncovered last years
 - External experts articles uploaded or referenced as well
 - Video and community discussions
- Non-Oracle – check links at http://cominder.eu/index.php?action=technotes&topicid=dba_links

Today we will focus on...



Oracle DBA performance tuning tools

Performance Tuning

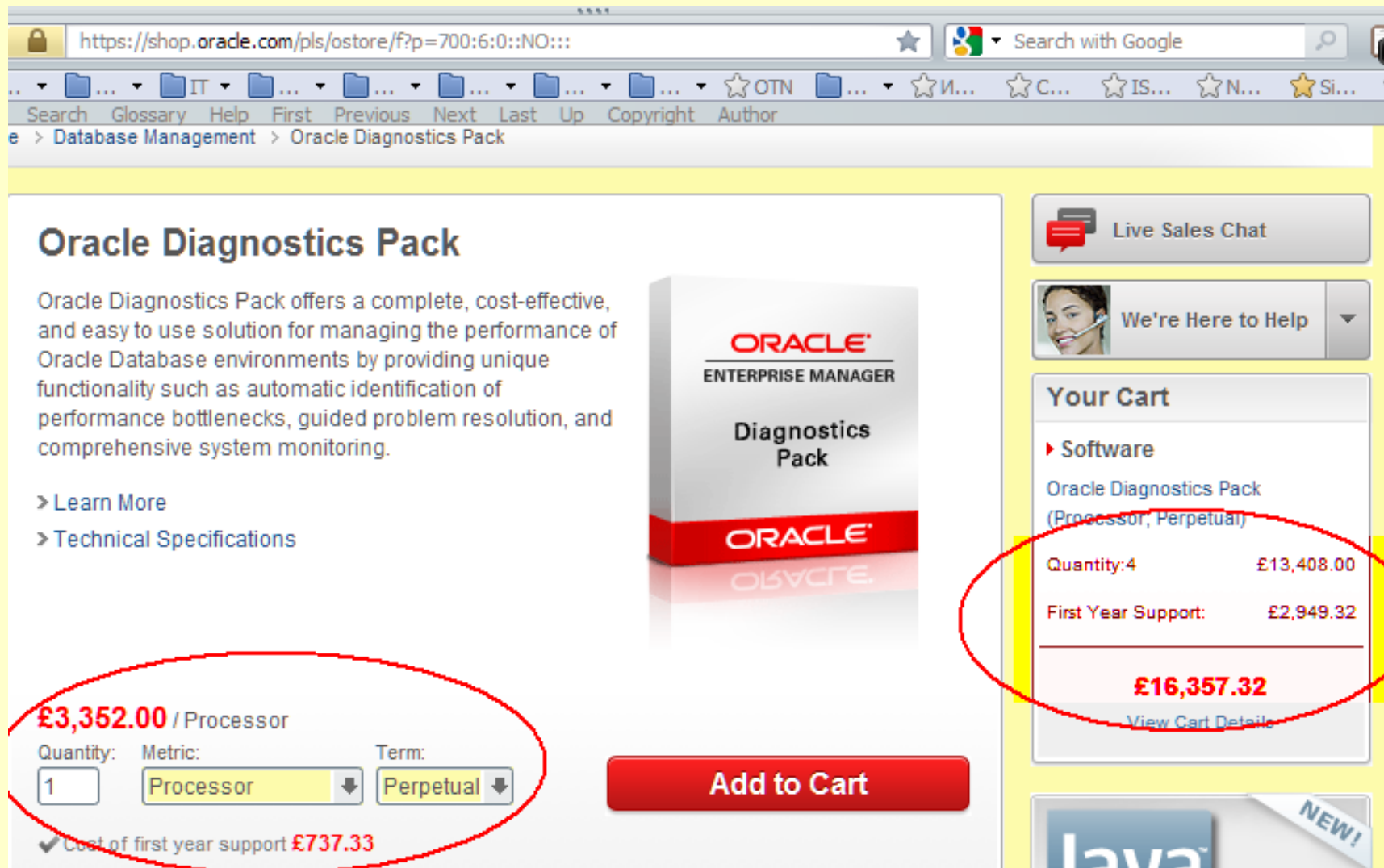
- On-line (fire-fighting)
- Off-line (normal analyse)

- Drill-down approach (by who is using)
 - OS
 - DB instance
 - Session(s)
 - SQLs
- Identify bottleneck per Class of work/wait
 - CPU
 - I/O
 - Locking

Oracle recommended tools

- **ADDM** - automatic
 - **AWR** – Automatic Workload Repository / **ASH** – Active Sessions History
 - Available in 10g/11g+
 - Really good!
“The Automatic Workload Repository (AWR) and Active Session History (ASH) are two very important utilities, that allow us to see what is happening on the database both from a holistic point of view and also at the session level.”
 - Reports available in EM (DB Console) or generated by provided scripts
 - Require at least **Diagnostic Pack (\$\$)**
“These 2 utilities are part of the Oracle Diagnostic Pack and require a special license to use.”
- src: Oracle Premier Support - Oracle Database Support News - November, 2012 Vol 22 [ID 1513219.1]
- **Tuning Sets + Advisors framework** – require **Tuning Pack (\$\$)**

Oracle recommended tools



Oracle Diagnostics Pack

Oracle Diagnostics Pack offers a complete, cost-effective, and easy to use solution for managing the performance of Oracle Database environments by providing unique functionality such as automatic identification of performance bottlenecks, guided problem resolution, and comprehensive system monitoring.

> Learn More
> Technical Specifications

£3,352.00 / Processor

Quantity: Metric: Term:

✓ Cost of first year support **£737.33**

ORACLE
ENTERPRISE MANAGER
Diagnostics Pack
ORACLE
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► Software

Oracle Diagnostics Pack (Processor, Perpetual)

Quantity: 4	£13,408.00
First Year Support:	£2,949.32

£16,357.32

[View Cart Details](#)

NEW!

See Also:

<http://www.pythian.com/blog/an-open-letter-to-larry-ellison-on-awr-and-ash-licensing/>

Free tools for off-line analysis

- StatsPack – available in 8i, 9i, 10g, 11g

“Those users who do not have this license, must use the statspack utility instead, which is still shipped with the Oracle Database.”

- Tracing:
 - Tracing can be enabled in many ways
 - TKPROF
 - TRCA – Trace Analyzer
- SQL – Analyse
 - SQLHC – SQL Healthcheck
 - SQLT – more advanced than SQLHC
- *DBMS_PROFILER (calls must be embedded into application or DB code)*
- *Custom Collection of SQL/Scripts*

Choose the “microscope”

\ Scope Tools \	DB instance	Session(s)	Singe SQL(s)	Multiple SQL(s)	Notes
ADDM	auto	auto	auto	auto	10g+
AWR / ASH	+	+?	+	-	Diagnostic Pack
T-SETs +Advisors	!	!	+	+	Tuning Pack
StatsPack	+	+	+	-	free, just install
Trace					free, standard feature
* TKPROF	-	+	+	+	free, pre-installed binary
* TRCA	-	+	+	+	free, extra install in DB
SQL analysis					
* SQLHC	-	-	+	-	free, extra download, 10G+
* SQL-T	-	-	+	-	free, extra install in DB

StatsPack

- Installation:
 - Create tablespace + `@?/rdbms/admin/spcreate` (or `spdrop` to remove)
- Setup
 - Snapshot level (what and how detailed data collected)
 - Thresholds (which SQL-s will be filtered out)
 - Some variables for reporting (like number of rows for SQL, etc.)
- Snapshotting
 - Whole DB instance
 - For Session (`session_id=..`)
- Reporting
 - The Instance Report (`spreport.sql` and `sprepins.sql`)
note: session statistics will be added to reports if was snapshot per session
 - The SQL report (`sprepsql.sql` and `sprsqins.sql`)
 - It is just SQL reports ==> we can improve it!

Tracing

- Trace can be enabled in many ways:
 - alter session set SQL_TRACE = TRUE;
 - alter session set events '10046 trace name context forever,level 12';
 - exec DBMS_SUPPORT.START_TRACE(..);
 - exec DBMS_MONITOR.SESSION_TRACE_ENABLE(..)
 - exec DBMS_MONITOR.CLIENT_ID_TRACE_ENABLE(..)
 - exec DBMS_SYSTEM.SET_SQL_TRACE_IN_SESSION(&SID,&SERIAL,FALSE);
 - exec DBMS_SUPPORT.START_TRACE_IN_SESSION(&SID,&SERIAL, waits=>true, binds=>true);
 - exec DBMS_SYSTEM.SET_EV(&SID,&serial, 10046,12,");
 - oradebug event 10046 trace name context forever, level 12
- Requirements (to make trace usable)
 - statistics_level = typical; timed_statistics = true;
- Enable options
 - In current session or for other session
 - In logon trigger...
- DB in MTS (Shared Server) mode – use TRCSESS to merge session traces into one (10g+)

TRCA – Trace Analyzer

- Installation:
 - Download from MOS
 - Create tablespace + packages
 - 9i, 10g, 11g
- Processing
 - On source system (attach to DB to get execution plans and other info) - **Recommended**
 - On other system
- Input (via sql*plus)
 - Process one trace or many related traces (list in trca control file)
- Output (all packaged into .zip file)
 - HTML file with better formatting and more details compared to TKPROF
 - The same in TEXT file
 - Log-file
 - TKPROF files too

SQL Healthcheck

- SQLHC - subset of the SQL used by the SQLTXPLAIN (SQLT) for “lightweight” initial check
- SQLHC - is used to check the environment in which a single SQL Statement runs:
 - checks Cost-based Optimizer (CBO) statistics
 - schema object metadata
 - configuration parameters
 - and other elements
- **Requirements:**
 - 10g+
 - Optional: Diagnostic and Tuning Pack (it will use that info if available)
- **Input:** SQL_ID from an AWR or ASH report or you can select it (SQL_ID) from V\$SQL
- **Processing:** @sqlhcxec.sql - it just collect information, does not execute SQL itself!
- **Output:** Health-check Report (MOS note 1366133.1 have sample output and presentation)

SQLT (SQLTXPLAIN)

- SQLT - Advanced tool to diagnose SQL statements performing poorly
- Sometimes – the Time of diagnostic may be quite long!
- **Requirements:**
 - 9i+
 - Optional: Diagnostic and Tuning Pack (it will use that info if available)
- **Input:** SQL_ID from an AWR or ASH report or you can select it (SQL_ID) from V\$SQL. works on a single SQL statement at a time and captures only ONE specific SQL_ID or HASH_VALUE.
- **Processing:** @sqlhcxec.sql - it just collect information, does not execute SQL itself!
- **Output:** Set of HTML, Text, sql and other files. Start with:
 - sqlt_sNNNNN_lite.html
 - sqlt_sNNNNN_main.html
 - sqlt_sNNNNN_readme.html
- MOS note 215187.1 have sample output and presentation

oratop – for on-line analysis

- Like top in OS – for On-Line picture
- Is a compiled C program.
- Check MOS Note 1500864.1 for:
 - Downloads for 32 and 64-bit Linux
 - Quick Start Guide and User Guide
 - Sample output
- Limitations:
 - The program is not portable; it runs on **Linux** platforms only, but: **can be used to monitor remote databases on any platform.**
 - The program is compatible with oracle client version 11.2.
 - Server compatibility with 11.2 onward.
 - Requires server to have been started with the following parameters:
 - `statistics_level=TYPICAL`
 - `timed_statistics=TRUE`

Links and Notes

Links:

- General notes:
 - [Oracle Performance Diagnostic Guide \(OPDG\) \[ID 390374.1\]](#)
 - [Get Proactive with Oracle Database Diagnostic Tools \[ID 1459344.1\]](#)
 - [SQL_TRACE \(10046\), TKProf and Explain Plan - Overview Reference \[ID 1459344.1\]](#)

- ADDM / AWR / ASH
 - [How to use the Automatic Database Diagnostic Monitor \[ID 250655.1\]](#)
 - [AWR Reporting - Licensing Requirements Clarification \[ID 1490798.1\]](#)
 - [Automatic Workload Repository \(AWR\) Reports - Start Point \[ID 1363422.1\]](#)
 - [FAQ: How to Use AWR Reports to Diagnose Database Performance Issues \[ID 1359094.1\]](#)

Links: Statspack

- Statspack
 - Installing and Configuring StatsPack Package [ID 149113.1]
 - FAQ- Statspack Complete Reference [ID 94224.1]
 - Statistics Package (STATSPACK) Guide [ID 394937.1]
 - Gathering a StatsPack snapshot [ID 149121.1]
 - Systemwide Tuning using STATSPACK Reports [ID 228913.1]
 - To fix some issues in 11g:
<http://kerryosborne.oracle-guy.com/2008/11/statspack-still-works-in-10g-and-11g/>

Links: Trace tools

- Tracing:
 - How To Collect 10046 Trace (SQL_TRACE) Diagnostics for Performance Issues [ID 376442.1]
 - General SQL_TRACE / 10046 trace Gathering Examples [ID:1274511.1]
 - How to Enable SQL_TRACE for Another Session or in MTS Using Oradebug [ID 1058210.6]
 - Methods for tracing sessions which use database links [ID 1531375.1]
 - How To Trace A Dblink (Database Link) Activity (On Local And Remote Sides) [ID 422455.1]
 - What is TRCSESS and How to use it ? [ID 280543.1]
- TRCA – TKPROF and Trace Analyzer
 - NOTE:41634.1 - TKProf Basic Overview
 - NOTE:32951.1 - TKProf Interpretation (9i and below)
 - NOTE:760786.1 - TKProf Interpretation (9i and above)
 - <http://www.ordba.net/Tutorials/OracleUtilities~TKPROF.htm>
 - NOTE:224270.1 - TRCANLZR (TRCA): SQL_TRACE/Event 10046 Trace File Analyzer - Tool for Interpreting Raw SQL Traces

Links: SQLHC, SQLT

- SQLHC

- NOTE:1366133.1 - SQL Tuning Health-Check Script (SQLHC)
- NOTE: 1417774.1 FAQ: SQL Health Check (SQLHC) Frequently Asked Questions
- NOTE: 1455583.1 SQL Tuning Health-Check Script (SQLHC) Video

- SQLT

- NOTE:215187.1 - SQLT (SQLTXPLAIN) - Tool that helps to diagnose a SQL statement performing poorly
- FAQ: SQLT (SQLTXPLAIN) Frequently Asked Questions [ID 1454160.1]
- NOTE 1470811.1 How to Use SQLT (SQLTXPLAIN) to Create a Testcase Without Row Data
- NOTE: 1465741.1 How to Use SQLT (SQLTXPLAIN) to Create a Testcase Containing Application Data
- Sample report and author's notes at <http://carlos-sierra.net/category/sqltxplain-sqlt/>

Bonus track:

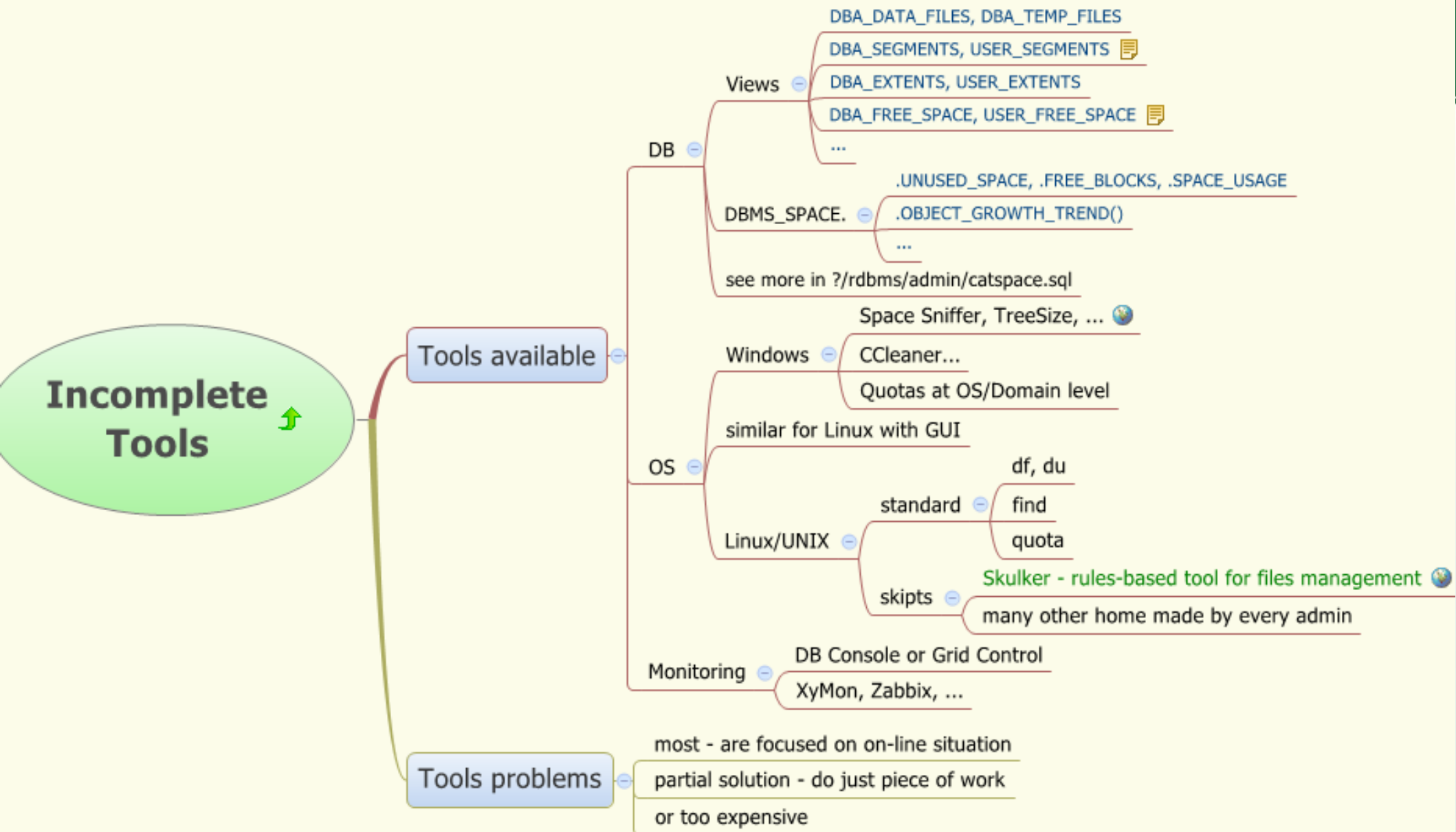
SpaceStat

some steps to space control

SpaceStat

- CoMinder SpaceStat:
 - Collection of SQL, Shell (cmd – is planned) scripts
 - Collects DB space info (ASM, OS files/dirs size info – is planned)
 - Snapshots like in StatsPack, but for space segments
 - Based on DB views: DBA_SEGMENTS, DBA_DATA_FILES,
 - Reports current state and/or changes for period
 - Usage by files, file types
 - Usage by segments
 - Usage by users
 - Size dynamics
 - Other (can easy develop new reports)
 - **History**
 - Available for download since 1st June, 2012
 - Ver. 0.55 published 16 of June, 2013

SpaceStat – why it was made?!



SpaceStat

- DB – Summary

```
SPACESTAT report for

DB_NAME          DBID  CREATED                LOG_MODE
-----
DEMODB          77043597  13.05.2011 21:32:19 ARCHIVELOG
-----

Hostname:          abc-oracle04.abc.com
Instance:          DEMODB
Started:           01.02.2012 23:06:00
Server IP:         10.10.10.10
OS:                x86_64/Linux 2.4.xx

Begin Snap:94  DEMODB 01-04-2012 01:01:03
End Snap:158  DEMODB 01-05-2012 01:01:03
Elapsed:30 days

=== Files Size ===
      OLD_GB      NEW_GB      DELTA_GB      D_PCT      AVG_DAY_GB
-----
      285.08      299.97      14.89      5.22      .496

=== By Files type ===
FILE_TYPE          OLD_GB      NEW_GB      DELTA_GB      D_PCT
-----
DATA_FILE          277.08      291.97      14.89      5.37
TEMP_FILE          8.00        8.00        .00        .00
```

SpaceStat

- DB – Summary

```
=== Segments Size ===
      OLD_GB      NEW_GB      DELTA_GB      D_PCT      AVG_DAY_GB
-----
      260.48      273.07      12.59      4.83      .420
=== By Segment type ===
SEGMENT_TYPE      OLD_GB      NEW_GB      DELTA_GB      D_PCT
-----
TABLE              148.80      157.07      8.27      5.56
INDEX              100.57      103.27      2.69      2.68
TYPE2 UNDO         5.27        6.57        1.30      24.69
LOBSEGMENT         5.72        6.05        .32       5.67
CLUSTER            .10         .10         .00       .06
LOBINDEX           .03         .03        -.00      -.23
ROLLBACK           .00         .00         .00       .00
CACHE              .00         .00         .00       .00
TABLE PARTITION    .00         .00         .00       .00
NESTED TABLE      .00         .00         .00       .00
```

SpaceStat

- DB – Segments changes

=== New SEGMENTS existing in 157 DEMODB 01-05-2012 01:01:01 only (or size=0 in 93 DEMODB 01-04-2012

OWNER	SEGMENT_TYPE	SEGMENT_NAME	TABLESPACE_NAME	NEW_MB
STEN	TABLE	JN_BAAK_DETAILS	JN_TBL	136.00
STEN	INDEX	JN_BAAK_DETAILS_ROW_ID_I	JN_IND	52.00
RSJOBMAN	TABLE	RW_SERVER_QUEUE	TOOLS	26.00
STEN	INDEX	JN_BAAK_DETAILS_IDS_I	JN_IND	24.00
STEN	TABLE	JN_BAAK_FACT_ALL_TM	JN_TBL	22.00

=== Old SEGMENTS exist in 93 DEMODB 01-04-2012 01:01:01 only (or size=0 in 157 DEMODB 01-05-2012

OWNER	SEGMENT_TYPE	SEGMENT_NAME	TABLESPACE_NAME	OLD_MB
STEN	TABLE	TESTFACT_ERROR_2011_07_15	STEN_TBL	183.00
STEN	TABLE	TOGF_TRANS_20100608_BCK	STEN_TBL	41.00
STEN	TABLE	YDELSER_20110831	STEN_TBL	13.00
STEN	TABLE	YDELSER_20110704	STEN_TBL	12.00
STEN	TABLE	TUNDE_31122010_16	STEN_TBL	5.00

===== CHANGED SEGMENTS =====

OWNER	SEGMENT_TYPE	SEGMENT_NAME	TABLESPACE_NAME	OLD_MB	NEW_MB	DELTA_MB
STEN	TABLE	JN_BAAK_GODS	JN_TBL	16633.00	18041.00	1408.00
STEN	TABLE	JN_BAAK_LIN	JN_TBL	12223.00	13567.00	1344.00
STEN	TABLE	JN_BAAK	JN_TBL	12295.00	13570.00	1275.00
STEN	TABLE	DWH_FACT_BAAK_LIN	STEN_AVG_TBL	4169.00	4864.00	695.00
STEN	INDEX	PK_TESTFACT_FLD_IOT	EDIF_BIG_TBL	11136.00	11584.00	448.00
STEN	TABLE	DWH_FACT_BAAK_LIN_BAK	STEN_AVG_TBL	496.00	896.00	400.00
PERFSTAT	TABLE	STATS\$SQLTEXT	PERFSTAT	432.00	819.94	387.94
STEN	INDEX	JN_BAAK_LIN_ROW_ID_I	JN_IND	2240.00	2260.00	20.00

DB space details

- DB – Top 100 segments

```
select TOT.* from (
select B.OWNER, B.SEGMENT_TYPE, B.SEGMENT_NAME, B.TABLESPACE_NAME,
      B.BYTES/1024/1024 MBYTES, B.BYTES/S.SBYTES*100 PCT
  from DBA_SEGMENTS B,
      (select sum(bytes) SBYTES from DBA_SEGMENTS) S
 order by B.BYTES DESC, B.OWNER, B.SEGMENT_TYPE, B.SEGMENT_NAME
) TOT where rownum<101;
```

OWNER	SEGMENT_TYPE	SEGMENT_NAME	TABLESPACE	MBYTES	PCT
STEN	TABLE	JN_TAAK_GOODS	JN_TBL	17593	6.26
STEN	TABLE	TSS_SEGMENTS	STEN_TBL	14745	5.25
STEN	TABLE	TAAK_LIN	TAAK_BIG_TBL	13351	4.75
STEN	TABLE	JN_TAAK	JN_TBL	13126	4.67
STEN	TABLE	JN_TAAK_LIN	JN_TBL	13119	4.67
STEN	INDEX	PK_EDIFACT_FLD_IOT	EDIF_BIG_TBL	11456	4.08
STEN	TABLE	TAAK_GOODS	TAAK_BIG_TBL	7042	2.51
STEN	TABLE	BOGF_TRANS	BOGF_BIG_TBL	6912	2.46
STEN	TABLE	ADRESSE	ADR_BIG_TBL	5888	2.10
STEN	LOBSEGMENT	SYS_LOB0000027537C00005\$\$	STEN_SML_TBL	4676	1.66

DB space details

- DB – Top 20 users

```
select TOT.* from (  
select B.OWNER, sum(B.BYTES/1024/1024) MBYTES, sum(B.BYTES)/S.SBYTES*100 PCT  
  from DBA_SEGMENTS B,  
       (select sum(bytes) SBYTES from DBA_SEGMENTS) S  
group by B.OWNER, S.SBYTES  
order by MBYTES DESC  
) TOT where rownum<21;
```

OWNER	MBYTES	PCT
STEN	263224.19	94.11
SYS	6007.65	2.15
PERFSTAT	3569.56	1.28
TAYB	973.19	0.35
ANI	900.94	0.32
CPROTO	727.69	0.26
ABW	707.00	0.25
SYSKNL	524.31	0.19
HKISKO	357.63	0.13
GOTICH	313.19	0.11
ASRNAF	264.19	0.09
CPHNRA	121.25	0.04
SPACESTAT	86.69	0.03

DB size dynamic

- sps_report_dynamo_db.sql (added in 0.55)

```
Please specify reporting date start in format of YYYY.MM.DD: 2013.01.01
Please specify reporting date end in format of YYYY.MM.DD: 2013.04.30
===== Database Files Size Dynamic =====
```

SNAP_ID	SNAP_TS	DB_FILE_GB	CTL	REDO	UNDO	TEMP	DATA
651	01.01.2013 01:01:03	387.026	0.000	6.000	5.438	8.000	367.588
661	06.01.2013 01:01:02	390.869	0.000	6.000	6.500	8.000	370.369
675	13.01.2013 01:01:02	393.869	0.000	6.000	6.500	8.000	373.369
689	20.01.2013 01:01:02	400.369	0.000	6.000	6.500	8.000	379.869
703	27.01.2013 01:01:02	407.278	0.000	6.000	6.563	8.000	386.715
713	01.02.2013 01:01:02	410.403	0.000	6.000	6.563	8.000	389.840
717	03.02.2013 01:01:02	411.153	0.000	6.000	6.563	8.000	390.590
731	10.02.2013 01:01:03	415.279	0.000	6.000	6.563	8.000	394.716
747	17.02.2013 01:01:02	426.216	0.000	6.000	9.188	8.000	403.029
771	07.04.2013 01:01:01	425.985	0.000	6.000	10.500	8.000	401.485
785	14.04.2013 01:01:01	429.071	0.000	6.000	10.500	8.000	404.571
791	17.04.2013 01:01:02	430.377	0.000	6.000	10.500	8.000	405.877
793	18.04.2013 01:01:01	430.752	0.000	6.000	10.500	8.000	406.252
795	19.04.2013 01:01:02	431.439	0.000	6.000	10.500	8.000	406.939
797	20.04.2013 01:01:02	431.971	0.000	6.000	10.500	8.000	407.471
799	21.04.2013 01:01:02	432.283	0.000	6.000	10.500	8.000	407.783
801	22.04.2013 01:01:02	411.192	0.000	6.000	1.063	8.000	396.129
803	23.04.2013 01:01:01	413.942	0.000	6.000	3.438	8.000	396.504
805	24.04.2013 01:01:01	415.382	0.000	6.000	3.438	8.502	397.441
807	25.04.2013 01:01:01	415.632	0.000	6.000	3.438	8.502	397.691
809	26.04.2013 01:01:01	416.976	0.000	6.000	3.751	8.502	398.723
811	27.04.2013 01:01:01	417.757	0.000	6.000	3.751	8.502	399.504

DB size dynamic

- sps_report_dynamo_db.sql

```

===== Database Segments Size Dynamic =====
SEGMENT_TYPE      COLUMN
*****
TABLE              TBL
INDEX              IND
LOBSEGMENT         LOBS
LOBINDEX           LOBI
TABLE PARTITION    TBLP
INDEX PARTITION    INDP
LOB PARTITION      LOBP
NESTED TABLE      NEST
TYPE2 UNDO         UNDO
ROLLBACK           RLB
CACHE              CCH
CLUSTER            CLST
    
```

SNAP_ID	SNAP_TS	DB_SEGS_GB	TBL	IND	TBLP	INDP	LOBS	LOBI
800	21.04.2013 01:01:02	388.423	240.945	134.323	0.00006	0.00000	9.703	0.027
652	01.01.2013 01:01:03	351.917	219.803	119.609	0.00006	0.00000	8.711	0.027
662	06.01.2013 01:01:03	355.872	221.404	121.402	0.00006	0.00000	8.781	0.027
676	13.01.2013 01:01:02	358.797	223.300	122.682	0.00006	0.00000	8.789	0.027
690	20.01.2013 01:01:02	361.596	225.354	123.539	0.00006	0.00000	8.859	0.027
704	27.01.2013 01:01:03	357.011	220.824	123.158	0.00006	0.00000	8.922	0.027

SpaceStat links

- Download CoMinder SpaceStat: <http://cominder.eu/index.php?action=solutions>
- "Some Steps to Space Control" article in UKOUG magazine Oracle Scene, Issue 48 at <http://viewer.zmags.com/publication/81b2adef#/81b2adef/40>
- OUG Harmony 2012 presentation "Space Control - how to stop loosing space and time, and become living.": http://cominder.eu/getfile.php?dfa=spacecontrol_pdf&dfv=last
- Similar tool: Database Size Stat (DSS) by Damir Vadas
<http://damir-vadas.blogspot.com/2010/02/monitor-database-size.html>
<http://damir-vadas.blogspot.com/2011/10/monitor-database-size-part-ii.html>
but: “Non commercial/production use only!
All others use only with author permission.”

Q + A

Thanks for attention!

Andrey Chervonets

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www: <http://www.cominder.eu>