

ORACLE®

ORACLE
OPEN
WORLD

experience

INNOVATION

November 11–15, 2007

ORACLE®




ORACLE®



DBA's New Best Friend: Advanced SQL Tuning Features of Oracle Database 11g

Peter Belknap, Sergey Koltakov, Jack Raitto



The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Agenda

- SQL Tuning Challenges
- Oracle Database 11g Solutions
 - Automatic SQL Tuning
 - Real-time SQL Monitoring
 - Partition Advisor
- Q & A

SQL Tuning Challenges

- Oracle Database 10g introduced SQL advisors to simplify application and SQL tuning
- Remaining challenges
 - SQL Tuning still reactive
 - Painful to find and investigate long-running SQL
 - Partitioning excluded from schema optimization advice
- Oracle Database 11g solutions
 - Automatic SQL Tuning
 - Real-time SQL Monitoring
 - Partition Advisor component of SQL Access Advisor

Automatic SQL Tuning

The Self-Managing Database

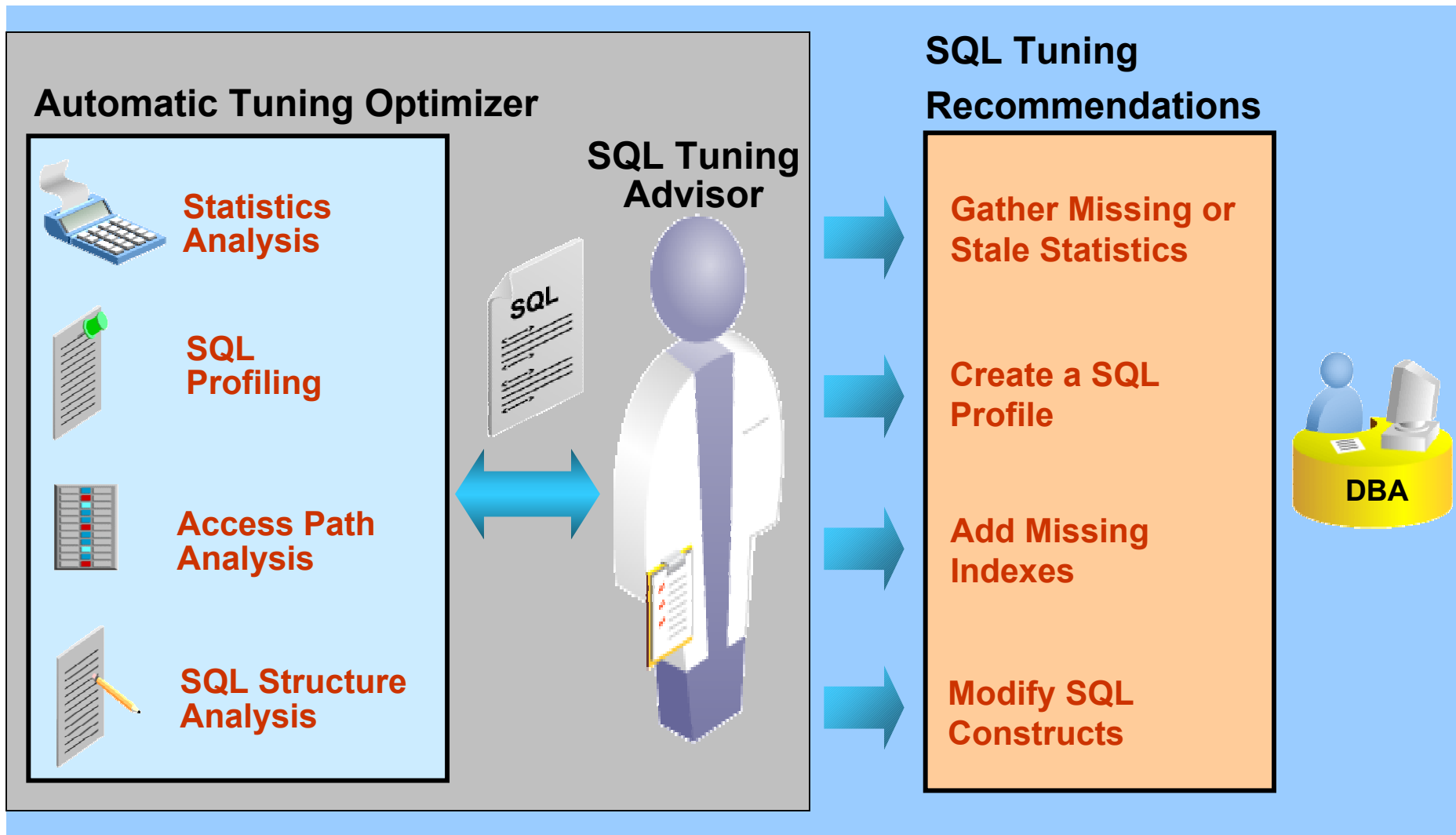


Challenges of Manual SQL Tuning

- Requires expertise in several domains
 - SQL optimization: adjust the execution plan
 - Access design: provide fast data access
 - SQL design: use appropriate SQL constructs
- Time consuming
 - Plans are complicated
 - Each SQL statement is unique and each execution can be different
 - Potentially large number of statements to tune
 - Testing proposed changes is labor-intensive
 - Many possible ways to a solution
- Never ending task
 - SQL workload always evolving
 - Plan regressions

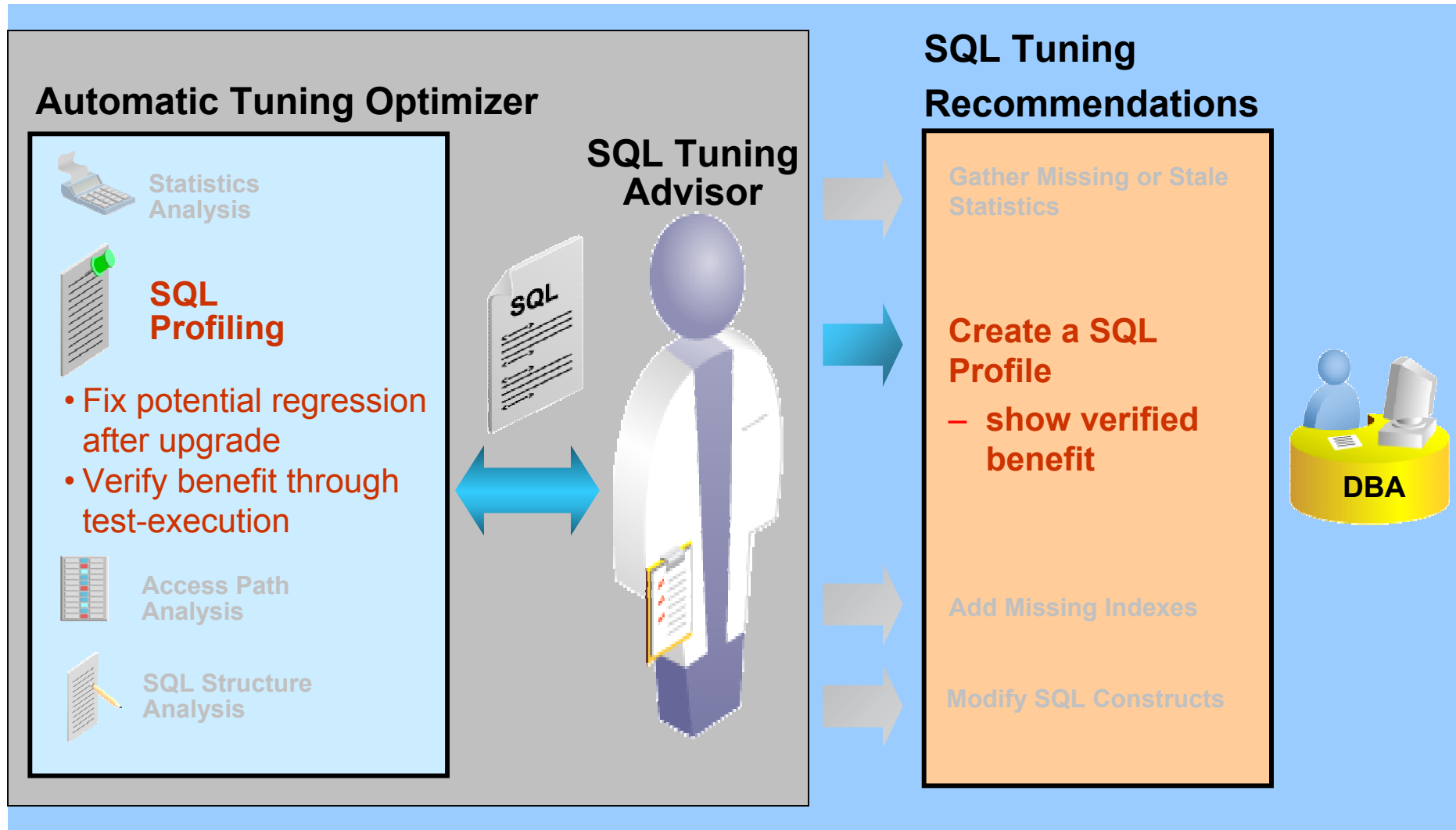
Simplifying SQL Tuning

SQL Tuning Advisor, since Oracle Database 10g



Improvements in Oracle Database 11g

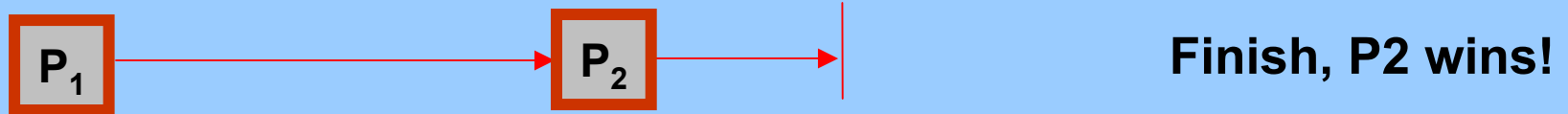
Better SQL Profiling



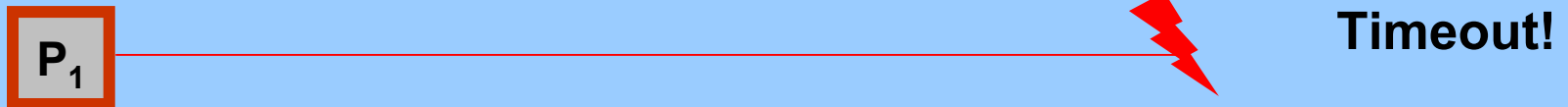
Testing SQL Profiles (1)

Measuring actual benefit with test-execution

Naïve: Execute in Order



But what if P1 never completes?



It would be great to run them concurrently....



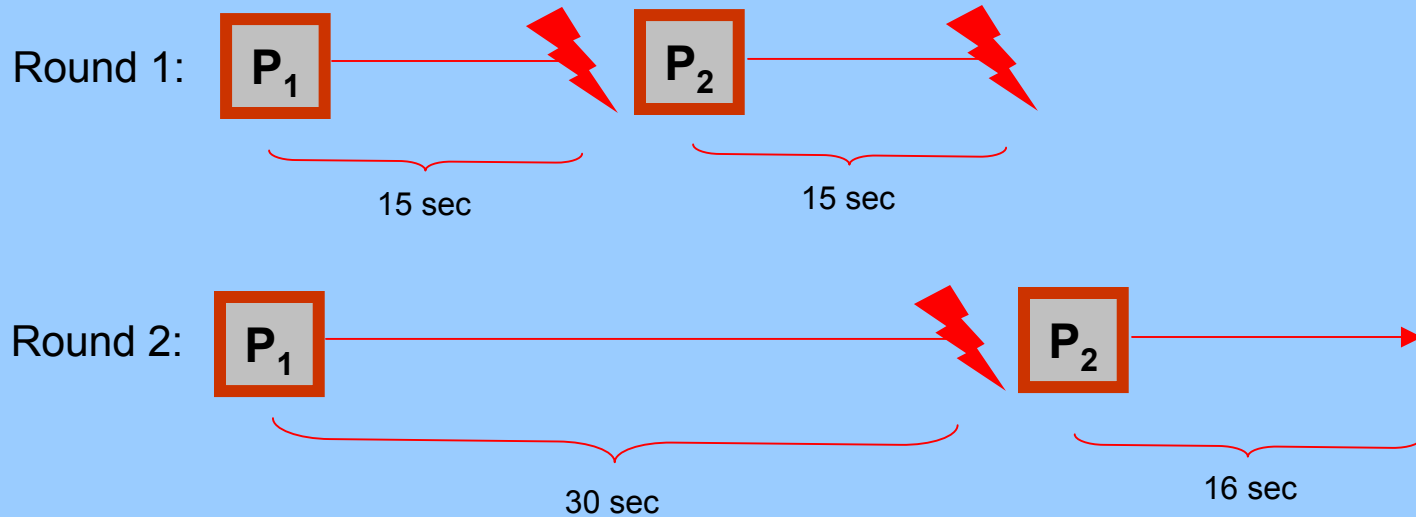
But then I take 2 CPUs, and N in the general case...



Testing SQL Profiles (2)

Measuring actual benefit with test-execution

Solution: Tournament Execution

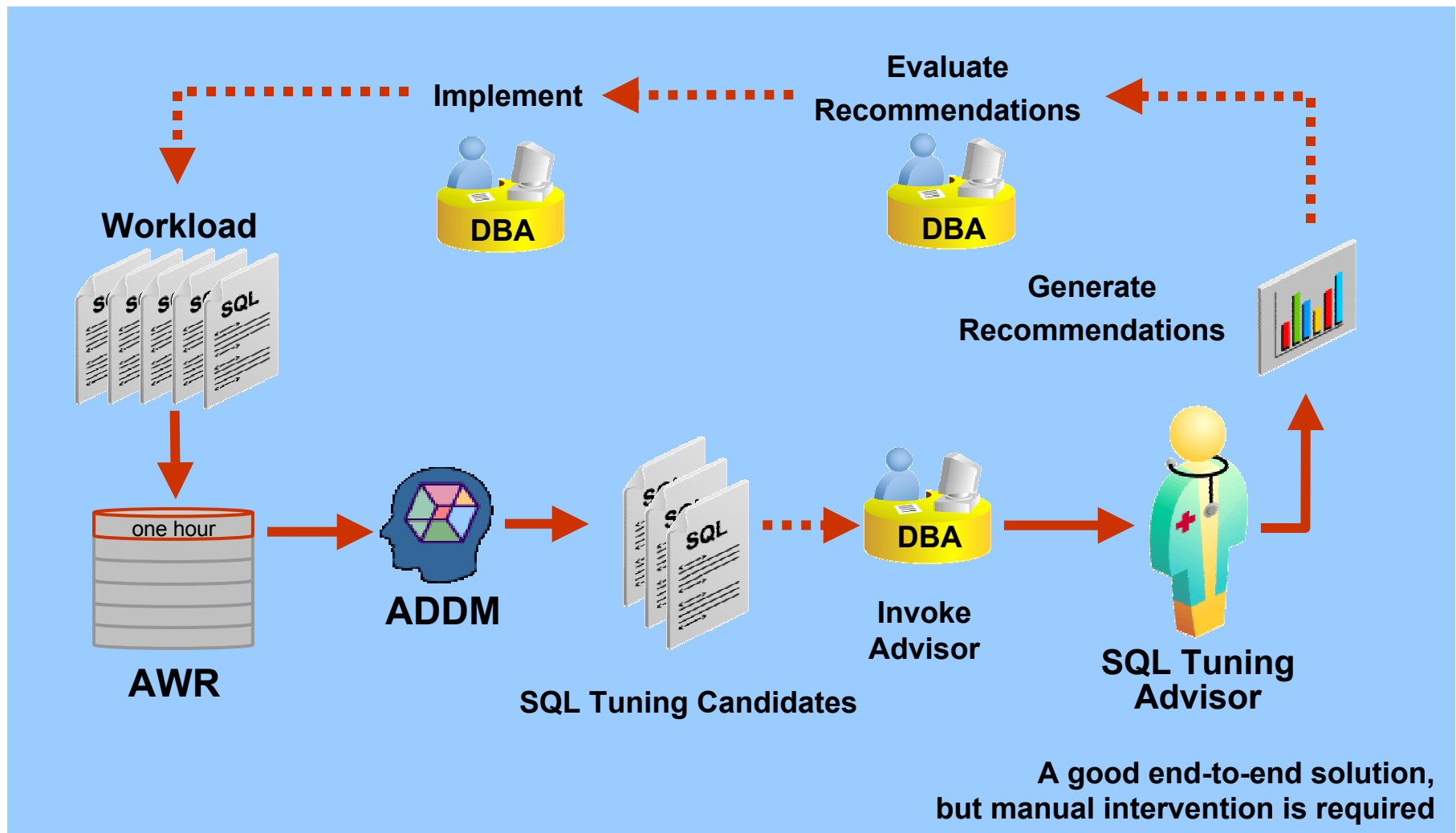


Your winner, with a knockout in the second round, P_2 !



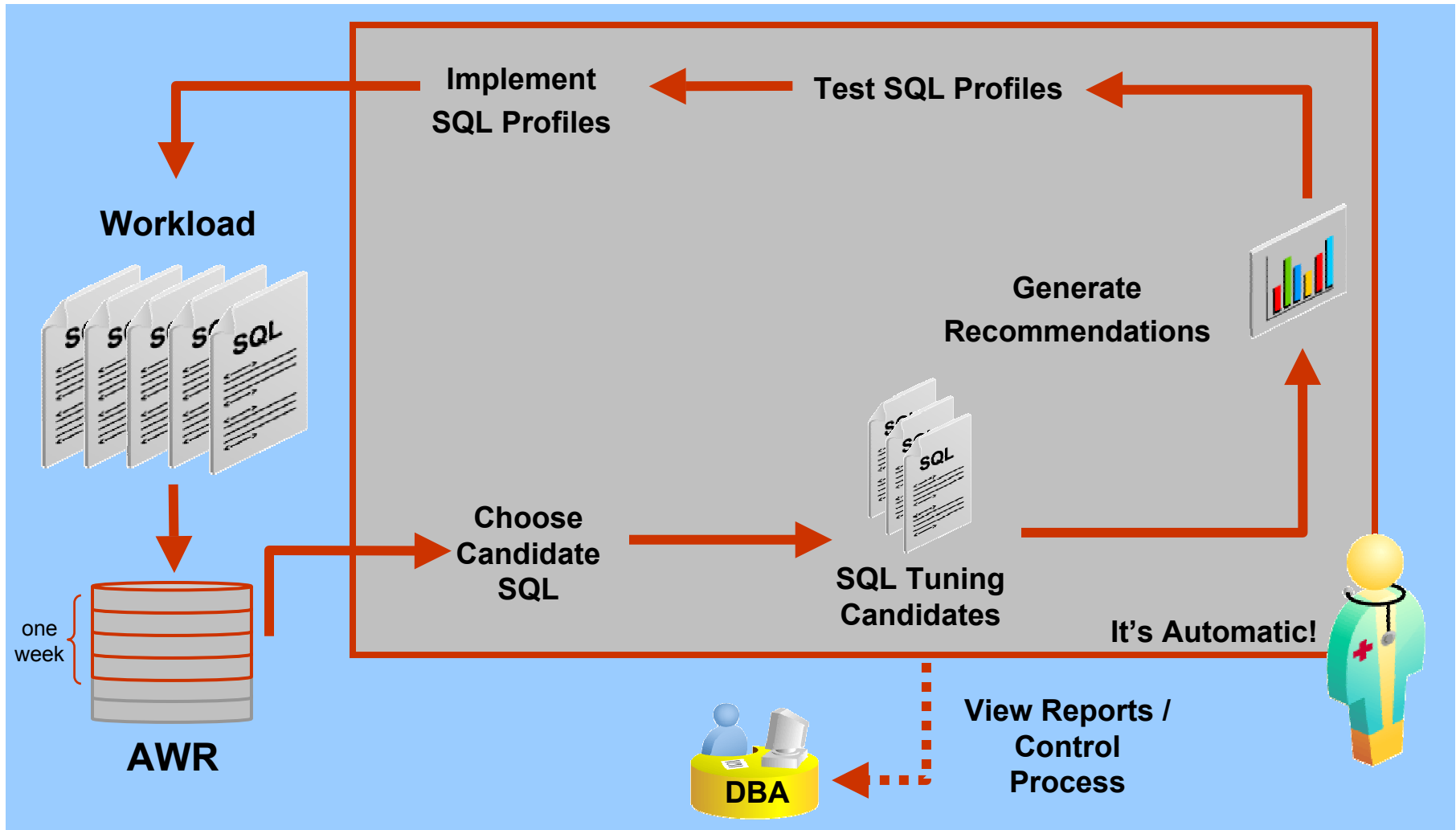
SQL Tuning in Oracle Database 10g

End-to-end Workflow

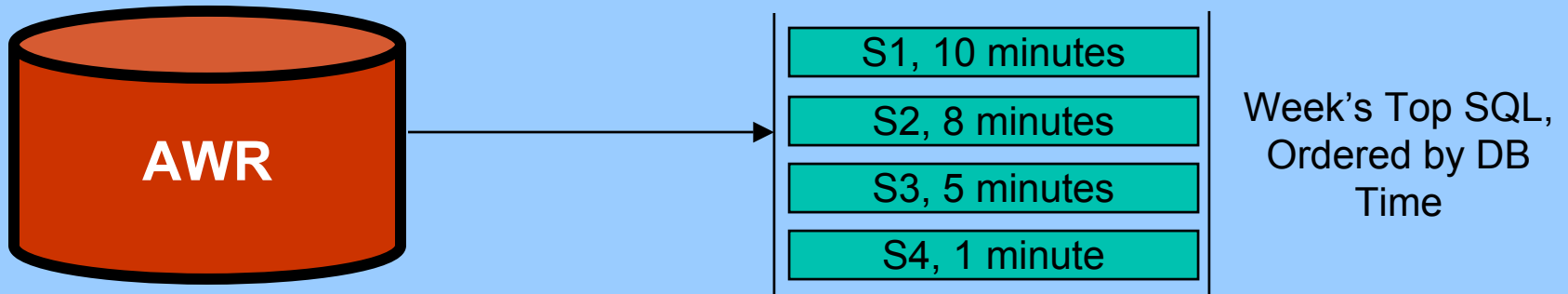


Automatic SQL Tuning in Oracle 11g

The Self-Managing Database



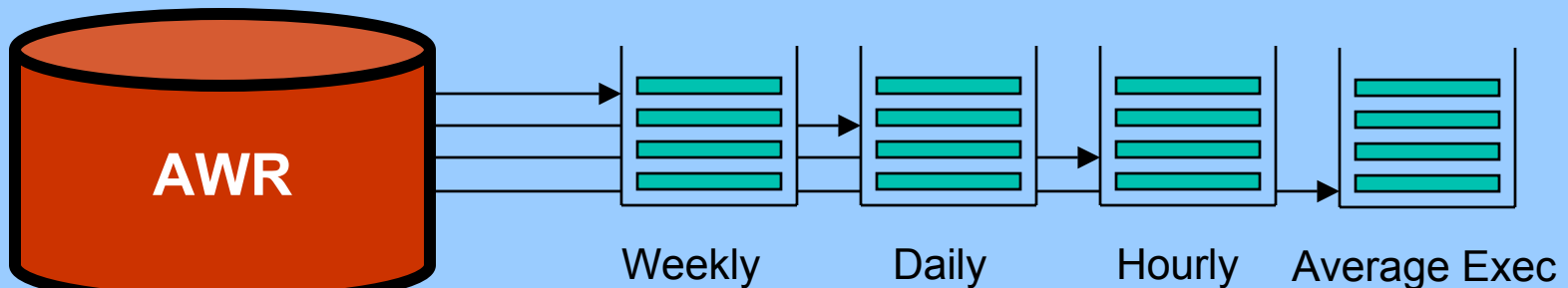
Picking Candidate SQL (1)



I could just pick from the top down...

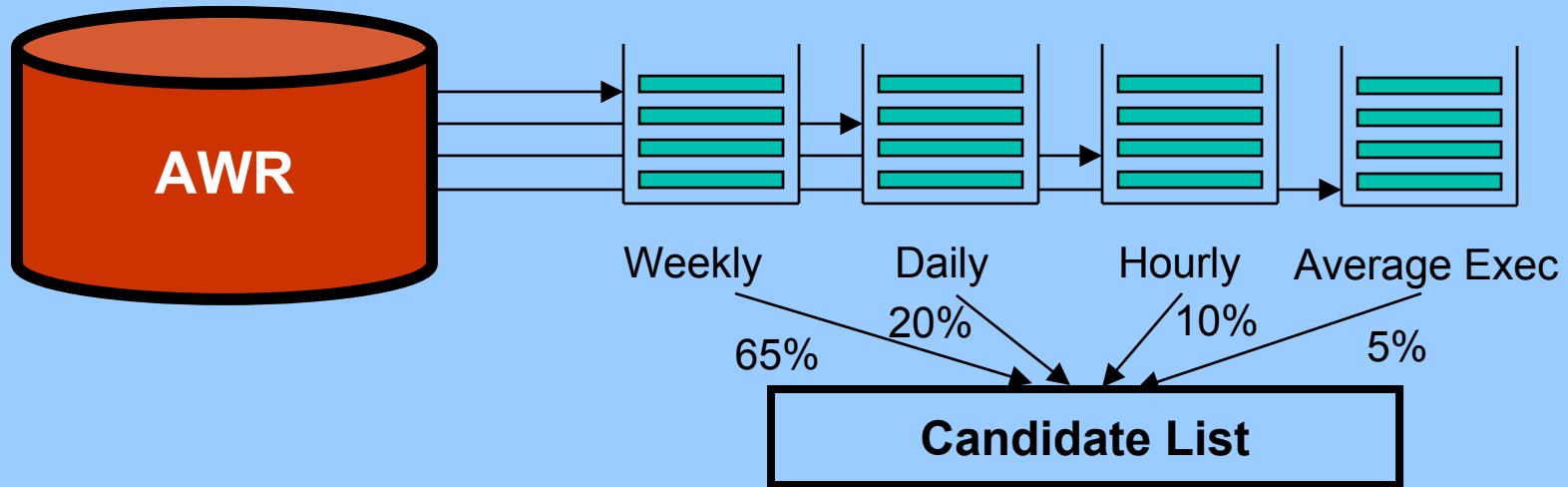
But I will miss SQLs with important hotspots!

Let's try a more balanced approach:



OK, but where do I start?

Picking Candidate SQL (2)

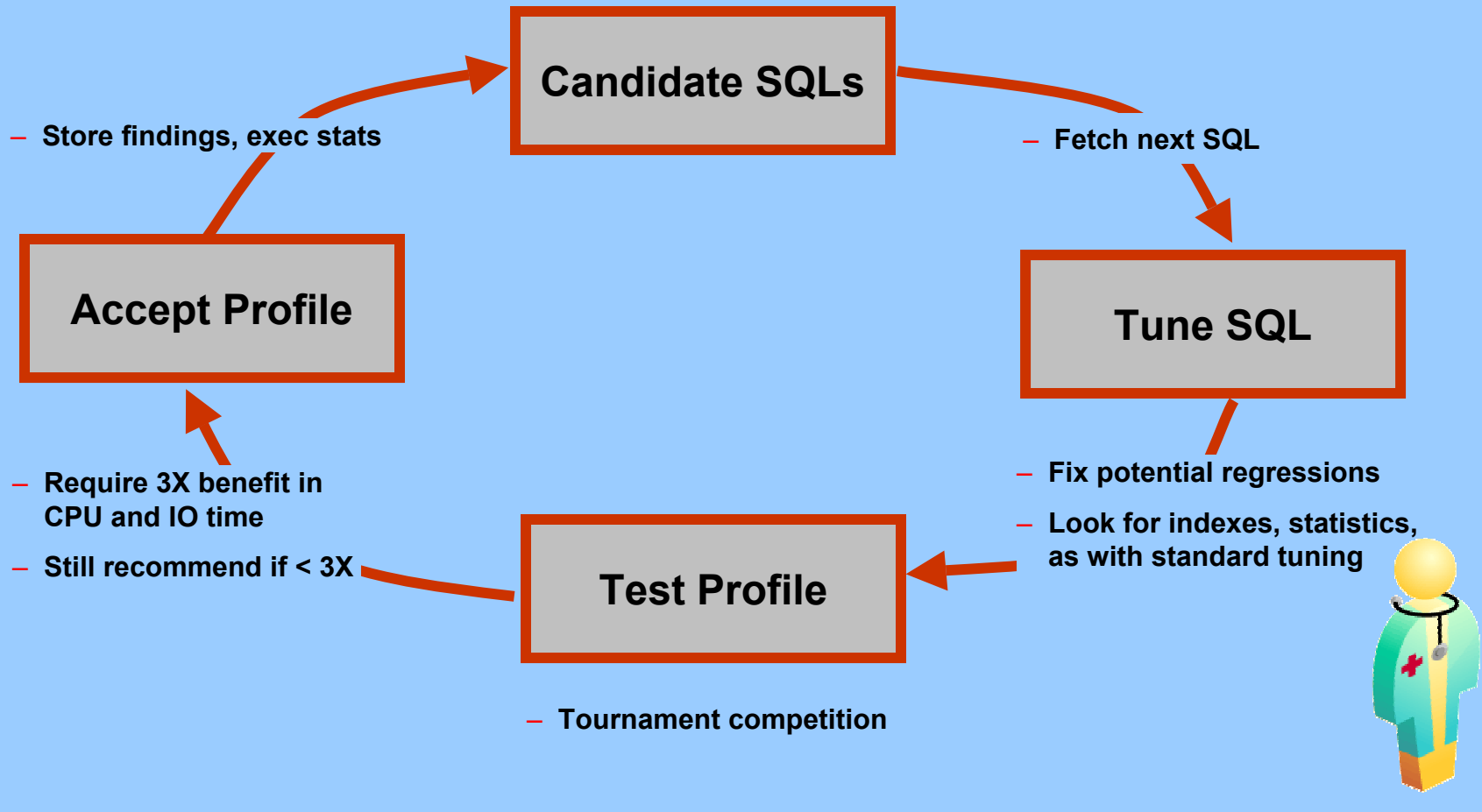


- Eventually we need one list to tune from: merge the buckets.
- All buckets are not created equal: focus on the week, but don't forget about the others.
- Focus on the SQLs we have not seen recently: Don't re-tune SQLs if nothing has changed!



Tuning Flow

Tuning activities per SQL



Focus on SQL Profiles

First step in automating SQL tuning

Auto-testing/implementing is limited to profiles because:

- No lengthy, expensive set-up process (building an index takes time)
- Private to the current compilation
- No change to user SQL (does not change semantics)
- SQL-level recommendation, can be effectively tested
- Easily reversed by the DBA

Testing is done for regular SQL Tuning Advisor tasks as well!

Automatic SQL Tuning Defaults

Sensible defaults with flexible configurations

- Out-of-the-box defaults:
 - Runs in each maintenance window (MAINTENANCE_WINDOW_GROUP)
 - SQL profiles are tested but not implemented
- DBA can configure using EM:
 - Whether / When / How long it runs
 - Resources it uses
 - Whether it implements profiles
 - How many profiles it implements

Automatic SQL Tuning Task

Automated Maintenance Tasks

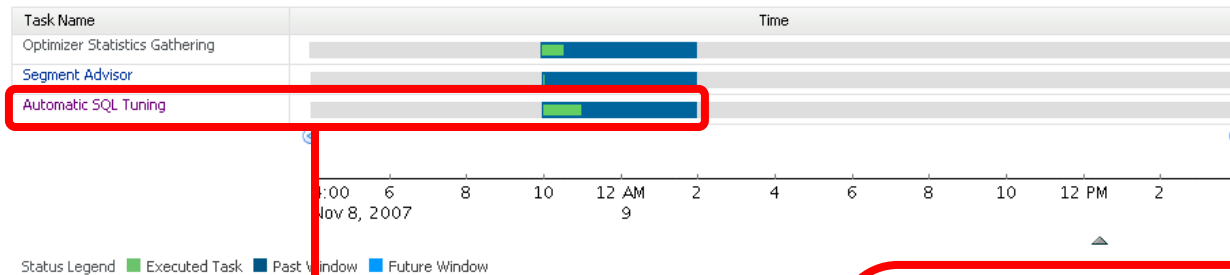
Status **Enabled** [Configure](#)

TIP If the status is Disabled, there are no future windows.

Logged in As SYSTEM

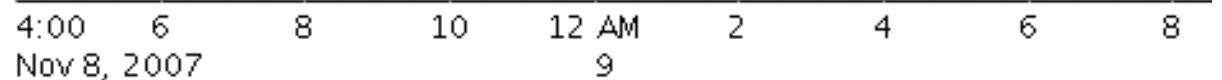
Collected from Target: **Nov 9, 2007 12:28:40 PM PST**

Begin Date: Interval:
(example: Nov 9, 2007)



Logged in As SYSTEM

Automatic SQL Tuning



Automatic SQL Tuning Configuration

Automated Maintenance Tasks Configuration

Global Status ☒ Enabled ☐ Disabled

Task Settings

Optimizer Statistics Gathering ☒ Enabled ☐ Disabled [Configure](#)

Segment Advisor ☒ Enabled ☐ Disabled

Automatic SQL Tuning ☒ Enabled ☐ Disabled [Configure](#)

Maintenance Window Group Assignment

				Edit Window Group
Window	Optimizer Statistics Gathering	Segment Advisor	Automatic SQL Tuning	
	Select All Select None	Select All Select None	Select All Select None	
FRIDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SATURDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SUNDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
MONDAY_WINDOW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
TUESDAY_WINDOW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WEDNESDAY_WINDOW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
THURSDAY_WINDOW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Automatic SQL Tuning Settings

Maximum Time Spent Per SQL During Tuning (sec)

Automatic Implementation of SQL Profiles ☒ Yes ☐ No

Maximum SQL Profiles Implemented Per Execution

Maximum SQL Profiles Implemented (Overall)

Automatic SQL Tuning Result Summary

Task Activity Summary

The activity summary graph shows the benefit of the task activities on the system's high-load SQL. Only profiles that significantly improve SQL performance were implemented.

Time Period

Begin Date Nov 8, 2007 10:00:01 PM GMT-08:00 End Date Nov 9, 2007 12:28:52 PM GMT-08:00

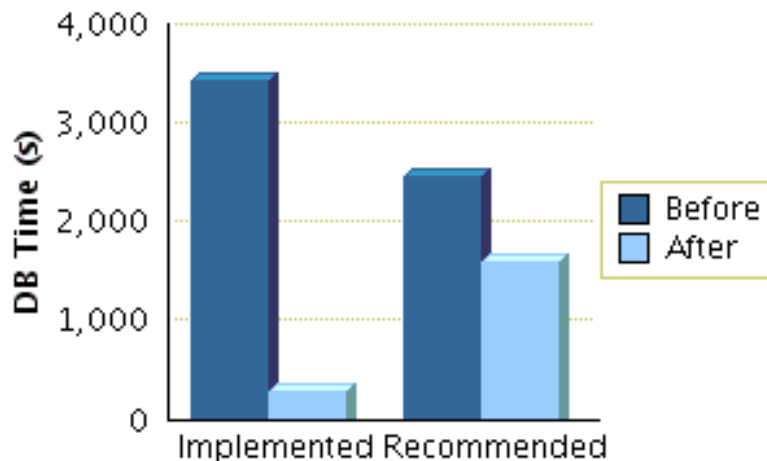
Overall Task S

Executions

SQL Exec

Breakdown by Finding Type

Profile Effect Statistics



Nov 9, 2007 12:28:52 PM GMT-08:00

ure SQL

Automatic SQL Tuning Result Recommendations

Automatic SQL Tuning Result Details

Begin Date Nov 8, 2007 10:00:01 PM GMT-08:00

End Date Nov 9, 2007 12:37:13 PM GMT-08:00

Recommendations

Only profiles that significantly improve SQL performance were implemented.

Select	SQL Text	Parsing Schema	SQL ID	SQL Profile	Plan	Plan Hash	Date
<input checked="" type="radio"/>	SELECT /* AST_DEMO */ 'B' tt1.ch_...	DWH_TEST	4519a3...	SQL Profile (91.3%) ✓			11/8/07
<input type="radio"/>	SELECT :B1 TASK_ID, F.FINDING_ID FINDING...	DBSNMP	a8j39qt...		✓		11/8/07
<input type="radio"/>	SELECT TASK_LIST.TASK_ID FROM (SELECT /*...	DBSNMP	g12bmt...		✓		11/8/07
<input type="radio"/>	SELECT TASK_LIST.TASK_ID FROM (SELECT /*...	DBSNMP	bqfx5q...		✓		11/8/07
<input type="radio"/>	SELECT a.advisor_name, a.task_name, a.in...	SYSTEM	fms1vr1j...		✓		11/8/07
<input type="radio"/>	select /* SQL Monitor demo */ * from...	DEMO	6552kf1bd4h1n	(<10%) ✓	✓	✓	11/8/07
<input type="radio"/>	select 4/min(o_orderkey-1) from orders	DEMO	ftvuz6pxnqftm	(85.3%) ✓			11/8/07
<input type="radio"/>	select /*+ parallel(8) */ count(*) from ...	DEMO	64xuptx8765pv		✓		11/8/07
<input type="radio"/>	select /*+ USE_NL(s c) FULL(s) FULL(c) A...	AST	c0qumqg2616uk				11/8/07
<input type="radio"/>	select dbms_sqltune.report_sql_monitor(s...	SYSTEM	7auut5zmy339w				11/8/07
<input type="radio"/>	select sum(O_TOTALPRICE * 1024) from ord...	DEMO	dhbd87cya2hnw			✓	11/8/07
<input type="radio"/>	select count(*) from lineitem	DEMO	ds3y1fz1qgy9d				11/8/07
<input type="radio"/>	select /*+ parallel(4) */ * from (s...	DEMO	203z7cxfh0d26		✓		11/8/07
<input type="radio"/>	select /*+ parallel(5) */ * from ...	DEMO	1u4ptshn038c2		✓		11/8/07
<input type="radio"/>	SELECT status FROM dba_autotask_client W...	SYSTEM	dqjcc345dd4ak		✓		11/8/07
<input type="radio"/>	select * from (select O_ORDERDATE...	DEMO	78cg6d7k4xuw0	(85%) ✓	✓	✓	11/8/07

Automatically Tuned SQL Details Drilldown

SQL Details: 4519a3p79jt43

Logged in As SYSTEM

Switch to SQL ID Go

View Data Historical

Refresh

SQL Worksheet

Schedule SQL Tuning Advisor

SQL Repair Advisor

Text

```
SELECT /* AST_DEMO */ 'B' || tt1.ch_featurevalue_09_id ch_featurevalue_09_id, 'B' || tt1.pg_featurevalue_13_id pg_featurevalue_13_id, 'B' || tt1.pg_featurevalue_15_id pg_featurevalue_15_id, 'G' || tt1.pg_featurevalue_01_elgr_id pg_featurevalue_01_id,...
```

Details

Select the plan hash value to see the details below.

Plan Hash Value All

There are multiple plans found for this SQL statement.

SQL Details: 4519a3p79jt43

Statistics

Switch to SQL ID Go

View Data Historical

Refresh

SQL Worksheet

Schedule SQL Tuning Advisor

SQL Repair Advisor

Summary

Text

value_13_id pg_featurevalue_13_id, pg_featurevalue_01_id,...

Logged in As SYSTEM

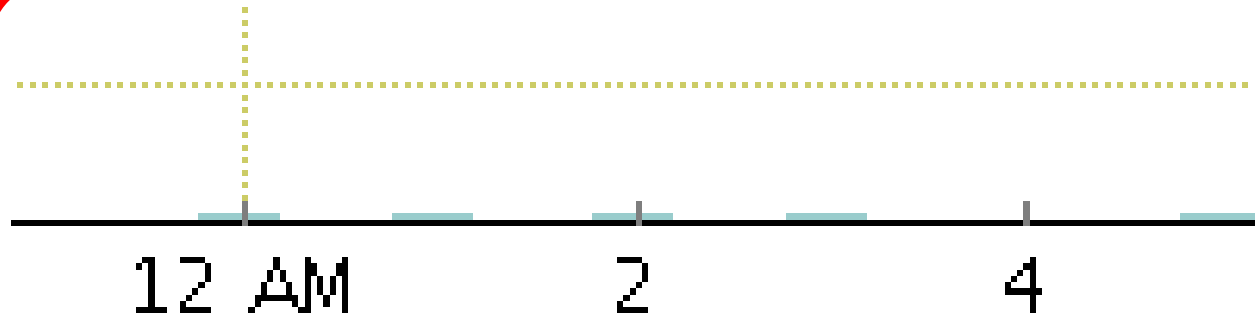
Refresh

SQL Worksheet

Schedule SQL Tuning Advisor

SQL Repair Advisor

featurevalue_13_id pg_featurevalue_13_id, pg_featurevalue_01_id,...



Advisor Task Name

SYS_AUTO_SQL_TUNING_TASK

Advisor Task Owner

SYS

Task Completion

Nov 8, 2007 10:35:12 PM

Finding Name	Occurrences (last 24 hrs)
Top SQL by DB Time	2 of 19
CPU Usage	2 of 19

Conclusions

- *Manual SQL tuning* is painful even for the experts
- *Oracle 10g SQL Tuning Advisor* quickly gives DBA good choices
- *Oracle 11g Automatic SQL Tuning* automates the process by making the easy decisions
- *DBA can control* as much of the process as he wants

Just when you thought it was safe to run your SQLs...



There's a lot more to SQL performance than bad plans!

- Potential run-time issues
- Finding high response-time SQL is no piece of cake
- Keeping tabs on Parallel SQL is even harder

Real-Time SQL Monitoring

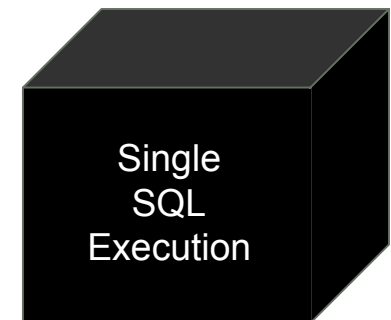
Shining new light
on SQL Performance



Problem:

Managing High Response-Time SQLs

- **Monitoring:** tracking high response-time SQL
 - What is that expensive SQL (ETL, DDL, batch, report, ...) I started up to?
 - Do I have any high response-time SQL running on my OLTP system?
 - Any SQL executing parallel?
 - **Investigating:** why is this execution so expensive?
 - Plan has hundreds of operations -- where is the time being spent?
 - Why is a particular operation so expensive?
 - SQL runs parallel, is DOP appropriate? is there a skew?
- ➔ What is going on inside a SQL execution???

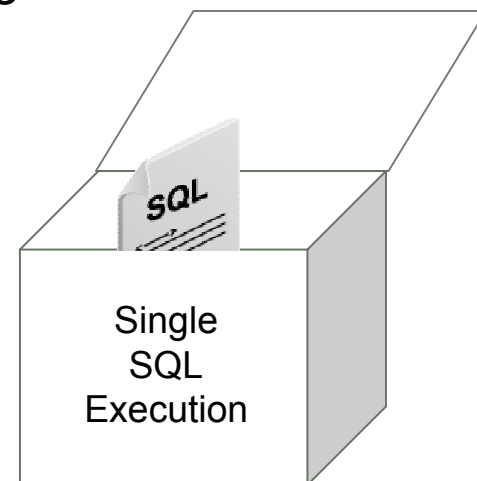


Solution:

Real-time SQL Monitoring

Looking inside the SQL

- Enabled **out-of-the-box** with no performance impact
- **Automatically** monitors SQL executions that:
 - consume more than 5 seconds of CPU or I/O time
 - are running parallel: PQ, PDML, PDDL
- Monitors each execution **independently**
- Exposes monitoring statistics at **multiple levels**
 - Global execution level
 - Plan operation level (Plan Tuning)
 - Parallel Execution level (PX Tuning)
- Guides your tuning efforts



How does it work?

- Exposes monitoring statistics in:
 - V\$SQL_MONITOR
 - Cumulative DB time breakdown (CPU, IO, Application, etc)
 - PL/SQL, Java Exec Times
 - V\$SQL_PLAN_MONITOR
 - #rows, #executions, memory, temp space per plan operation
 - Plan operation begin and end times
 - V\$ACTIVE_SESSION_HISTORY (ASH)
 - Each execution of each SQL identifiable in ASH
execution key: (SQL_ID, SQL_EXEC_START, SQL_EXEC_ID)
 - Parallel Execution Servers share an execution key with QC, but use a separate Session ID
- Separate entries for each Parallel Execution Server
- Refreshes statistics every second, during query execution
- Statistics available for at least 5 minutes, even with cursor age-outs

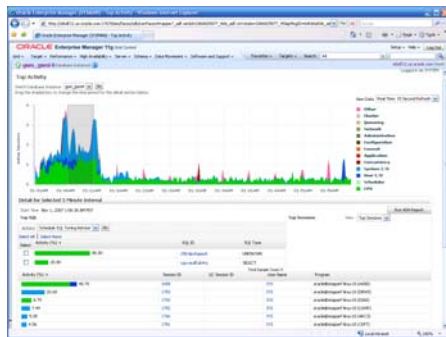
How do I use it?

- 11g Enterprise Manager Grid Control
- Additional reporting (available today):
DBMS_SQLTUNE.REPORT_SQL_MONITOR

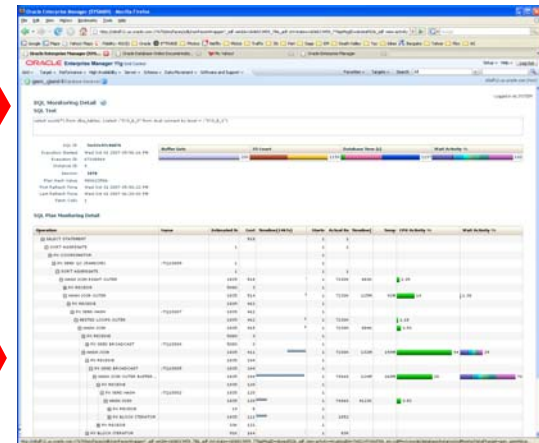
Enterprise Manager Flow (1)

SQL Details

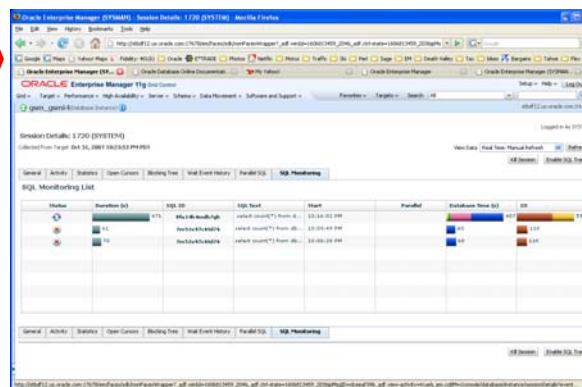
Top Activity



Monitoring Details

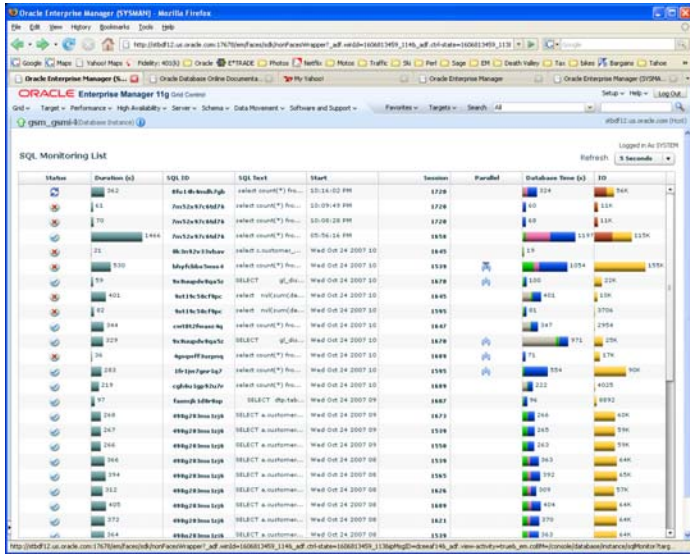


Session Details

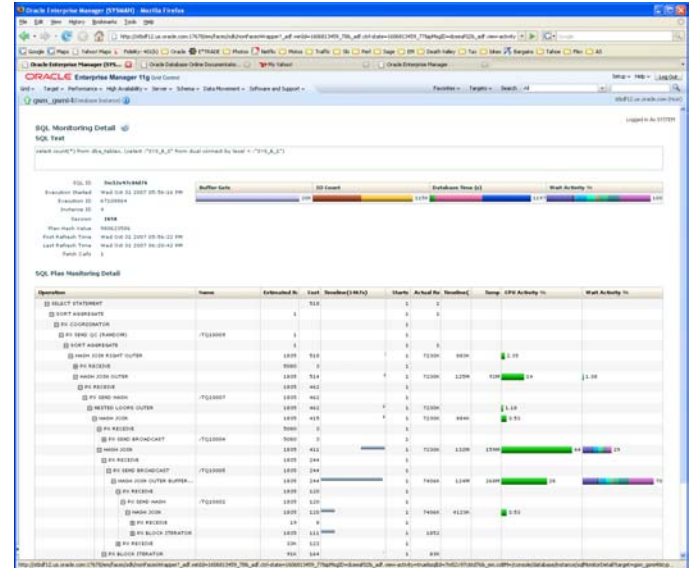


Enterprise Manager Flow (2)



















Monitoring List



Monitoring Details



SQL Monitoring List

					Refresh 5 Seconds ▾	
Status	Duration	SQL ID		Session	Ended	
	<div><div></div></div> 2.6hr	ft2mfz40z1ud6		85		
	1.2mn	d54ac55u9nyhb	85	 2  2 2.3mn	<div><div></div></div> 813K	01:40:35 PM
	1.3mn	ds3y1fz1os				12:56:10 PM
	6.3mn	203z7cxfh0d26		85	<div><div></div></div> 1207K	12:55:52 PM
	15.0s	grhc7up		<div><div></div></div> 9.4mn	<div><div></div></div> 1257K	12:55:21 PM
	56.0s	238cwr2		<div><div></div></div> 1.7mn	<div><div></div></div> 82K	12:54:24 PM
	2.0mn	dhbd87c				12:53:13 PM
	15.0s	5pp5kg9v		<div><div></div></div> 55.3s	<div><div></div></div> 47K	12:51:58 PM
	16.0s	42z4mhc8bdkfq	78	 5  2 1.1mn	<div><div></div></div> 89K	12:51:44 PM
	19.0s	2q50ruwnwdz15	78	 5  2 1.0mn	<div><div></div></div> 73K	12:45:26 PM
	13.0s	c0xjav3sckg14	78	 5 23.8s	<div><div></div></div> 38K	12:35:58 PM

Disk Reads - 1159715 (92%)

SQL Monitoring Details

Global Execution Plan



Session 85

Plan Hash Value 3554797743

First Refresh Time Fri Nov 9 2007 12:36:02 PM

Last Refresh Time Fri Nov 9 2007 12:45:26 PM

9s)	Execut	Actual R	Memory	Temp (M	CPU Activity %	Wait Activity %
	1	99				
	1	99				
	1	99				



HASH JOIN OUTER		1302	597	1	1311	655K		
HASH JOIN		1302	537	1	1311	654K		
INDEX FULL SCAN	I_USER2	71	1	1	72			
HASH JOIN		1302	535	1	1311	648K		
INDEX FAST FULL SCAN	I_OBJ1	60K	59	1	60K			
TABLE ACCESS FULL	ORDERS	6000K	24K	1	6000K		1.92	4.47
















SQL Monitoring Details (Parallelism)

SQL Monitoring Detail 

Global Execution Detail

SQL ID: [203z7cxfh0d26](#)
Execution Started: Fri Nov 9 2007 12:45:26 PM
Execution ID: 16777245
Instance ID: 1
Session: [85](#)
Plan Hash Value: 635542202









Buffer Gets:  903K
IO Count:  1207K
Database Time:  23.6mn
Wait Activity %:  100

Parallel Server	Buffer Gets	IO Count
<input type="checkbox"/> All Parallel Servers		
<input type="checkbox"/> Instance 1		
 Parallel Coordinator		
<input type="checkbox"/> Instance 2		
<input type="checkbox"/>  Parallel Set 1		
Parallel Server 1 (p000)	 226K	 225K
Parallel Server 2 (p001)	 226K	 225K
Parallel Server 3 (p002)	 226K	 226K
Parallel Server 4 (p003)	 226K	 226K
<input type="checkbox"/>  Parallel Set 2		
Parallel Server 1 (p004)		 87K
Parallel Server 2 (p005)		 44K
Parallel Server 3 (p006)		 87K
Parallel Server 4 (p007)		 87K

225,686 buffer gets

Wait Activity %

0.08

 14
 14
 14
 14
 12
 7.19
 12
 13

Conclusion

- Real-Time SQL Monitoring is
 - Monitoring and tuning for high response-time SQLs
 - New, fine-grained SQL statistics
 - tracked automatically
 - updated while the SQL runs
 - highly visible and accessible
 - at no cost to your production system
 - The only way to know what's happening inside single SQL execution
 - The quickest way to the root cause of a performance problem: If you can find the problem, you can fix it!

Partition Advisor



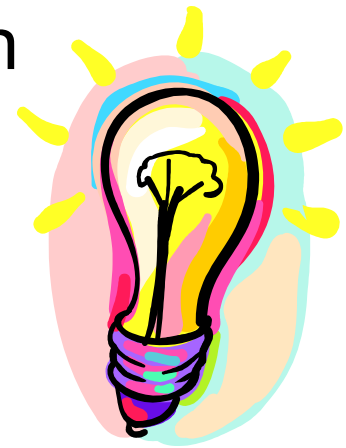
Problem

- SQLs on large tables run too long or timeout
- High I/O counts
- Too much pressure on buffer pool
- Disgruntled users
- Low transaction rates
- Too many complex SQLs to figure out on my own
- Put out a fire here, another starts over there



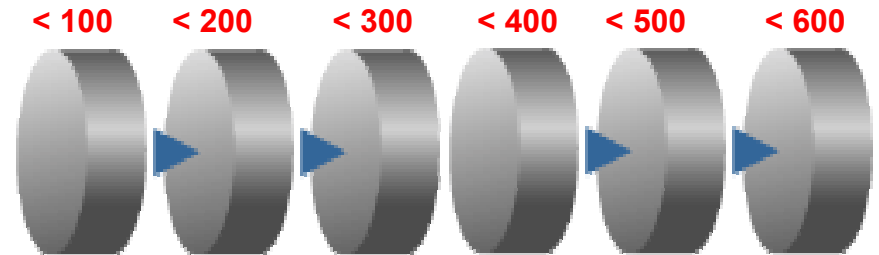
Solution

- Get new 11g partition advice along with other advice from the new 11g SQL Access Advisor
 - Recommendations targeted at partition elimination in query processing
 - Recommendations to aid certain join processing



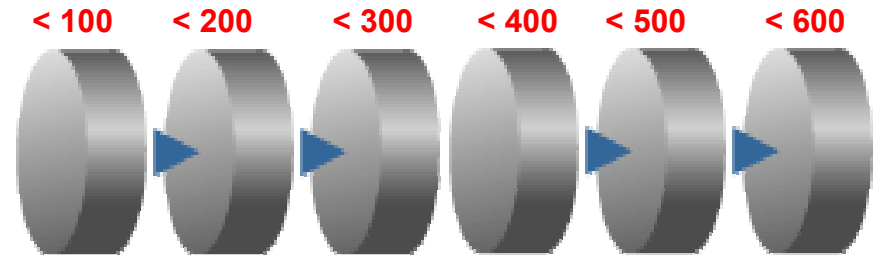
Interval Partitioning

```
CREATE TABLE emp  
  (empno NUMBER(6),  
   first_name VARCHAR(20),  
   last_name VARCHAR(20),  
   deptno NUMBER(6))  
PARTITION BY RANGE (deptno) INTERVAL 100  
PARTITION p1 VALUES LESS THAN 100
```



Interval Partitioning

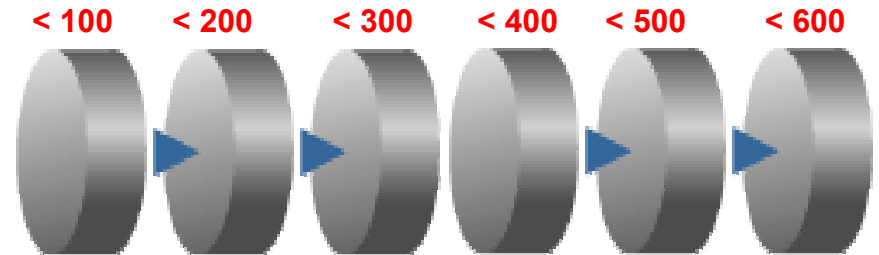
```
CREATE TABLE emp  
  (empno NUMBER(6),  
   first_name VARCHAR(20),  
   last_name VARCHAR(20),  
   deptno NUMBER(6))  
PARTITION BY RANGE (deptno) INTERVAL 100  
PARTITION p1 VALUES LESS THAN 100
```



Interval partition is a new, automated form of range partitioning.

Partition Elimination

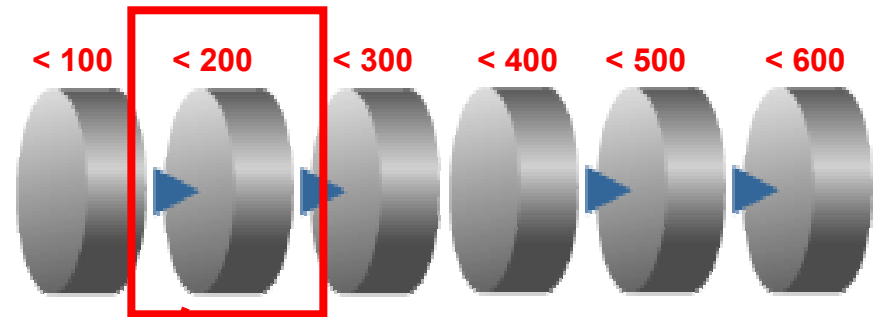
```
CREATE TABLE emp  
  (empno NUMBER(6),  
   first_name VARCHAR(20),  
   last_name VARCHAR(20),  
   deptno NUMBER(6))  
PARTITION BY RANGE (deptno) INTERVAL 100  
PARTITION p1 VALUES LESS THAN 100
```



```
SELECT empno, last_name, first_name  
FROM emp  
WHERE deptno = 123
```

Partition Elimination

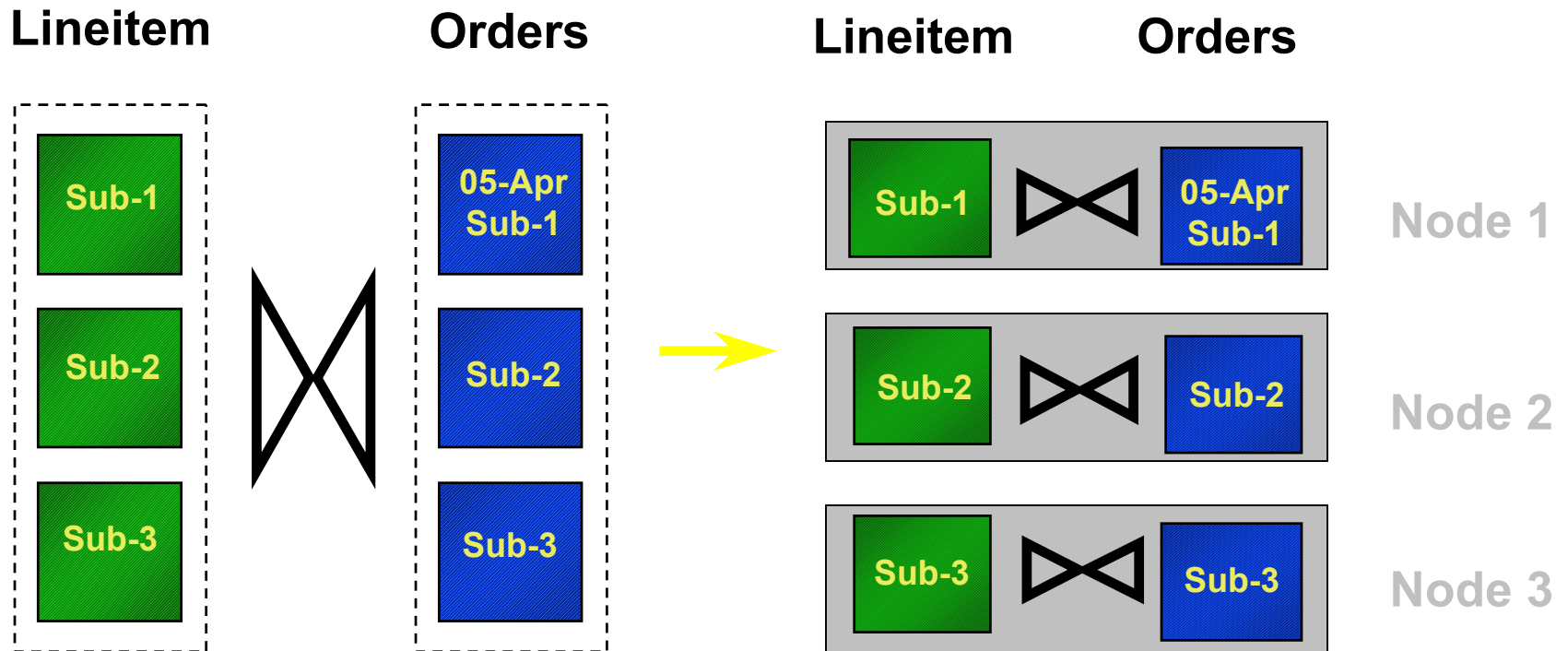
```
CREATE TABLE emp  
(empno NUMBER(6),  
 first_name VARCHAR(20),  
 last_name VARCHAR(20),  
 deptno NUMBER(6))  
PARTITION BY RANGE (deptno) INTERVAL 100  
PARTITION p1 VALUES LESS THAN 100
```



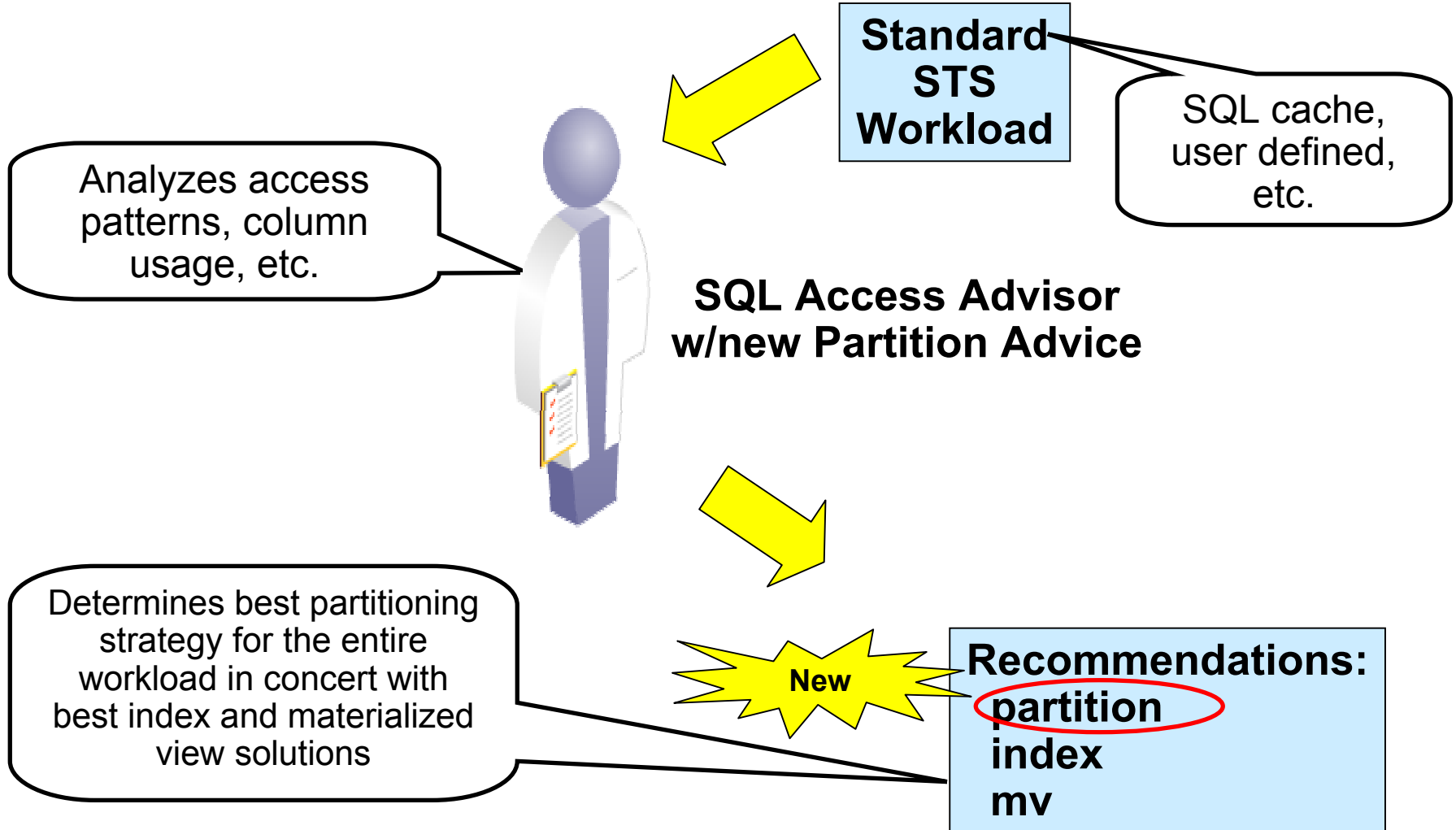
```
SELECT empno, last_name, first_name  
FROM emp  
WHERE deptno = 123
```

Partition-wise Join

When joining two tables that are partitioned on the join-key, Oracle may choose to join on a per-partition basis.

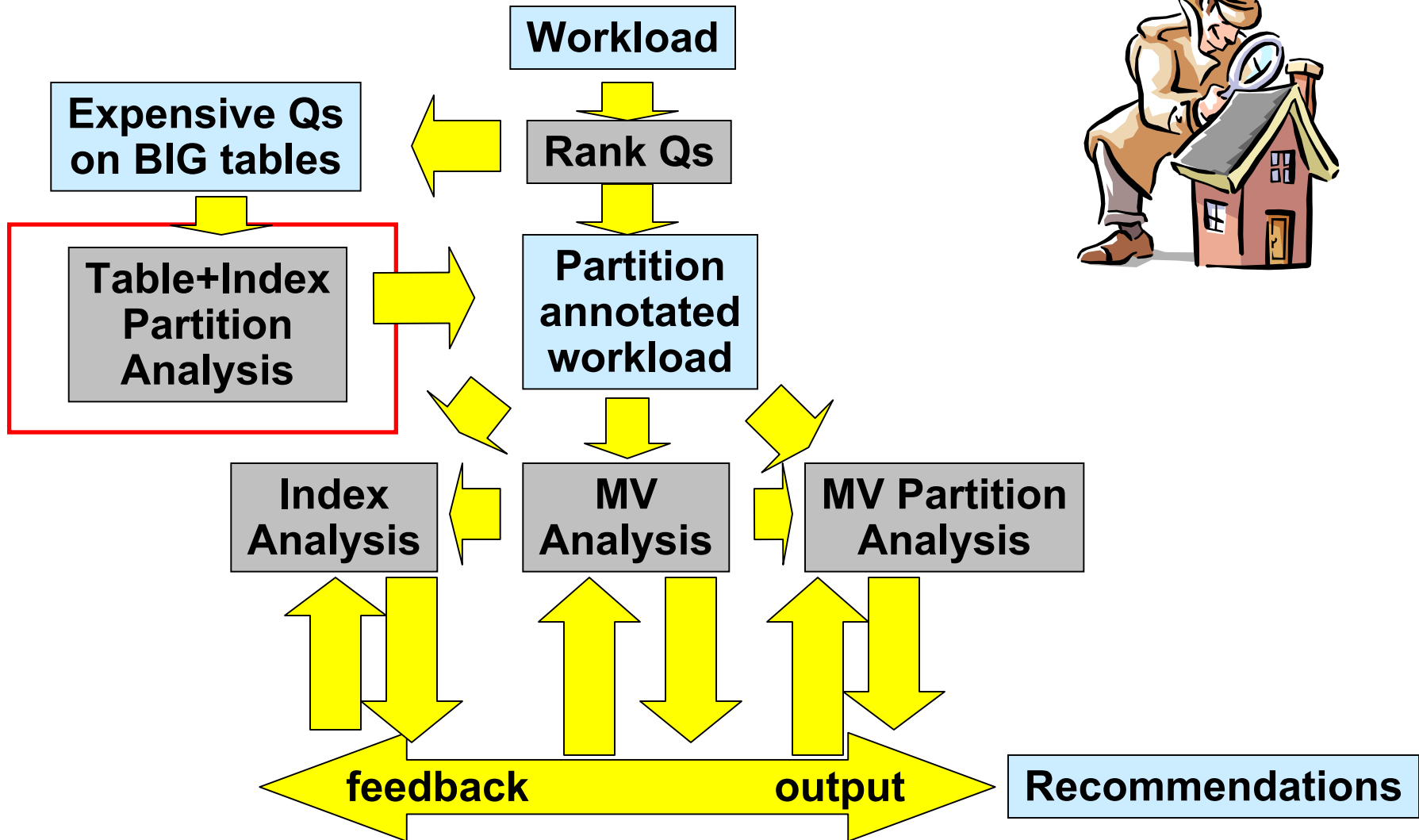


How does SAA work?





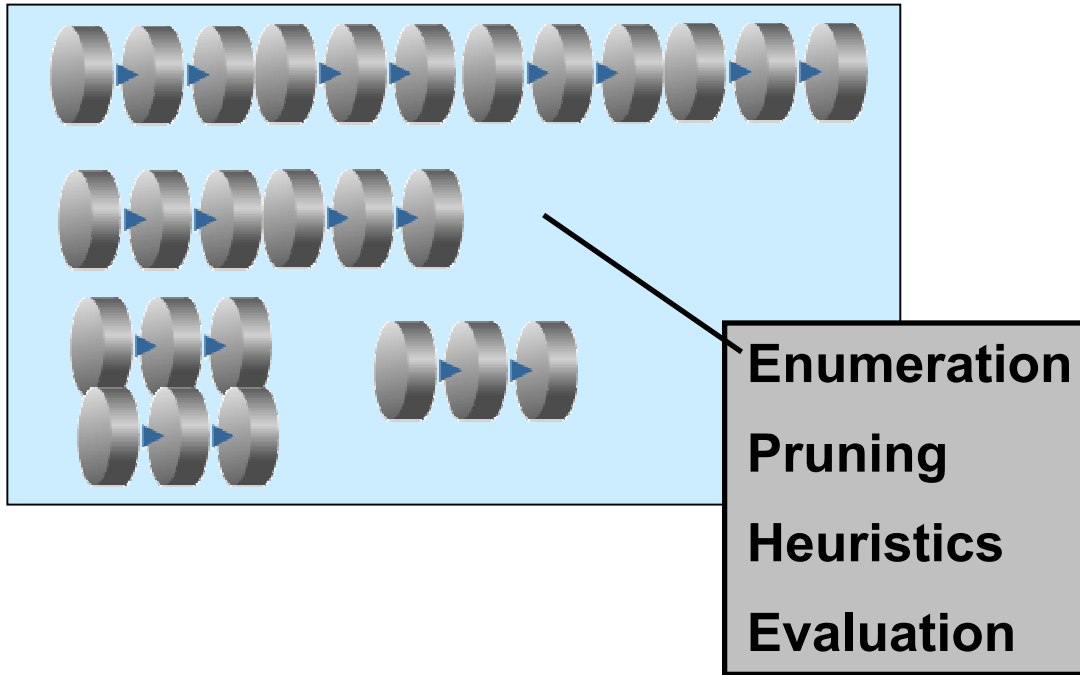
How does SAA work?



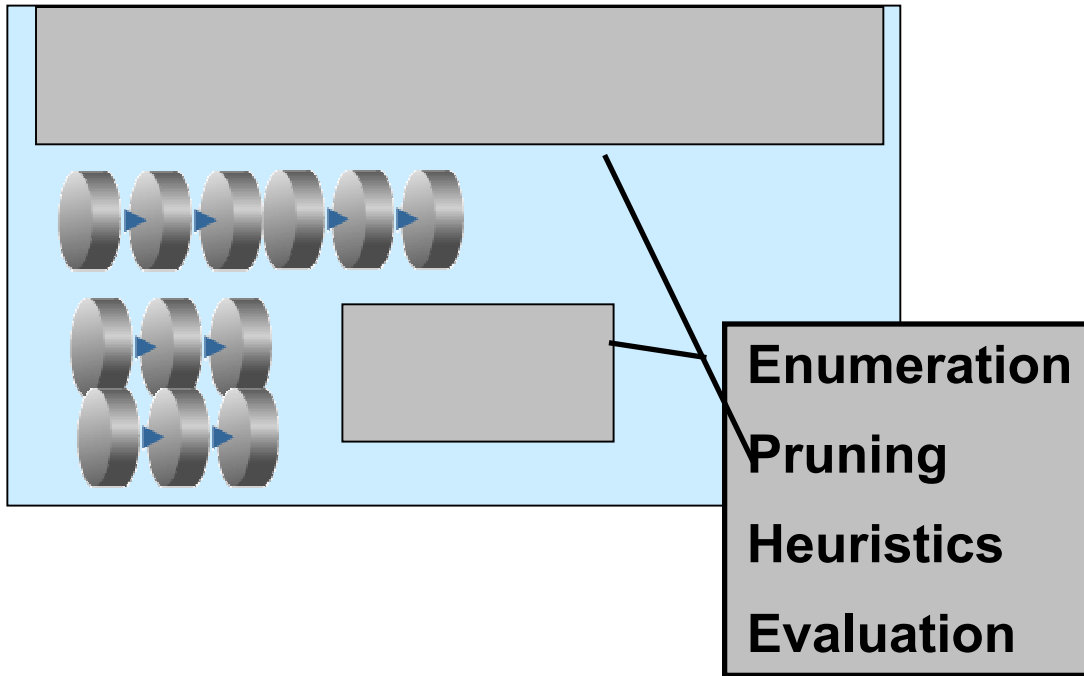
Partition Advisor Problem Space

- Fact: If I partition table T1, all Qs referencing T1 are affected (+ or -)
- Fact: If I also partition table T2, the same applies
- Fact: Lots of Qs reference multiple tables forming a network of inter-relationships
- Therefore: A potential partitioning scheme on each different table affects each potential partitioning scheme on other tables in that network

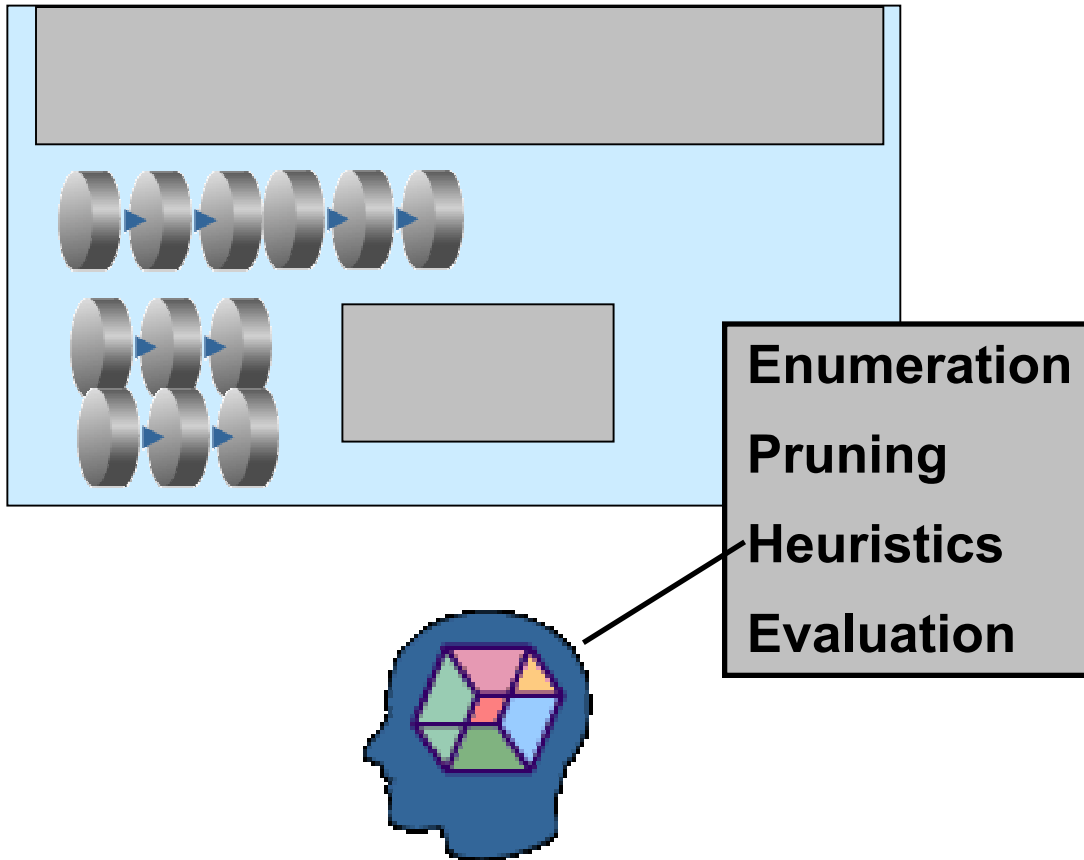
Partition Advisor



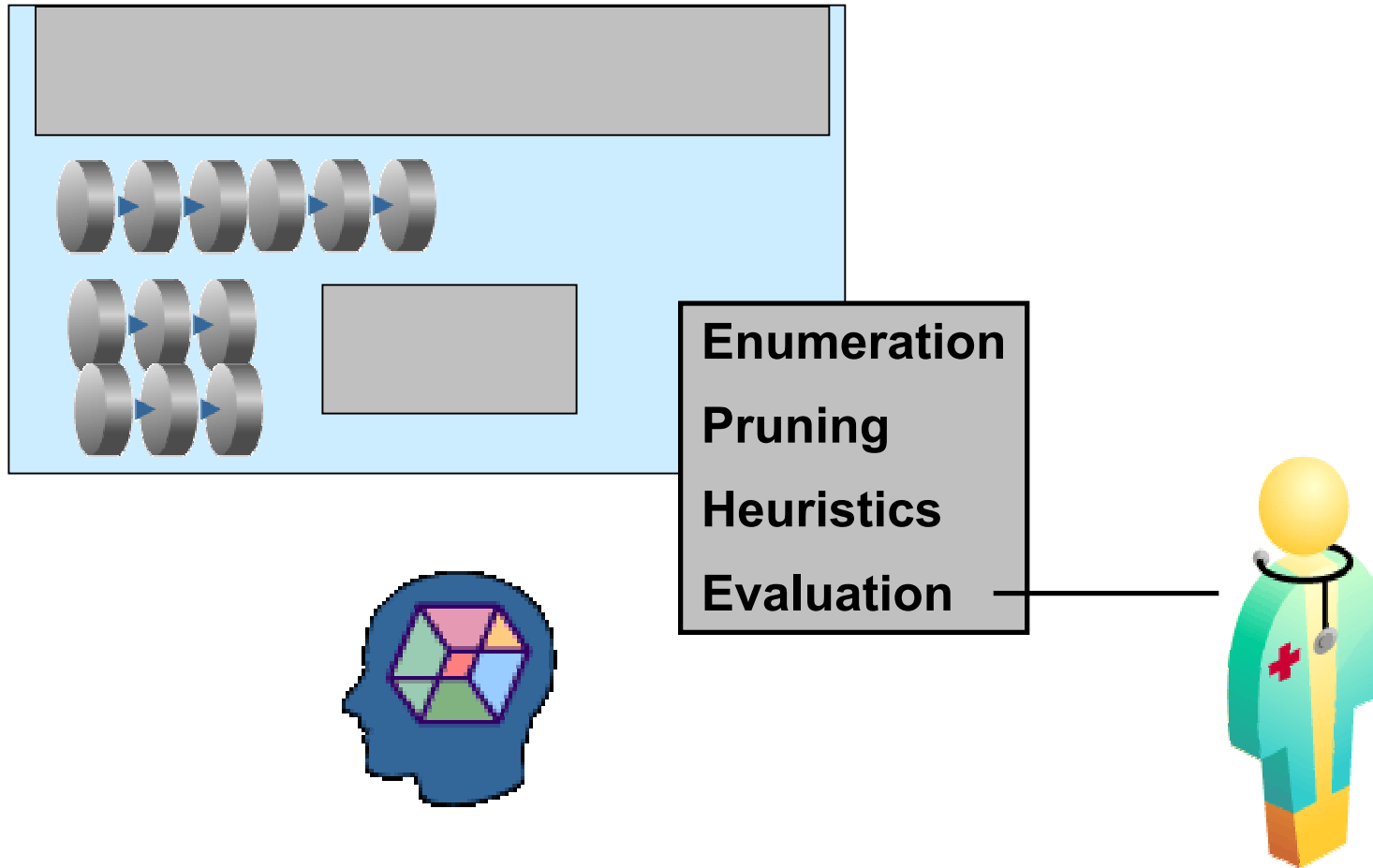
Partition Advisor



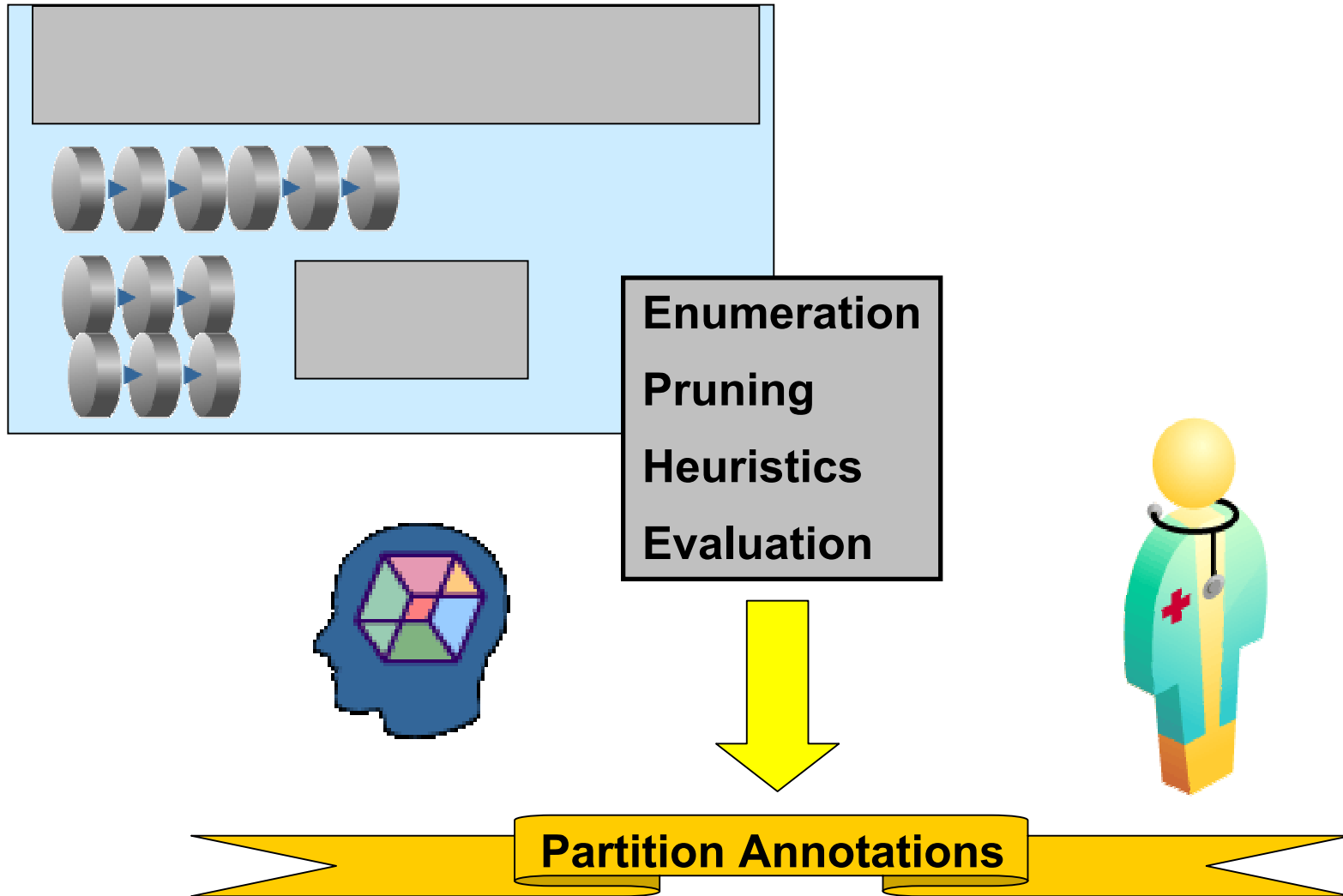
Partition Advisor



Partition Advisor

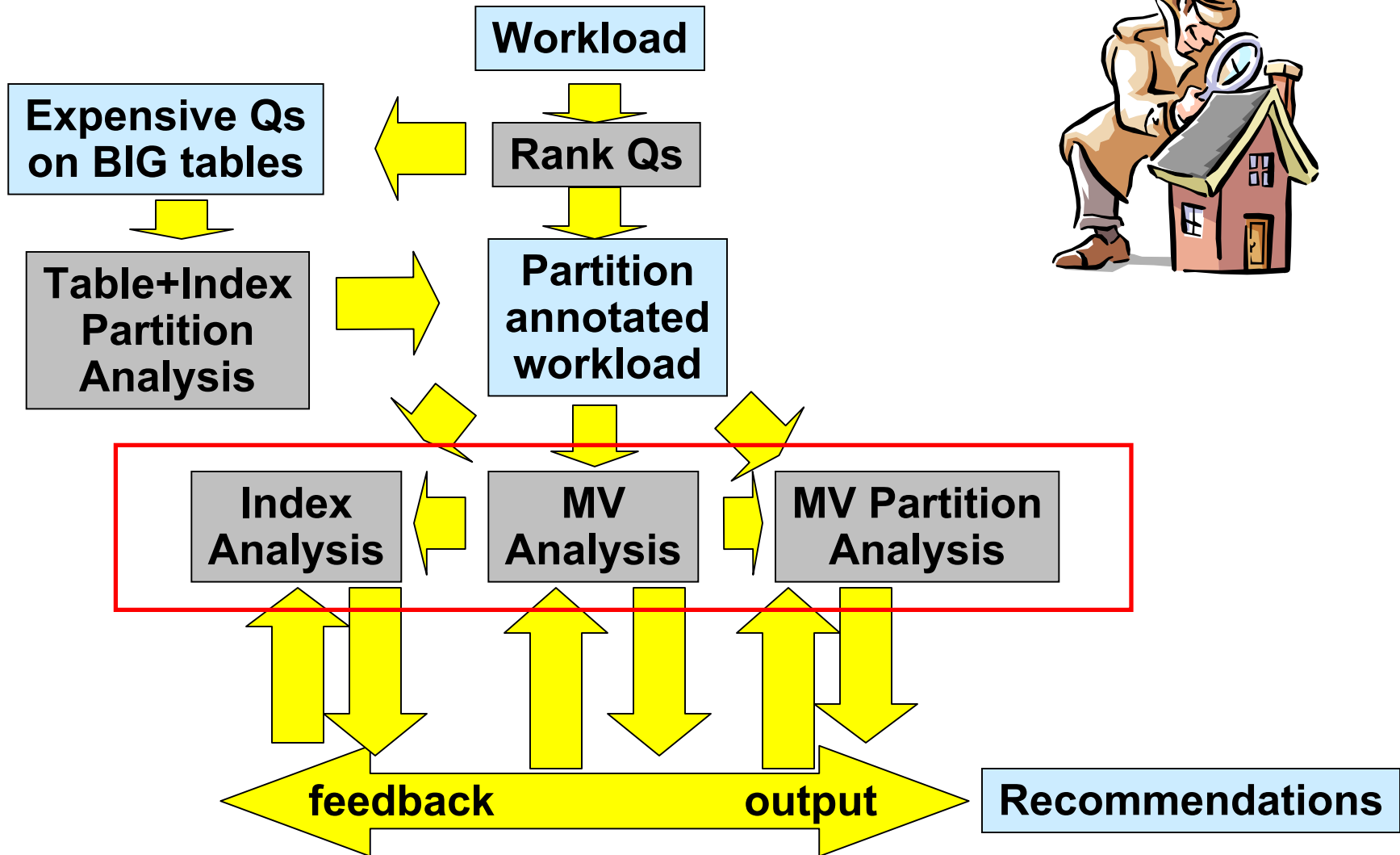


Partition Advisor





How does SAA work?



MV & Index Advisor

MV Analysis:
joins
group bys
dimensions

Index Analysis:
predicates
group bys
joins
index-only access
bitmap access

MV candidates

Index candidates

Evaluate

**MV Partition
Advisor**

Optimizer / Query Rewrite

**Associated groups
of access candidates**

Global access optimization

Recommendations



What does SAA do?

What does SAA do?

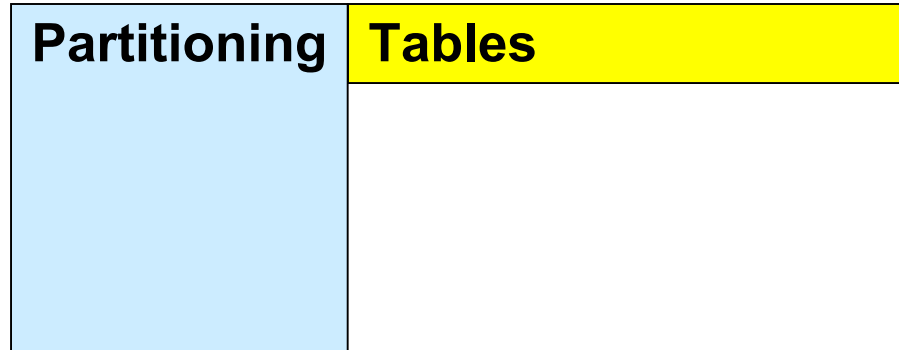
Recommends:

Partitioning



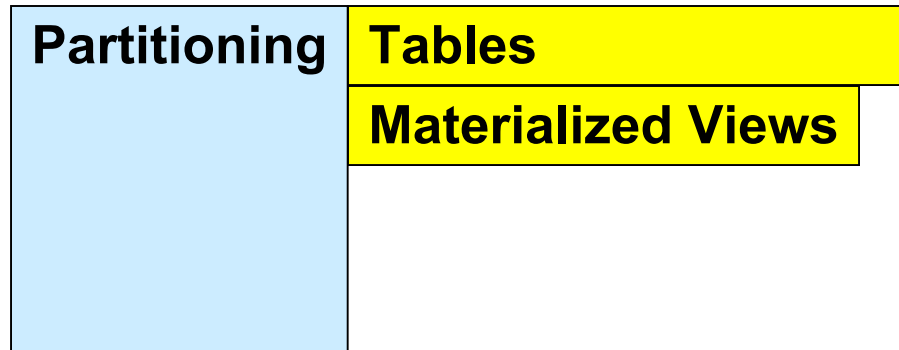
What does SAA do?

Recommends:



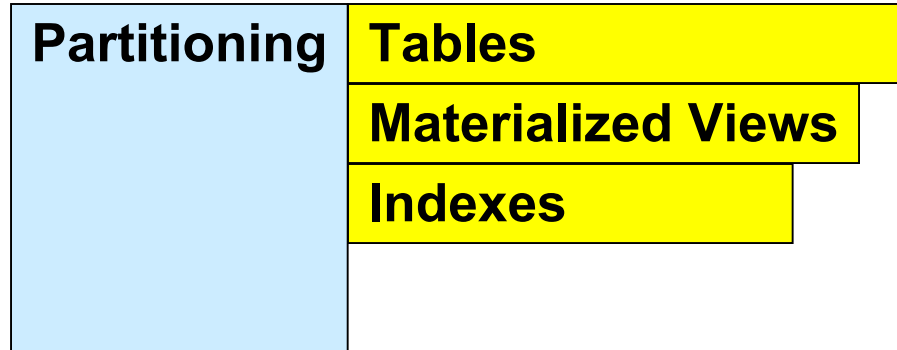
What does SAA do?

Recommends:



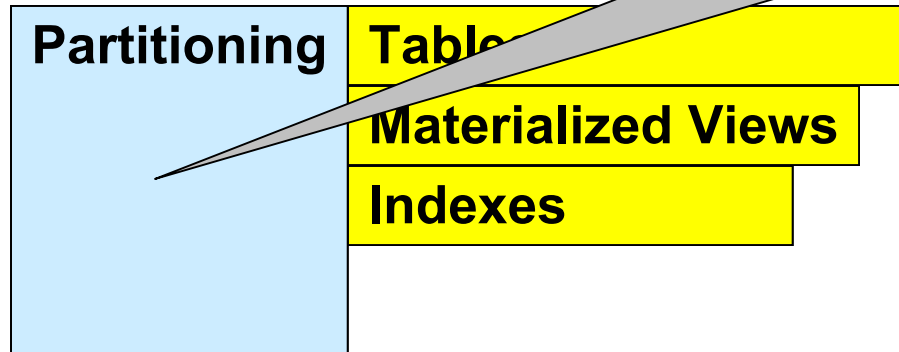
What does SAA do?

Recommends:



What does SAA do?

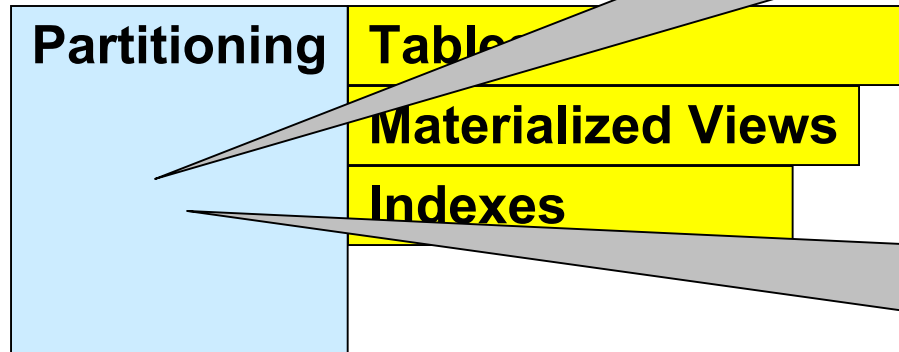
Recommends:



**Supported
Partitioning Types:
Interval
Hash**

What does SAA do?

Recommends:

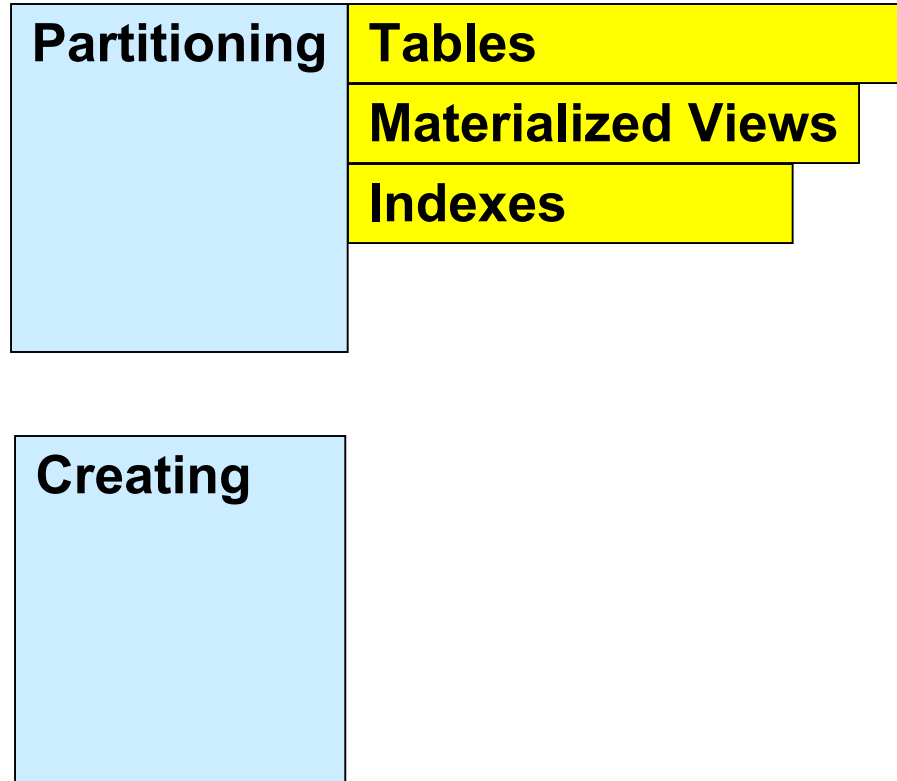


**Supported
Partitioning Types:
Interval
Hash**

**Supported Partition
Key Types:
Date
Number**

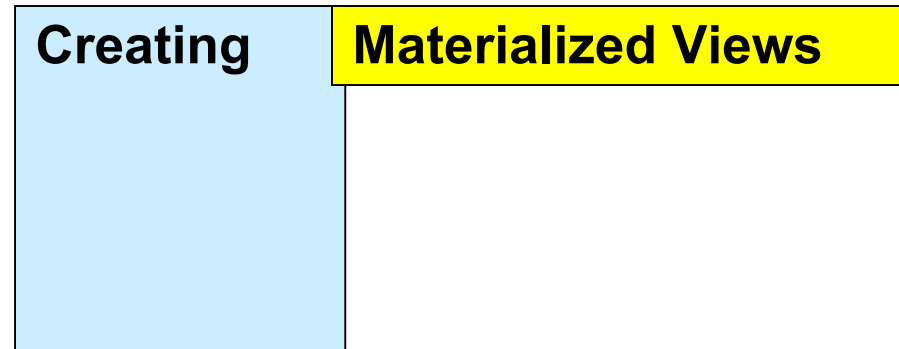
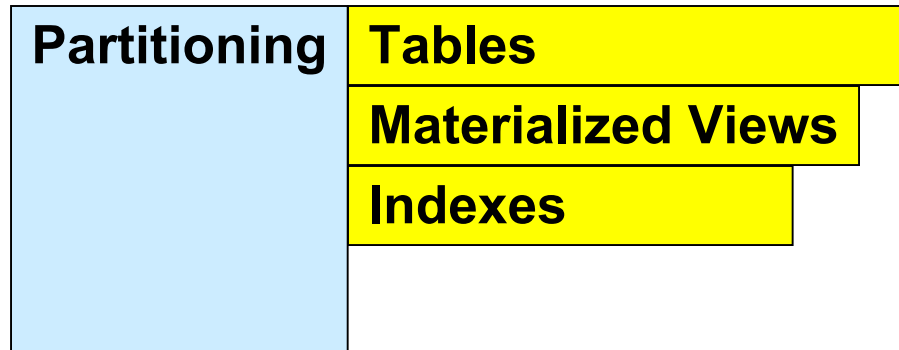
What does SAA do?

Recommends:



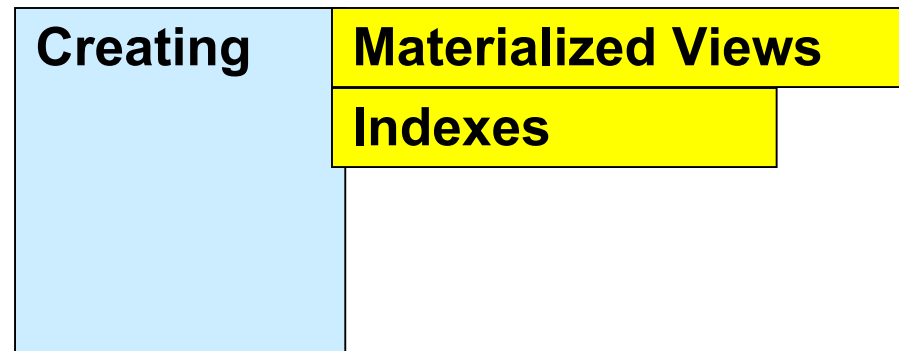
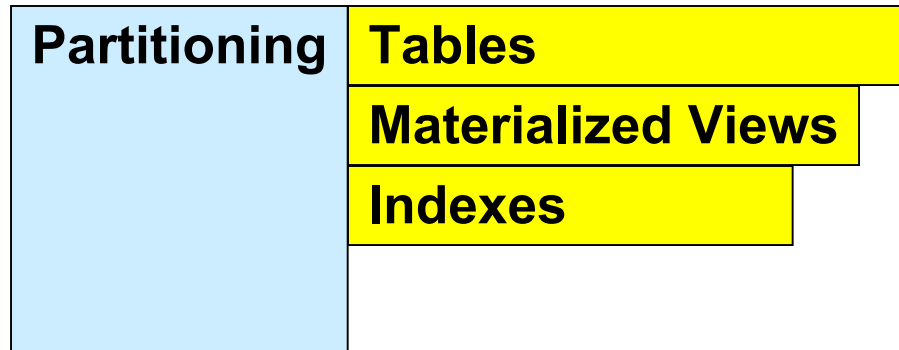
What does SAA do?

Recommends:



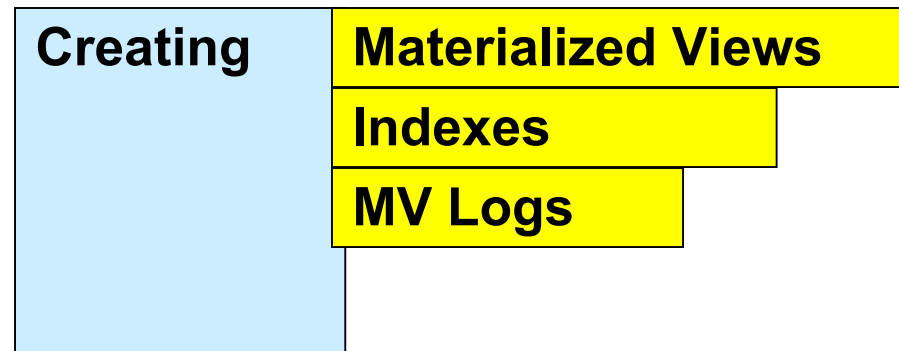
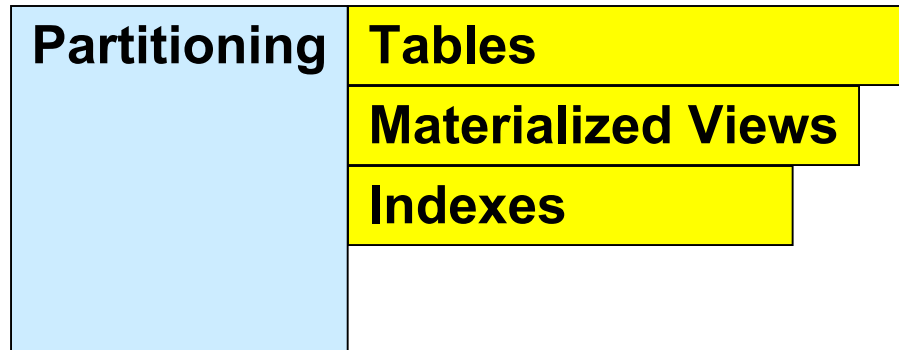
What does SAA do?

Recommends:



What does SAA do?

Recommends:



What does SAA do?

Recommends:

Partitioning

Tables

Materialized Views

Indexes

Creating

Materialized Views

Indexes

MV Logs

Holistic Advice

Choosing Partition Advice

ORACLE Enterprise Manager 11g Database Control

Help Logout Database

Workload Source

Recommendation Options

Schedule

Review

SQL Access Advisor: Recommendation Options

Database database
Logged In As SH

Cancel Back Step 2 of 4 Next

Access Structures to Recommend

☒ Indexes

☒ Materialized Views

☒ Partitioning

New

Scope

The advisor can run in one of two modes, Limited or Comprehensive. Limited Mode is meant to return quickly after processing the statements with the highest cost, potentially ignoring statements with a cost below a certain threshold. Comprehensive Mode will perform an exhaustive analysis.

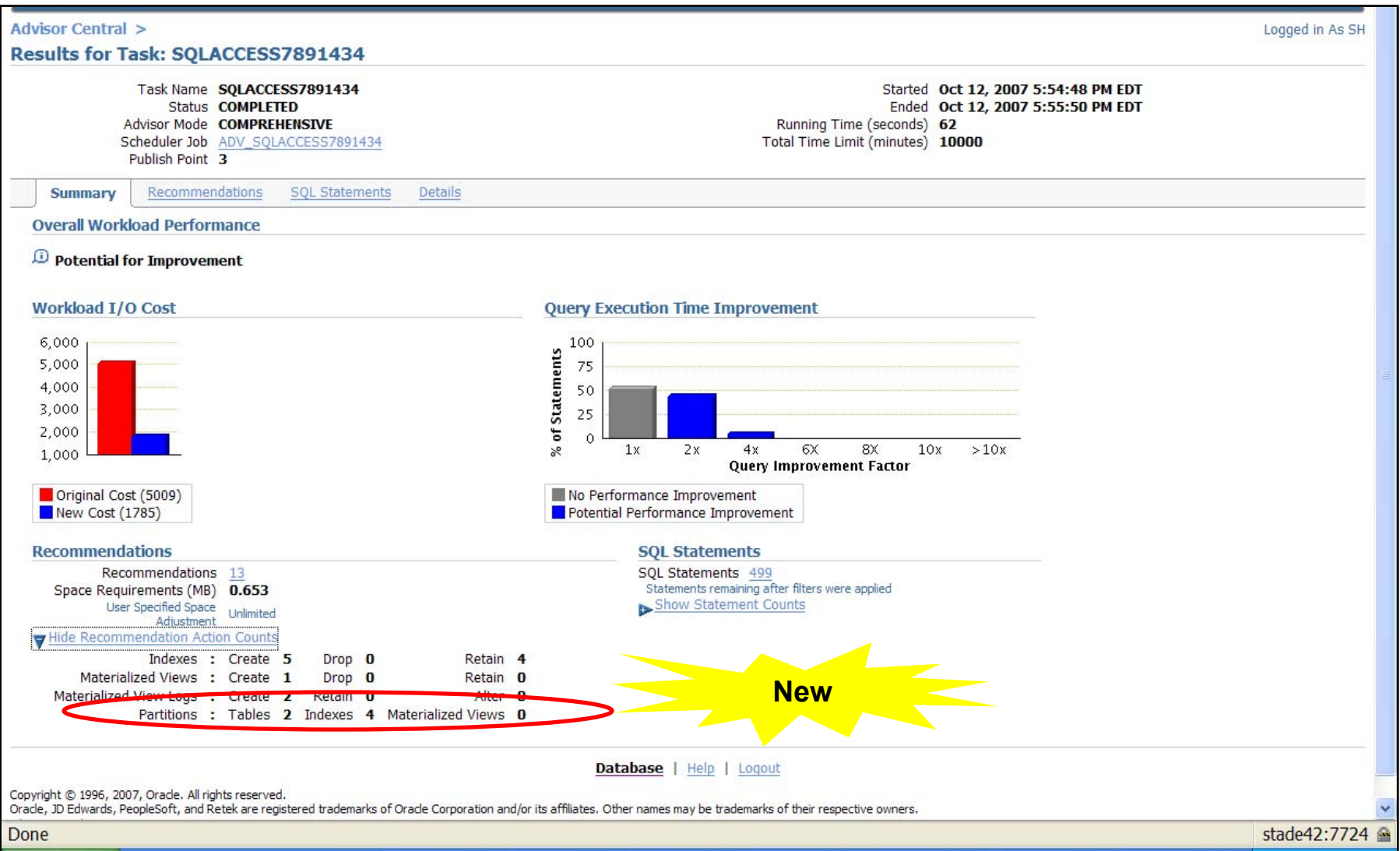
☐ Limited
Analysis will focus on highest cost statements

☒ Comprehensive
Analysis will be exhaustive

▶ Advanced Options

Cancel Back Step 2 of 4 Next

Recommendation summary



Partition recommendations

Advisor Central > Results for Task: SQLACCESS7891434 >

Logged in As SH

Recommendation Details
















SQL Access Advisor generates default object names and uses the default schemas and tablespaces specified during task creation, but you can change them. If you edit any name, dependent names, which are shown as readonly, will be updated accordingly. If the Tablespace field is left blank the default tablespace of the schema will be used. When you click OK, the SQL script is modified, but it is not actually executed until you select 'Schedule Implementation' on the Recommendations or SQL Statements pages.

Cancel OK

Actions

Set Schema for All Actions  Go

Set Tablespace for All Actions  Go

Implementation Status	Recommendation IDs	Action	Object Name	Object Attributes	Indexed Columns	Base Table	Schema	Tablespace
	1,4,5,8,7,6,9,11,13	New 12,10 PARTITION_TABLE	PRODUCTS				SH	
		2,3 PARTITION_TABLE	CUSTOMERS				SH	
		2 CREATE_MATERIALIZED_VIEW_LOG				SH.SALES	SH	
		2 CREATE_MATERIALIZED_VIEW_LOG				SH.CUSTOMERS	SH	
		2 CREATE_MATERIALIZED_VIEW	MV\$\$_00130000	General Match			SH	
		2 GATHER_TABLE_STATISTICS	MV\$\$_00130000				SH	
		3 RETAIN_INDEX	SALES_CUST_BIX	BITMAP	CUST_ID	SH.SALES	SH	
	12,13	RETAIN_INDEX	PRODUCTS_PK	BTREE	PROD_ID	SH.PRODUCTS	SH	
		3 RETAIN_INDEX	CUSTOMERS_GENDER_BIX	BITMAP	CUST_GENDER	SH.CUSTOMERS	SH	
	7,8,11	RETAIN_INDEX	SALES_PROD_BIX	BITMAP	PROD_ID	SH.SALES	SH	

Done

stade42:7724

Partition Recommendation

Recommendation: 1

SQL Access Advisor generates default object names and uses the default schemas and tablespaces specified during task creation, but you can change them. If you edit any name, dependent names, which are shown as readonly, will be updated accordingly. If the Tablespace field is left blank the default tablespace of the schema will be used. When you click OK, the SQL script is modified, but it is not actually executed until you select 'Schedule Implementation' on the Recommendations or SQL Statements pages.

Can

Actions

Set Tablespace for All Actions 

Implementation Status	Action	Object Name	Object Attributes	Indexed Columns	Base Table	Schema	Tablespace	Partiti
<input checked="" type="checkbox"/>	PARTITION_TABLE	PRODUCTS				SH	<input type="text"/>	("SUPP
<input checked="" type="checkbox"/>	CREATE_INDEX	PRODUCTS_IDX\$\$_00130003	BTREE, LOCAL	SUPPLIER_ID, PROD_LIST_PRICE, PROD_NAME	SH.PRODUCTS	SH	<input type="text"/>	

SQL Affected by Recommendation: 1

						Previous	1-10 of 255	
Statement ID	Statement	Original Cost	New Cost	Cost Improvement	Cost Improvement (%)	Execu		
116	SELECT prod_name FROM products p WHERE prod_list_price=123 AND supplier_id=267	10	2	8	80.00			
119	SELECT prod_name FROM products p WHERE prod_list_price=375 AND supplier_id=282	10	2	8	80.00			
122	SELECT prod_name FROM products p WHERE prod_list_price=461 AND supplier_id=8	10	2	8	80.00			
123	SELECT prod_name FROM products p WHERE prod_list_price=431 AND supplier_id=240	10	2	8	80.00			
126	SELECT prod_name FROM products p WHERE prod_list_price=355 AND supplier_id=5	10	2	8	80.00			
128	SELECT prod_name FROM products p WHERE prod_list_price=139 AND supplier_id=98	10	2	8	80.00			
131	SELECT prod_name FROM products p WHERE prod_list_price=441 AND supplier_id=103	10	2	8	80.00			
133	SELECT prod_name FROM products p WHERE prod_list_price=451 AND supplier_id=12	10	2	8	80.00			
136	SELECT prod_name FROM products p WHERE prod_list_price=594 AND supplier_id=257	10	2	8	80.00			
137	SELECT prod_name FROM products p WHERE prod_list_price=445 AND supplier_id=243	10	2	8	80.00			
						Previous	1-10 of 255	

Conclusions

- SAA now covers your data access problems with all possible access solutions
- New for 11g:
 - Partition advice, including hash and new interval on date and number
 - Incremental advice
- Partition recommendations are holistically generated, simultaneously considering all possible access solutions across an entire SQL workload
- SAA is easy to use as ever – partition advice is yours for click of a checkbox!

O&A

ORACLE®

Navigating to SQL Access Advisor

Job Activity
Jobs scheduled to start no more than 7 days ago
Scheduled Executions 0 Running Executions 0 Suspended Executions 0 Problem Executions

Home | [Performance](#) | [Availability](#) | [Server](#) | [Schema](#) | [Data Movement](#) | [Software and](#)

Related Links

Access	Advisor Central	Alert History
Alert Log Contents	All Metrics	Baseline Metric Thresholds
Blackouts	EM SQL History	Metric and Policy Settings
Metric Collection Errors	Monitoring Configuration	Monitor in Memory Access
Policy Groups	Scheduler Central	Mode
Target Properties	User-Defined Metrics	SQL Worksheet

Database | [Help](#) | [Logout](#)

Copyright © 1996, 2007, Oracle. All rights reserved.
Oracle, JD Edwards, PeopleSoft, and Retek are registered trademarks of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.
[About Oracle Enterprise Manager](#)

EM Home Page

ORACLE Enterprise Manager 11g
Database Control
Database Instance: database > Logged in As SH

Advisor Central

Advisors | [Checkers](#)

Page Refreshed Oct 12, 2007 5:35:07 PM EDT

Advisors

ADDM	Automatic Undo Management	Data Recovery Advisor
Memory Advisors	MTTR Advisor	Segment Advisor
SQL Advisors	SQL Performance Analyzer	

Advisor Tasks

Search
Select an advisory type and optionally enter a task name to filter the data that is displayed.

Advisory Type	Task Name	Advisor Runs	Status
---------------	-----------	--------------	--------

Advisor Central Page

ORACLE Enterprise Manager 11g
Database Control
Database Instance: database > **Advisor Central** > Logged in As SH

SQL Advisors

The SQL Advisors address several important use cases having to do with SQL: identify physical structures optimizing a SQL workload, tune individual statements with heavy execution plans, identify and correct result set divergence, build test cases for failed SQL.

SQL Access Advisor

[SQL Access Advisor](#) Evaluate an entire workload of SQL and recommend indexes, partitioning, materialized views that will improve the collective performance of the SQL workload.

SQL Tuning Advisor

[SQL Tuning Advisor](#) Analyze individual SQL statements, and recommend SQL profiles, statistics, indexes, and restructured SQL to SQL performance.

[Automatic SQL Tuning Results](#) View the results of automated execution of SQL Tuning Advisor on observed high-load SQL.

SQL Advisor Page

Using SQL Access Advisor

ORACLE Enterprise Manager 11g Database Control

Help Logout Database

Advisor Central >

SQL Access Advisor: Initial Options

Select a set of initial options.

☐ Verify use of access structures (indexes, materialized views, partitioning, etc) only

☒ Recommend new access structures

☒ Inherit Options from a previously saved Task or Template

Overview

The SQL Access Advisor evaluates SQL statements in a workload Source, and can suggest indexes, partitioning, materialized views and materialized view logs that will improve performance of the workload as a whole.

TIP You are selecting the starting point for the wizard. All options can be changed from within the wizard.

Tasks and Templates

View Templates Only

View Options

Select Name	Description
<input type="radio"/> SQLACCESS_EMTASK	Default Enterprise Manager task template
<input type="radio"/> SQLACCESS_GENERAL	General purpose database template
<input type="radio"/> SQLACCESS_OLTP	OLTP database template
<input checked="" type="radio"/> SQLACCESS_PARTITION_SMALL	For demo purposes only
<input type="radio"/> SQLACCESS_WAREHOUSE	Data Warehouse database template

Database | Help

Copyright © 1996, 2007, Oracle. All rights reserved.
Oracle, JD Edwards, PeopleSoft, and Retek are registered trademarks of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.
[About Oracle Enterprise Manager](#)

Done

Choose initial options

ORACLE Enterprise Manager 11g Database Control

Help Logout Database

Workload Source Recommendation Options Schedule Review

SQL Access Advisor: Workload Source

Database database

Logged In As SH

Cancel Step 1 of 4 Next

Select the source of the workload that you want to use for the analysis. The best workload is one that fully represents all the SQL statements that access the underlying tables.

☐ Current and Recent SQL Activity
SQL will be selected from the cache.

☒ Use an existing SQL Tuning Set

SQL Tuning Set SH.SQLSET_TEST_500

☐ Create a Hypothetical Workload from the Following Schemas and Tables
The advisor can create a hypothetical workload if the tables contain dimension or primary/foreign key constraints.

Schemas and Tables

Add

Comma-separated list

TIP Enter a schema name to specify all the tables belonging to that schema.

Filter Options

TIP For workloads containing a large number of SQL statements, Oracle recommends using filtering to reduce analysis time.

Cancel Step 1 of 4 Next

Database | Help | Logout

Copyright © 1996, 2007, Oracle. All rights reserved.
Oracle, JD Edwards, PeopleSoft, and Retek are registered trademarks of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.
[About Oracle Enterprise Manager](#)

https://stade42:7724/em/console/database/sqlaccess?target=database&type=oracle_database&advisoryCentralURL=/em/console/database/instance/advisorTa... stade42:7724

Select a workload

Running advisor job

Workload Source Recommendation Options **Schedule** Review

SQL Access Advisor: Schedule

Database **database**
Logged In As **SH**

Select job options

Advisor Task Information

* Task Name

Task Description

Journaling Level **Basic**
The level of journaling controls the amount of information that is logged to the advisor journal during execution of the task. This information appears

* Task Expiration (days)
Number of days this task will be retained in the database before being purged

* Total Time Limit (minutes)

Scheduling Options

Schedule Type

Time Zone

Repeating

SQL Access Advisor: Review

Database **database**
Logged In As **SH**

Review & submit

Information

No filter options have been specified. If this workload contains a large number of SQL statements, the SQL Access Advisor analysis may take a long time to complete. To spe

[Filter Options](#)

Please review the SQL Access Advisor options and values you have selected.

Task Name **SQLACCESS7891434**
Task Description **SQL Access Advisor**
Scheduled Start Time **Run Immediately**

Options

Modified	Option	Value	Description
<input checked="" type="checkbox"/>	SQL Tuning Set	SH.SQLSET_TEST500	Import Workload from SQL Repository
<input checked="" type="checkbox"/>	Workload Source	SQL Tuning Set	The source of SQL statements to be used to create the workload

Advisor Central

Advisors [Checkers](#) Page Refresh

Advisors

[ADDM](#) [Memory Advisors](#) [SQL Advisors](#) [Automatic Undo Management](#) [MTTR Advisor](#) [SQL Performance Analyzer](#) [Data Recovery Advisor](#) [Segment Advisor](#)

Advisor Tasks

Search

Select an advisory type and optionally enter a task name to filter the data that is displayed in your results set.

Advisory Type	Task Name	Advisor Runs	Status
All Types <input type="button" value="v"/>	<input type="text"/>	Last Run <input type="button" value="v"/>	All <input type="button" value="v"/>

By default, the search returns all uppercase matches beginning with the string you entered. To run an exact or case-sensitive match, double quote the search string. You can use the wildcard symbol

Results

Select	Advisory Type	Name	Description	User	Status	Start Time	End Time
<input checked="" type="radio"/>	SQL Access Advisor	SQLACCESS7891434	SQL Access Advisor	SH	COMPLETED	Oct 12, 2007 5:54:48 PM	
<input type="radio"/>	SQL Access Advisor	SQLACCESS2771376	SQL Access Advisor	SH	COMPLETED	Oct 12, 2007 4:00:39 PM	