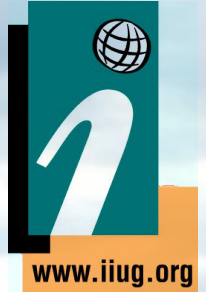


Exploring the SysAdmin DB – Monitoring and Tuning



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We Build Fast Databases!



Presented by Lester Knutsen, President of Advanced DataTools Corporation. Lester has been building large Data Warehouse and Business Intelligence Systems using IBM Informix Database software for over 12 years. Lester is a member of the IBM Gold Consultant program and in October 2008 was presented with one of the Inaugural Data Champion awards by IBM.

Agenda

- What is the SysAdmin Database and how can it help me?
- What do I need to monitor to tune an Informix database?
 - Server statistics
 - Disk I/O statistics
 - Table I/O statistics
 - User Sessions statistics
 - SQL Queries statistics
- How can I automate monitoring with the SysAdmin Database?
- Examples and code to use the SysAdmin Database for monitoring....

Sysadmin Database

- This is a real database, not like the Sysmaster database
- Takes disk space
- Recommend you move it out of rootdbs to another dbspace if you use it:

```
execute function admin ( "reset sysadmin" , "dbspace" );
```

```
execute function task ( "reset sysadmin" , "dbspace" );
```

Permissions

- By Default only the user informix has DBA access
- You must grant other users access

\$INFORMIXDIR/etc/sysadmin

```
informix@ids1150srvr:/opt/IBM/informix/etc/sysadmin> ls -l
total 124
drwxrwxr-x 2 informix informix 4096 2009-04-29 21:24 conv
-rw-r--r-- 1 informix informix 976 2009-04-14 23:11 db_create.sql
-rw-r--r-- 1 informix informix 20390 2009-04-14 23:11 db_install.sql
-rw-r--r-- 1 informix informix 1087 2009-04-14 23:11 db_uninstall.sql
-rw-r--r-- 1 informix informix 50616 2009-04-14 23:11 sch_aus.sql
-rw-r--r-- 1 informix informix 808 2009-04-14 23:11 sch_sqlcap.sql
-rw-r--r-- 1 informix informix 26294 2009-04-14 23:11 sch_tasks.sql
-rw-r--r-- 1 informix informix 1031 2009-04-14 23:11 start.sql
informix@ids1150srvr:/opt/IBM/informix/etc/sysadmin>
```

To Re-create the Sysadmin

```
cd $INFORMIXDIR/etc/sysadmin  
dbaccess - db_create.sql  
dbaccess sysadmin db_install.sql  
dbaccess sysadmin sch_tasks.sql  
dbaccess sysadmin sch_aus.sql  
dbaccess sysadmin sch_sqlcap.sql  
dbaccess sysadmin start.sql
```

What is in the SysAdmin?

- New Functions
- SQL API (task and admin functions)
- PH - Scheduler
- MON - Monitoring and Sensors
- AUS – Auto Update Statistics
- New Threads
 - dbworker
 - dbscheduler

Scheduler Threads

```
onstat -g ath | grep db
```

44	44db5d30	44762a54	1	sleeping secs: 247	1cpu*	dbScheduler
112	4581c248	44763058	1	sleeping forever	1cpu*	dbWorker2
113	454417b8	44763c60	1	sleeping forever	1cpu*	dbWorker1

Home for some new functions

SQL administration API

```
execute function sysadmin:admin  
  ( "params" );
```

```
execute function sysadmin:task  
  ( "params" );
```

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Example – SQL to do a Checkpoint

```
execute function sysadmin:task ("onmode", "c" );
```

Results

```
(expression)      Checkpoint Completed
```

```
execute function sysadmin:admin ("onmode", "c" );
```

Results

```
(expression)  
108
```

Task and Admin Functions

- Performs operation
- Returns a value that signifies whether the function succeeded or failed.
- Inserts a row into the `command_history` table of the `sysadmin` database.
- The return codes for the `admin()` and `task()` functions indicate whether the function succeeded or failed in different formats:
 - The `task()` function returns a textual message. The message is also inserted into the `cmd_ret_msg` column in `command_history` table.
 - The `admin()` function returns an integer. This number is also inserted into the `cmd_number` column in the `command_history` table.
 - If RETURN is greater than zero, the function succeeded, and a new row was inserted into the `command_history` table.
 - If RETURN is zero, the function succeeded, but IDS could not insert a new row into the `command_history` table.
 - If RETURN is less than zero, the function failed

SQL API Documentation

- **IBM Informix Dynamic Server Administrator's Reference**
 - Chapter 20. SQL Administration API Functions

Tables

Tables – Some Undocumented

- command_history
- ph_group
- ph_task
- ph_run
- ph_alert
- ph_threshold
- ph_version
- mon_config
- mon_prof
- mon_sysenv
- mon_vps
- mon_checkpoint
- mon_memory_system
- mon_table_profile
- mon_table_names
- mon_users
- aus_cmd_info
- aus_command

Tables

Tables

- ph_group is group definitions
- ph_task is the task definitions
- ph_run records when tasks actually execute
- ph_alert and ph_thresholds record those definitions
- command_history records all admin SQL actions
- ph_version is text for various flag columns

Views

- ph_alerts a subset of ph_alert
- ph_config == ph_thresholds without the description

Documentation

- **IBM Informix Dynamic Server Administrator's Guide**

- **Part 6. Automatic Monitoring and Corrective Actions**

- Chapter 27. Overview of Automatic Monitoring and Corrective Actions .

- Chapter 28. The sysadmin Database

- Chapter 29. The command_history Table

- Chapter 30. The Scheduler

- Chapter 31. Remote Administration with SQL Administration API Commands.

Documentation

- **IBM Informix Dynamic Server Administrator's Reference**
 - Chapter 3. The sysadmin Database 3-1
 - Chapter 20. SQL Administration API Functions

Auto Update Statistics

- `aus_command` - History of commands executed
- `aus_cmd_list` – Commands to be executed
- `aus_cmd_comp` and `aus_cmd_info` - Work tables
- Created by the functions in
- `$INFORMIXDIR/etc/sysadmin/sch_aus.sql`.
- Used by tasks that run periodically to find tables needing their statistic refreshed
- Done daily by default but may be changed as you wish

When was AUS last run?

```
select
  substr(b.name,1,20) as db,
  substr(c.tabname,1,20) as table,
  aus_cmd_type as level,
  aus_cmd_time as when
from   sysadmin:aus_command a,
       sysmaster:sysdatabases b,
       sysmaster:systabnames c
where  a.aus_cmd_dbs_partnum = b.partnum
and    a.aus_cmd_partnum = c.partnum
and    b.name not matches "sys*"
and    c.tabname not matches "sys*"
order by aus_cmd_id
```

Example

db	table	level	when
stores	employee	L	2010-04-20 11:37:06
stores	customer	L	2010-04-20 11:37:06
stores	customer	H	2010-04-20 11:37:06
stores	orders	L	2010-04-20 11:37:06
stores	orders	H	2010-04-20 11:37:06
stores	manufact	L	2010-04-20 11:37:06
stores	manufact	H	2010-04-20 11:37:06
stores	stock	L	2010-04-20 11:37:06
stores	stock	H	2010-04-20 11:37:06
stores	items	L	2010-04-20 11:37:06
stores	items	H	2010-04-20 11:37:06
stores	items	M	2010-04-20 11:37:06
stores	state	L	2010-04-20 11:37:06
stores	state	H	2010-04-20 11:37:06
stores	call_type	L	2010-04-20 11:37:06

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Pre-defined Sensors

- **Tables for pre-defined sensors**
- `$INFORMIXDIR/etc/sysadmin/sch_tasks.sql`
- The tables include
 - `mon_config`, `mon_onconfig`, `mon_profile`, `mon_vps`, `mon_users`,
`mon_onconfig` `mon_table_names` `mon_vps`
 - The data collected by the sensors will cause these tables to grow.
- **You may add still more tables for your own sensors**
- Need enough space to hold data collected.

Some built-in tasks

- mon_config - Changes to the DBMS configuration file
- mon_sysenv - Tracks the database servers startup environment.
- mon_profile - Collect the general profile information
- mon_checkpoint - Track the checkpoint information
- mon_table_profile - Collect SQL profile information by table/fragment
- mon_table_names - Collect table names from the system
- check_backup - Checks to ensure a backup has been taken
- mon_users - Collect information about each user

Create Your own task

```
INSERT INTO ph_group VALUES (0,"LKMONITOR","Lesters Monitoring System");
```

```
INSERT INTO ph_task ( tk_name, tk_type, tk_group, tk_description,  
tk_execute, tk_start_time, tk_stop_time, tk_frequency  
)  
VALUES  
(  
"Monitor Sysprofile",  
"TASK",  
"LKMONITOR",  
"Collect and Save data from Sysprofile",  
"insert into dbmonitor:idsperformance  
select current, * from sysmaster:sysprofile ",  
CURRENT,  
NULL,  
INTERVAL ( 1 ) minute to minute  
);
```

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Thank You

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- For the Final Presentation and to download the code and samples for this presentation, please visit our web site at the link below:

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- Thank You



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