

Informix Basic Administration

Part 1: Basic Administration



Barrie Shaw

Virtual-DBA Informix/PostgreSQL Lead DBA &
Delivery Manager
XTIVIA Inc.

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Introduction

Barrie Shaw is a Senior IBM Informix Certified System Administrator with over twenty-five years of experience using Informix software, including database administration, systems administration, application development and support. She leads the XTIVIA Informix Virtual-DBA team for managed services and consulting. Barrie was a member of IBM's Gold Consultant group for 10 years. She enjoys interacting with her clients, teaching them to use Informix and wowing them with her vi skills.

The following eBook covers the installation of Informix, initial configuration and best practices. It also includes how to add space, how to start and stop the database engine and how to run a second instance on the same server.

Part 1

Basic Administration





Informix Installation and Initial Set-Up



1.1 Overview

- Informix software installation
- Prepare four files needed to create an instance
 - Modify onconfig and sqlhosts files
 - Work with your sysadmin to ensure that the necessary entries are in the /etc/services and /etc/hosts files
- Set four environment variables: INFORMIXDIR, INFORMIXSERVER, ONCONFIG, PATH
- Dbspace allocation
- Startup and shutdown
- Physical and logical log sizing and allocation

1.2 Install Informix Software

- Copy tar file to desired directory
- Untar file
- Set `INFORMIXDIR` to correct path
- Confirm that `INFORMIXDIR` is owned by `informix:informix`
- As root, run `./ids_install`
- It is not necessary to create a test instance

1.3 Prepare for New Instance – onconfig file

- Create the root chunk with ownership of informix:informix and permissions of 660
- Using links for the chunks is recommended if using raw devices
- `cd $INFORMIXDIR/etc`
- Copy `onconfig.std` to *onconfig.instance*
- Modify *onconfig.instance*
 - `ROOTPATH` Set to the full path of the root chunk or link
 - `SERVERNUM` Set to a number not already used on the server
 - `DBSERVERNAME` Set to the new instance name
 - `TAPEDEV` Set to a valid file, directory, tape device or `/dev/null`
 - `LTAPEDEV` Set to a valid file, directory, tape device or `/dev/null`

1.4 Prepare for New Instance – sqlhosts file

- In \$INFORMIXDIR/etc, copy sqlhosts.std to **sqlhosts**
- If sqlhosts file is given a different name and/or location, specify the full path with \$INFORMIXSQLHOSTS environment variable
- Update with the appropriate values
 - Server name
 - Protocol
 - Host (name or IP)
 - Service name or port number
 - Options

Example:

Servername	protocol	host or IP	Port or service
informix_prd	onsoctcp	192.168.2.101	1527
informix_rss	onsoctcp	linux04	ifxrss

1.5 Prepare for New Instance - /etc/services file

- Ties the service name in sqlhosts to a port number
- This is not needed if a port number is used in the fourth column of sqlhosts
- Update with the appropriate values
 - Service name
 - Port/protocol

Example:

Service	Port
<code>ifxrss</code>	<code>1528/tcp</code>

1.6 Prepare for New Instance - /etc/hosts file

- Ties the hostname in sqlhosts to an IP address
- This is not needed if an IP address is used in the third column of sqlhosts

```
192.168.2.100    Linux01.xtivia.com    linux01
192.168.2.101    Linux02.xtivia.com    linux02
192.168.2.102    Linux03.xtivia.com    linux03
192.168.2.107    Linux04.xtivia.com    linux04
```

1.7 Initialize Instance

- Set environment variables
 - set **INFORMIXDIR** to installation directory
 - set **PATH** to `$INFORMIXDIR/bin:$PATH`
 - set **INFORMIXSERVER** to new instance name
 - set **ONCONFIG** to `onconfig.instance`
- Initialize instance – **Use `-i` only when creating a new instance**
 - **oninit -iv**
- Confirm that instance started properly
 - **onstat -m** to tail the online log

1.8 Overview – Build Out Instance

- Create additional dbspaces
 - Physical log
 - Logical logs
 - Data dbspace(s)
 - Temporary dbspaces
- Move physical log to its dbspace
- Create logical logs in their own dbspace
- Drop original logical logs
- Customize configuration

2

DbSPACE Recommendations and Creation



2.1 DbSPACE General Guidelines

- For performance reasons, it is recommended that separate dbspaces be allocated for the logical and physical log, temporary/sort space, and data
- It is generally considered best practice to distribute databases, tables, indexes and fragments across multiple dbspaces
 - Provides for greater granularity when monitoring
 - Enables identification of “hot spots” on disk
- By default, physical and logical logs are created in root dSPACE so these should be moved
- It is recommended to create multiple temporary dbspaces to distribute I/O across disks and allow for parallel processing
- Temporary dbspaces should all be the same size

2.2 Creating a dbspace

- A dbspace is created using a “chunk” of contiguous disk space
- The chunk can be a raw device or a file in a file system directory, also called a “cooked” file
- A chunk must be created with ownership of informix:informix and permissions of 660
- The following instructions are for using cooked files:
 - cd to directory
 - touch chunkfile
 - chown informix:informix chunkfile
 - chmod 660 chunkfile
- Create the dbspace using the onspaces command
- Use the -c option to create a dbspace
- The size (-s) is given in kilobytes
- The size must be a minimum of 1000 kb and can be a maximum of 2-4 TB depending on the platform
- To create the dbspace:
 - Normal dbspace
`onspaces -c -d dbspace1 -p /full/path/chunkfile1 -o offset -s kbytes`
 - Temporary dbspace
`onspaces -c -d tempdbs -t -p /full/path/chunkfile2 -o offset -s kbytes`
- Example
 - > `cd /opt/IBM/informix_prd/db_spaces`
 - > `touch plogdbs`
 - > `chown informix:informix plogdbs`
 - > `chmod 660 plogdbs`
 - > `onspaces -c -d plogdbs -p plogdbs -o 0 -s 500200`

2.3 Adding a Chunk to a dbspace

- Dbspaces can be expanded by adding a chunk
- The same command is used for normal and temporary dbspaces
- Use the `-a` option of the `onspaces` command:

```
onspaces -a dbspace1 -p /full/path/chunkfile2 -o offset -s  
kbytes
```

3

Physical and Logical Log Sizing and Allocation



3.1 Physical Log Considerations

- Used to store before-images of pages being modified
 - Used for fast recovery in the event of a server failure
 - Available for a backup process to determine the correct version of a page to be backed up
- A checkpoint is triggered when the physical log reaches 75% full
- The physical log pages must be contiguous
- Newer versions of Informix require a larger physical log for checkpoint processing
- A performance advisory will be reported in the online log if it is too small

01:07:51 Performance Advisory: Based on the current workload, the physical log might be too small to accommodate the time it takes to flush the buffer pool.

01:07:51 Results: The server might block transactions during checkpoints.

01:07:51 Action: If transactions are blocked during the checkpoint, increase the size of the physical log to at least 2087736 KB.

3.2 Logical Log Considerations

- Logical log files, or transaction logs, are used to store a record of all transactions made against the data in any logged databases
- Transaction logs can be backed up to tape or disk and later used during a restore to recreate all activity up to the point of failure
- Logical log sizing
 - Small enough to minimize data loss in the event of a failure
 - Big enough that they are not filling too frequently
 - After instance creation, monitor usage in online log to determine if size needs to be adjusted
- A performance advisory will be reported in the online log if the logical logs are too small.

00:41:12 Performance Advisory: Logical log file size might be too small for a checkpoint to complete.

00:41:12 Results: The size of individual logical log files is too small for the current workload, resulting in each log file filling very quickly. If log files fill in less than 30 seconds, the checkpoint might remain blocked because the last log file fills during the time needed to perform the checkpoint.

00:41:12 Action: Increase the size of the individual logical log files so that it takes at least 30 seconds to fill each one. Look at the online log to determine how quickly the log files are filling, and then increase the size of the files proportionately.

3.3 Move Physical Log

Informix version 12 offers two options for moving the physical log to its own dbspace:

- 1) Create a new dbspace using onspaces and use the onparams command to move the physical log to the dbspace. Specify the size in kbytes and dbspace name for the physical log with the onparams command.

```
onspaces -c -d plogdbs -p /full/path/plogdbs -o 0 -s 500200  
onparams -p -s 500000 -d plogdbs -y  
-y will answer yes to prompt
```

- 2) Create a new physical log space using onspaces. An instance can have only one plogspace, so creating a new one will move the physical log to the new space.

```
onspaces -c -P plogdbs -p /full/path/plogdbs -o 0 -s 500000
```

3.4 Create Logical Log Files

- Add logical log dbspace

```
onspaces -c -d llogdbs -p llogdbs -o 0 -s 200000
```

- Determine how many logs to add
 - How much space is available?
 - How quickly do you expect logs to fill?
 - How many days of buffer do you need if backups fail?
- Use onparams to add logical log files, specifying dbspace and size in kbytes

```
onparams -a -d llogdbs -s 10000 -y
```

3.5 Remove Logical Log Files from root dbspace

- Start by adding a few new logs
- Move current log to one of the newly added logs
 - Monitor with “`onstat -l`”
 - `onmode -l` as many times as necessary
- Drop original logs using `onparams`
`onparams -d -l 1 -y`
- Run “fake” archive to reuse dropped logs
`onbar -b -F`
- Add remaining logs



Startup and Shutdown



4 Startup and Shutdown

- **oninit** -- Will take informix from offline to online
 - No options starts informix in multi-user mode
 - v Verbose starts in multi-user mode with informational messages
 - i Use only at initialization; will destroy existing data;
FULL_DISK_INIT onconfig parameter prevents this from being done accidentally after initial startup
 - s Start instance in quiescent mode; only informix can perform tasks
 - j Start in administration mode; only informix and designated users can perform tasks.
-u options allows inclusion of user names. Also specified by ADMIN_MODE_USERS in onconfig file

4 Startup and Shutdown (continued)

- **onmode**
 - m Bring instance online from quiescent or administration mode
 - j Take informix to administrative mode
 - s Graceful shutdown: users can finish, no new sessions allowed
 - u Immediate shutdown: user sessions are rolled back and terminated
 - k Takes offline and removes shared memory
- Shutdown options can be combined
 - **onmode -kuy** Kill sessions immediately and take offline without prompting
- **onclean**
 - With no options, will tell you whether or not informix is offline
 - -k Use only when necessary to shut down when onmode won't work. Can also be used to clean up residual memory segments after a crash



Configuration Recommendations



5 Configuration Recommendations

- When upgrading from an older version of informix, copy the onconfig.std file for the new version, then manually update the new file with the needed values from the old one
- onconfig_diff will compare two onconfig files and output the differences
 - `onconfig_diff -c -f onconfig.std -s onconfig.myprod`

- Some parameters to check for differences:

MSGPATH	VPCLASS cpu, num=1, noage
DEF_TABLE_LOCKMODE	DBSPACETEMP
SINGLE_CPU_VP	SBSPACETEMP
RESIDENT	CLEANERS
SHMVIRTSIZE	NETTYPE
DIRECT_IO	SHMADD
MULTIPROCESSOR	LOCKS
OPTCOMPIND	ALARMPROGRAM
BUFFERPOOL	DBSERVERALIASES

5 Configuration Recommendations (continued)

Modify the following as needed:

- **MSGPATH** Set to path for the online log if you don't want default
- **VPCLASS cpu, num=1, noage** Set "num=" to the number of CPU VPs
- **SINGLE_CPU_VP** Set to 1 for a single processor; 0 for multiprocessor
- **MULTIPROCESSOR** Set to 1 for multiprocessor; 0 for single processor
- **DEF_TABLE_LOCKMODE** Set to **row** for "lock mode row" (To be explained later)
- **DBSPACETEMP** List the allocated temporary dbspaces
- **SBSPACETEMP** List any allocated temporary smartblob spaces
- **ALARMPROGRAM** Change if a custom script is used



Creating a Second Instance on a Server



6 Creating a Second Instance on a Server

Sometimes it is beneficial to have multiple Informix instances on a single server. This can be done with a single installation of Informix software.

- Create the root chunk with ownership of informix:informix and permissions of 660
 - In `$INFORMIXDIR/etc` copy `onconfig.std` to `onconfig.instance2`
 - Modify `onconfig.instance2` as we did before. **The following parameters must be unique for each instance.**
 - `ROOTPATH` Set to the full path of the root chunk or link
 - `SERVERNUM` Set to a number not already used on the server
 - `DBSERVERNAME` Set to the new instance name
 - If using `/etc/services`, add a new service name and port for your instance
 - Add the servername entry to the existing `sqlhosts` file
- When creating multiple instances in the same `$INFORMIXDIR` environment, the following should be given unique names or locations:
- `MSGPATH` - Set to a unique filename for the instance, e.g. `online_server.log`
 - `TAPEDEV` and `LTAPEDEV` - For ease of management, create separate backup directories for each instance

Conclusion

We hope you found the Informix Basic Administration - Part 1 material useful. It was compiled by our Informix team to assist clients who desired to learn how to do things for themselves. Our customers wanted to know how to handle the basics from installation and configuration, to some basic maintenance tasks, including how to do backups and restores. Our goal is to provide the basics you need to keep a generic Informix installation running and recoverable. If you want to know the more complicated stuff, like Enterprise Replication (ER), High-availability Data Replication (HDR), Connection Manager, Remote Standalone Secondaries (RSS), Shared Disk Secondaries (SDS), or TimeSeries functionality, please give us a call.

Informix is a robust database system that is in use all over the globe. We've been known to get calls from clients who found it running on a server in their environment, very often hidden in a closet, doing something mission critical. Usually, no version is too old for us to help them, as our team has been doing this for a very long time.

XTIVIA has been providing Informix services for more than 20 years. Most of our team used to work directly for Informix and all have been specializing in Informix for many years. That is the same team you will work with when:

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