Introduction to Informix Dynamic Server on Mac OS X

Carlton Doe IBM cdoe@us.ibm.com



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Agenda

- System stuff to do first
 - Server tools for client version of O/S
 - access to a terminal window
 - enable root account (on client version of O/S)
 - kernel tuning prior to installing IDS and starting your first instance
- Opening and installing the software
 - installing the software
 - checking on user "informix"
- Preparing to start your first IDS instance
 - modifying the profile
 - creating where the instance will live
 - the basic instance files
 - turn it on!!
- Appendix
 - Architectural overview
 - optional -- configuring and starting a demo instance

System stuff to do first

- Informix Dynamic Server was born and bred in a Unix environment
 - its architecture is completely different from other data servers available today
 - fully multi-threaded from the core out
 - object-relational, not just relational
 - can define data types, access methods, add user-defined processing elements
 - almost everything can be executed at the command line
 - command line is the preferred interface for IDS administration though graphical tools are available
- In preparing for installation, some tasks will require "root" access
 - directory creation and setting permissions
- Using a terminal window to execute some steps may be faster than through the GUI. Your interface preference may vary but CLI and graphical will be shown

Server tools for client O/S

- Strongly recommend you install Mac OS X Server Management software on client version of Mac OS X
 - will be used to check "informix" user and group creation later
 - can be downloaded from:

—		
00	Workgroup Manager: Local	C
Server Admin	s New User Delete Refresh New Window Search	
€ + Authenticated as root to local directo	ory: /Local/Default	(
	Basic Advanced Groups Home Mail Print Quota Info Windows	
Q- Name Contains	Name: informix	200
User Name 🔺 UID	User ID: 502	
k cdoe 501 informix 502	Short Names: informix	
-		
	Password: ••••••• Verify: ••••••	
	User can 🗹 administer this server	
	✓ access account	
	Account Summary	
	Location: cdoes-macbook-pro.local/Local/Default	
	Home: /Users/informix Primary Group: Users (20)	
	Mail: No mail service for this user	
	Print Quota: None	
	Password: Shadow Password	
	Presets: No Presets Revert	Save
1 of 2 users selected		

http://support.apple.com/kb/dl968

Access to a terminal window

- Mac OS X comes with a built-in terminal program called "terminal"
 - found in the **Application:Utilities**

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8	b	ash	6	3		ł	bash		
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drw×r-×r-×	- 7	informi×	informix	238	Mar	15	22:48	gls	
drw×r-×r-×	3	root	informi×	102	Mar	15	22:50	gsk	
drw×r-×r-×	4	informi×	informi×	136	Mar	15	22:50	help	
drw×r-×r-×	17	informi×	informi×	578	Mar	15	22:49	ids_license	
drw×r-×r-×	8	informi×	informi×	272	Mar	15	22:50	incl	
-rw×r-×r-×	1	informi×	informix	15986	Mar	8	09:52	installesql	
drw×r-×r-×	3	informi×	informix	102	Mar	15	22:50	ism	
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drw×r-×r-×	3	informix	informix	102	Mar	15	22:47	master_license	
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drw×r-×r-×	3	informix	informix	102	Mar	15	22:48	release	
drw×r-×r-×	15	informix	informix	510	Mar	15	22:47	sdk_license	
drw×r-×r-×	11	informix	informix	374	Mar	15	22:50	snmp	
drwxrwx	2	informix	informix	68	Mar	15	22:49	ssl	
drwxrwx	3	informix	informix	102	Mar	15	22:51	tmp	
drw×r-×r-×	4	informix	informix	136	Mar	15	22:49	uninstall_csdk	
drw×r-×r-×	4	informix	informix	136	Mar	15	22:50	uninstall_ids1150	
-rw×r-×r-×	1	root	informix	29713	Mar	12	14:25	uninstallserver	
cdoes_macbook_pro:11_5 cdoe\$ pwd									
/opt/IBM/informix/11_5									
cdoes-macboo	ok-pi	ro:11_5 cd	oe\$						



Access to a terminal window

- Many users prefer to use an open source program called iTerm
 - available from iterm.sourceforge.net/
 - has more features, easier to use

See the Appendix for important configuration and use information!



not required for those using Mac OS X Server

- "Superuser" access can make creating directories and setting permissions easier
- IS required in order to tune the kernel (discussed next)
 - keep the password secure!!!
- Process is different for Leopard vs Snow Leopard
 - For Leopard
 - using an account with "admin" privileges, open Applications:Directory Utility
 - click on lock to open, enter administration password



- For Leopard (cont)
 - Select the Enable Root User from the Edit menu
 - create password
 - agree to disable automatic login, if not already disabled

📹 Directory Utility	File	Edit	Window	Help	
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		Spe	cial Chara	cters	₩Г
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For Snow Leopard

- using an account with "admin" privileges, open /System/Library/CoreServices/ **Directory Utility**
 - click on lock to open, enter administration password

•	00)	Directory Utility	
S	ervices	Search Policy		
		Select a servio	ce and click the pencil icon to edit settings	
	Enable	Name	Version	
		Active Directory	6.1	
	\checkmark	BSD Flat File and NIS	6.4	
		LDAPv3	6.4	
	\checkmark	Local	6.4	
	/			
	💼 c	lick the lock to prevent fur	ther changes.	? App



- For Snow Leopard (cont)
 - select the Enable Root User option from the Edit menu
 - enter the password for the root user ID
 - re-lock the utility when done

Edit Window He	elp			
Undo Redo	¥Z ዕዝZ	Direct	tory Utility	
Cut Copy Paste	第X 第C 第V	olicy		
Clear Select All	жA	Select a service and click	the pencil icon to edit settings. Version	
Change Root Pas	sword	e Directory	6.1	
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Search For Mac O	S X Servers	v3	6.4 6.4	
Special Character	s ℃#T			
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	~			
	👖 Click the	e lock to prevent further chang	es.	?
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- A data server like IDS requires a lot of horsepower from the operating system
 - default Mac OS X kernel parameters are insufficient for IDS to function so must be tuned
 - read the machine notes for specific kernel tuning guidelines
 - available from README file in the installation image



• or \$INFORMIXDIR/release/en_us/0333/ids_machine_notes_11.50.txt

ng system nction so must be tuned

- Of interest are the recommended kernel operating parameters under which IDS was compiled, tested and certified for operation on Mac OS X:
 - 1. Kernel Parameters

The values of the kernel parameters that were used for testing this product are given below. These values might need to be tuned depending on the application and availability of system resources.

```
kern.sysv.shmmax=4398046511104
```

kern.sysv.shmmin=1

kern.sysv.shmmni=512

kern.sysv.shmseg=512

kern.sysv.shmall=1073741824

kern.sysv.semume=10

kern.sysv.semmsl=87381

kern.sysv.semmnu=87381

kern.sysv.semmns=87381

kern.sysv.semmni=87381

kern.maxfiles=2147483647

kern.maxfilesperproc=40000

kern.maxvnode=150000

Note: this values are examples. They may be different from what is in the release notes on your distribution of the software

• To see what your kernel is set to, as "root" use the sysctl command to extract each of the referenced parameters to a file



Compare the results and see what changes need to be made



- Create (or update) /etc/sysctl.conf to include the parameters requiring tuning
- Restart computer for new parameters to take effect

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New	Info	Customize	Close		Execute	Bookmar
	Defa	ult				
kern.sysv kern.sysv kern.sysv kern.sysv kern.maxt kern.maxt kern.maxv ~ ~ ~	v.shmmax= v.shmseg= v.shmsel= v.shmall= v.semmnu= files=214 filesperp vnode=150	:439804651110 :512 :512 :1073741824 :87381 :7483647)roc=40000)00				
~						
~						
~						
∼ "sysctl (conf" 8	. 1970 writte	'n			



• Double click the . dmg package to mount the installation media



• Move through the greeting windows



• This begins the extract of the IDS binary into an installable form



- Once extracted, the IDS installer is invoked
- Will ask for "admin"-level user ID and password
 - used to create "informix" user ID and group if they don't exist



• Extract completes and the installer starts



 The installation splash screen is followed by several informational screens you'll click "Next" or "Continue" to advance through



• Second screen, click "Next" to continue



< Back

Next >

M undle	
rsion 11.50	
Cancel	
cuncer	

• Click to accept the license agreement then "Next" to continue

0 0	Installer
<u>I</u> ≣¥[₀	Software License Agreement Please read the following license agreement carefully.
	International License Agreement for Early Release of Programs Part 1 – General Terms THIS INTERNATIONAL LICENSE AGREEMENT FOR EARLY RELEASE OF PROGRAMS ("AGREEMENT") IS A LEGAL AGREEMENT BETWEEN YOU AND IBM. BY DOWNLOADING, INSTALLING, COPYING, ACCESSING, OR USING THE PROGRAM YOU AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU ARE Read non-IBM terms I accept both the IBM and the non-IBM terms I do not accept the terms in the license agreement Print
InstallShield	
	< Back Next > Cancel

- Enter the correct install location and continue
 - Mac OS X default is /Applications/IBM/informix
 - you can override this if you want

0 0	Installer
III «	Click Next to install "IBM Informix Dynamic Server Version 11.50 Bundle" to this directory, or click Browse to install to a different directory.
	Directory Name:
P	/Applications/IBM/informix
	Browse
diama (Al A)	
CH2	
InstallShield	
	< Back Next > Cancel

- If the "informix" user ID and group do not exist, installer will create them
 - required for IDS to function properly
- When prompted, enter the password for the "informix" user ID, ensure \$HOME is correct as well

000	Installer	
IBM®	Provide information to create the least 8 characters.	user informix. The password must contain at
See Y	User Informix home directory :	/Users/informix
	Password :	••••••
	Confirm Password :	••••••
Jund Latil		
(AP)		
AT S		
InstallShield		
	< Bac	Next > Cancel

- From this screen, you can decide whether you want a full install of the connectivity drivers (recommended) and data server or to execute a selective (custom) installation
 - for this example, a selective IDS install will be chosen

0 0	Installer	
	Select the products you would like to install: Product IBM Informix IConnect Version 3.50 IBM Informix Client-SDK Version 3.50 IBM Informix Dynamic Server Version 11.50	Setup Type Typical
InstallShield		
	< Back Next >	Cancel

- Having selected a custom IDS installation, from this screen, you can add and subtract functional modules
 - notice when selecting an option, a description and disk space required is displayed on the right hand side of the window



- On the next screen you're asked if the installer should create and start a demonstration instance for you
 - for now, answer "No"
 - screens showing this process are in the Appendix

0 0	Installer
====	Do you want to create an IDS domonstration database conver instance?
LIII®	
9	 Yes No You can use a demonstration database server instance to verify that IDS is
	installed correctly and that the hardware is configured correctly. You can also configure the demonstration database server instance to use it as a production instance.
InstallShield	
mstanomenu	
	< Back Next > Cancel



• The next screen summarizes the installation about to occur



		-
d	in the	
_	Cancel)

- Watch while the installation and branding process occurs
 - CSDK installed first (if selected) followed by IDS
 - only takes about 2 minutes, maybe three

00	Installer	
II: «	Installing IBM Informix Client-SDK Version 3.50. Please wait	
	/opt/IBM/informix/11_5/incl/dmi/blob.h	
	34%	
InstallShield		
	< Back Next > Can	



- A series of status and informational screens appear after the installation completes
- Congratulations! You've just installed Informix Dynamic Server



Checking on user "informix"

Checking on user "informix"

- As you have seen, if the "informix" user ID and group do not exist on your computer, the installer will create them for you
- Currently, when the installer creates them, it does not correctly register group "informix" as the "primary" group for the "informix" user ID (this will be fixed)
 - IDS **requires** that user "informix" have group "informix" as its primary group
 - it can be a member of other groups if you want, such as "admin"
- To change primary group, use the **Workgroup Manager** tool from the Server Management utility set
 - available by default on Server version of the O/S
 - must be installed on Client version
 - see page 4 for information on where to get the tools
Checking on user "informix"

- Select the "informix" user and select "Groups" from the menu
 - notice the default group is group "20" or the "Users" group

00	Workgro	oup Manager: Local		\bigcirc
Server Admin	New User Delete Re	fresh New Window Search		
€ - Authenticated as root to local directory	: /Local/Default			۲
	Basic A	dvanced Groups Home Mail	Print Quota Info Wir	ndows
Q- Name Contains	Primary Group ID:	20 Short Nam	e: staff	
User Name UID	Name:	Users		
informix 502	Other Groups:	Name	GID	+
		App Server Admins	81	_
		Application Server	79	
		Print Administrators	98	
		Administrators	80	
		Public	101	
		informix	501	
		Users	20	
		Inherited group memberships ar	re shown in italics.	
		Chambrid Car	\	
		Show innerited Groups)	
	Presets: No Preset	s 📩	Reve	ert Save
1 of 2 users selected				

Checking on user "informix"

- Click on the "+" to display all groups
 - scroll down, select "informix" and drag it either to the "Group ID", "Short Name" or "Name" field
 - select "Save"

00		Workgro	oup Manager: Local	
Server Admin Account	unts Preferences	New User Delete Re	efresh New Window Search	
↔ Authenticated as room	ot to local director	ry: /Local/Default		
1 4 0		Basic Ad	dvanced Groups Home Mail	Print Quota Info Windows
Q- Name Contains	5	Primary Group ID:	501 Short Name	e: informix
User Name	501	Name:	informix	
🥼 informix	502	Other Groups:	Name	GID +
			App Server Admins	81 -
			Application Server	79
			Print Administrators	98
			Administrators	80
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			Show Inherited Groups	
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1 of 2 users selected		riesets: No Preset	5	(Nevert) (

\bigcirc							
	⊕ - Local directory: /Loc	al/Default					
۲	Q- Name Contains						
	Name 🔺	GID					
	CVS Group	72	n.				
	Dialup	68					
	Everyone	12	11				
	Guests	99					
	HTTP Users	70	11				
	informix	501					
	Interactive	51	11				
	Kernel Memory	2					
	keytabusers	30					
	Local Accounts	61					
	Local System	1					
	Mailing List	78	E.				
	MySQL Users	74					
	Network	52					
	Network Accounts	62					
	Network Config	69					
	No Group	-1					
	Nobody	-2	U				
	Print Administrators	98					
	Print Operators	26					
	procmod	9					
	procview	8					
	Public	101	ĭ				
)	OuickTime Strea	76	•				
1							

Congratulations!

You're now ready to use Informix Dynamic Server

Preparing to start your first IDS instance

This will walk you through configuring and starting an instance manually

- For any user logging on to the physical server hosting an IDS instance and wanting to interact with it, several environment variables must be set:
 - INFORMIXDIR -- the location of the installed IDS data server
 - installation default is /Applications/IBM/informix
 - PATH -- must be modified to include \$INFORMIXDIR/bin
 - INFORMIXSERVER -- the name of the instance
 - ONCONFIG -- the instance configuration file
 - usually located in \$INFORMIXDIR/etc
 - naming convention: onconfig.instance name (or instance name abbreviation)
 - INFORMIXTERM in order for the IDS dbaccess utility to work in iTerm windows
 - also need to create several iTerm objects for everything to work correctly, see the Appendix!

- The variables can be set three ways:
 - globally in /etc/profile
 - locally in \$HOME/.profile for each user
 - for both, will immediately take affect for new iTerm (or comparable) sessions

0	0	In	formix	(68,1	1)	
F	1	₹¥	٢	C		$\supset \langle$
New	Info	Customize	Close		Execute	Book
	Info	rmix				
export export	INFORMIXD PATH=\$INF)IR=/Applicati ORMIXDIR/bin:	lons/IBN \$PATH	1/infor	mi×	
export export ∎	INFORMIXS ONCONFIG=	ERVER=product	ion 1			
export	INFORMIXT	ERM=terminfo				
~~~~~						
~						



- Third option to setting profile variables:
  - on-the-fly through a shell script stored in a pathed location, example called envprod
    - useful when there is more than one instance on the physical server
    - global parameters (INFORMIXDIR, PATH, TERM and INFORMIXTERM should be set in /etc/profile)

00	Default (7	74,14)	
📑 🚺 🔧			
New Info Custom	ize Close	Execute	Bool
Default			
<pre>## the first two parameter # global in nature and set # export INFORMIXDIR=/App # export PATH=\$INFORMIXDIN export IFX_ONTAPE_FILE_PRN export INFORMIXSERVER=pro- export ONCONFIG=onconfig_</pre>	rs might not ne t in /etc/profi lications/IBM/in R/bin/:\$PATH EFIX='production duction prod	ed to be set here if le nformix n'	they are
export PS1="Prod: " export MSGPATH=/opt/IBM/in cd /opt/IBM/informix/device	nformix/logs/pro ces/production	oduction.log	
"envprod" 12L, 421C writt	en		



- Third option to setting profile variables, on-the-fly
  - called by . envprod
    - notice syntax -- "." followed by a whitespace

00			Default (81,12)			
	i	- <b>%</b>				
New	Info	Customize	Close		Execute	E
	Defa	ult				
Prod:	своок-рг	J:∼ Cuoeֆ . e	nvproa			



• Regardless of the option selected, for this test setup make sure:

```
INFORMIXSERVER=production
ONCONFIG=onconfig.prod
TERM=vt100
INFORMIXTERM=terminfo
```

### Creating where the instance will live

### Creating where the instance will live

- With the data server installed, it's time to prepare to turn it on
- There are two important parts
  - understanding and creating data storage locations
  - modifying the required configuration files
- The first is easy and will be covered here
- The breadth of options for the second is too vast to be covered here though concepts will be introduced
  - please see
    - IBM Informix Dynamic Server Administration Guide from IBM documentation library
    - Administering Informix Dynamic Server, Building the Foundation by Carlton Doe ISBN-10: 158347076X ISBN-13: 978-1583470763

- The basic building block of IDS storage is the "page"
  - 4 16 KB in size on Mac OS X
  - system default is 4 KB
- All I/O occurs at a "page" level
- Can NOT administer pages

page	page
page	page

- Multiple pages create another physical entity the "chunk"
- You can administer a chunk to add to a "dbspace" (discussed next)
- Can be either "cooked" or "raw"
  - cooked regular file system flat files
  - raw unformatted disk partition

		_
page	page	
page	page	
		Chunl



- One or more physical chunks are used to create a "dbspace"
  - logical construct
  - most administration occurs at a dbspace level
- Databases, tables, indexes are created in dbspaces
- Several types of dbspaces
  - regular
  - temporary
  - simple BLOBspace
  - smart BLOBspace
- Every instance has at least one dbspace -- the rootdbs

page	pag	page	
page	pag	page	
Chun			
Chun			



- One or more dbspaces are used in an "instance"
  - logical construct
- Tunable database operating environment
- Multiple instances can operate simultaneously on a single server
  - each instance can contain multiple databases with their own tables, indexes and other objects

	page	page	
	page	page	
Chunk			
Chunk			
d			
			·



### Creating data storage locations

- Now that you understand how IDS views data storage, it's time to create some for your instance
- For a first instance, we'll keep things simple
  - use regular system files (aka cooked space)
  - single directory location without symbolic links
    - symbolic links are STRONGLY recommended as you progress and become more familiar with the data server

### Creating data storage locations

- Login as user "informix"
  - almost all instance administration occurs with user "informix"
- Open an iTerm window and use the su command to acquire "root"-level permissions
  - execute the following commands to create the storage directory:

mkdir /ifmx data chown informix: informix / ifmx data chmod 755 /ifmx data exit (to get out of "root")

#### Creating data storage locations

• Since you're still user "informix" in the iTerm window, create 4 flat files:

cd /ifmx data touch root space data 1 tmp space slob 1 chmod 660 *

- Will be using these to create 4 single-chunk dbspaces named
  - rootdbs -- the core instance dbspace
  - data space 1 -- for databases, tables, indexes and so on
  - work space -- temporary space for scratch tables and temporary objects
  - smart 1 -- for statistical and other instance objects, can be used for end-user objects too but you wont at this time

- There are two core files for IDS
  - "onconfig"
    - one for each instance on the server
    - usually named onconfig.instance name
    - located in \$INFORMIXDIR/etc
    - contains all the tunable parameters for the instance
  - "sqlhosts"
    - also in \$INFORMIXDIR/etc
    - usually only one per physical server
    - is the "phone book" of instance connectivity
      - lists where all the instances are in the enterprise and how to connect to them

- An instance \$ONCONFIG file can be daunting at first. Here's a *very* basic instance setup. From an iTerm window as user "informix":
  - cd \$INFORMIXDIR/etc
  - cp onconfig.std onconfig.prod
  - vi onconfig.prod (change these parameters -- **ARE** case sensitive): ROOTPATH /ifmx data/root space DBSPACETEMP work space SBSPACENAME smart 1 SYSSBSPACENAME smart 1 DBSERVERNAME production SHMVIRTSIZE 228592 TAPEDEV /dev/null LTAPEDEV /dev/null
  - write and quit to save your changes

- While in \$INFORMIXDIR/etc, create the sqlhosts file as well:
  - cp sqlhosts.std sqlhosts vi sqlhosts

remove the existing entries and add the following (case sensitive):

production onipcshm localhost prod shm

write and quit to save your changes

• This configures a "shared memory" connection to the instance. Only co-resident applications can connect to it.



# Turn it on!!!

# Turn it on!!

- With the files modified, it's time to turn the instance on
- Make sure your environment parameters are set as indicated earlier
- Open an additional iTerm window to monitor the instance log in real-time as you turn the instance on
  - helpful for debugging purposes
  - in the window:

#### tail -f \$INFORMIXDIR/tmp/online.log

• In the main window, execute the new instance initialization command and watch what happens:

oninit -ivy

# Turn it on!!

#### • You should see successful initialization:

00	Default (95,26)
<b>.</b>	1 🛠 🕕 🦪
New	Info Customize Close Execute Bookmarks
	Default
14:42:06	IBM Informix Dynamic Server Started.
Thu May 1	5 14:42:07 2008
14:42:07	Event alarms enabled. ALARMPROG = '/Applications/IBM/informix/etc/alarmprogram.sh'
14:42:07	Booting Language <-> from module <>
14:42:07	Loading Module <cnull></cnull>
14:42:07	Booting Language abuiltin> from module 🗢
14:42:07	Loading Module <builtinnull></builtinnull>
14:42:12	DR: DRAUTO is 0 (Off)
14:42:12	DR: ENCRYPT_HDR is 0 (HDR encryption Disabled)
14:42:12	IBM Informix Dynamic Server Version 11.50.FC1 Software Serial Number AAA#8000000
14:42:18	IBM Informix Dynamic Server Initialized Complete Disk Initialized.
•	
•	
•	
	'syemaster' database built successfully
14.42.20	'systills' database built successfully
14.42.20	'sysuser' database built successfully.
14:42:36	Building 'sysadmin' database
14:42:36	Logding Module <splnull></splnull>
14:42:37	'sysadmin' database built successfully.
14:42:37	SCHAPI: Started dbScheduler thread.
14:42:37	SCHAPI: Started 2 dbWorker threads.

#### Instance log (edited)

# New Info Default

#### Prod: oninit -ivy

Checking group membership to determi Reading configuration file '/Applicat Creating /INFORMIXTMP/.infxdirs...suc Creating infos file "/Applications/II Linking conf file "/Applications/IBM, Checking config parameters...succeede Writing to infos file...succeeded Prod: Allocating and attaching to she Creating resident pool 14704 kbytes. Allocating 200016 kbytes for buffer Initializing rhead structure...succee Initialization of Encryption...succee Initializing ASF...succeeded Initializing Dictionary Cache and SPI Bringing up ADM VP...succeeded Creating VP classes...succeeded Onlining 0 additional cpu vps...succe Onlining 2 IO vps...succeeded Forking main_loop thread...succeeded Initializing DR structures...succeede Forking 1 'soctop' listener threads. Starting tracing...succeeded Initializing 8 flushers...succeeded Initializing log/checkpoint informati Initializing dbspaces...succeeded Opening primary chunks...succeeded Opening mirror chunks...succeeded Validating chunks...succeeded Creating database partition...succeed Initialize Async Log Flusher...succee Forking btree cleaner...succeeded Initializing DBSPACETEMP list...succe Checking database partition index...: Initializing dataskip structure...suc Checking for temporary tables to drop Forking onmode_mon thread...succeeded Starting scheduling system...succeede Verbose output complete: mode = 5

Prod:

#### Command window

Default	$\bigcirc$
	1
Execute	Bookmarks
ne server run modesucceeded tions/IBM/informix/etc/onconfig.prod'succeeded cceeded BM/informix/etc/.infos.production"succeeded /informix/etc/.conf.production"succeeded ed	
ared memorysucceeded succeeded pool of 4K page sizesucceeded eded eded	
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	•

### Turn it on!!

- Create the other dbspaces from the iTerm command window
  - monitor the instance log in the other window for fun

onspaces -c -d data space 1 -p /ifmx data/data 1 -s 250000 -o 0 onspaces -c -d work space -t -p /ifmx data/tmp space -s 50000 -o  $\left( \right)$ onspaces -c -S smart 1 -p /ifmx data/slob 1 -s 20000 -o 0 \ -Df "LOGGING=ON" ontape -s -L 0

- If you want you can create a demo database named stores to play with
  - basic retail store-like database with products, customers and so on dbaccessdemo stores -log -dbspace data space 1
  - when prompted to save code examples, answer "NO"

### You're ready to rumble with IDS!!!!!

# Appendix

IDS has a completely different system architecture than any other data server on the market today

- more efficient
- more powerful



Called Dynamic Scalable Architecture - DSA



#### A more detailed view



as users connect, session pools built within pre-allocated memory – no additional memory necessary.

VP's – can work on behalf of 1 user or all users. The threading architecture allows fast and efficient distribution of the work.

disk space pre-allocated as chunks in dbspaces. user structures will be allocated from this available space.

#### Multiple instances, one data server



- Unlike other data servers available today, IDS is fully threaded and has been since 1993
  - Proprietary thread libraries, highly optimized for database operations
- Each engine process is known as a "virtual processor" (VP) because it schedules and runs its own threads. Are divided into classes based on functionality.
  - A thread can run on any VP in its class.
- To run a thread, VP retrieves thread's data and environment stack from ready queue and executes request.

Thread switch as opposed to process switch:

- support multiple users on one timeslice
- almost 100% productive CPU use

the "process space" is already allocated since the VP, or **oninit** process, was started when the engine started.



shared memory utilized here is already allocated in the VIRTUAL PORTION of memory. Sessions pools – stack space for example – are built within the pre-allocated memory allocated.

each thread has a pointer into the process text or

- Dynamic shared memory
  - can grow or shrink as needed to support operations
  - no need to constantly re-tune
- IDS tools enable you to look at anything in shared memory including instance and session-level information

l	Shared memory header		Buffer-header table			
-	Lock table		Physical-log buffer			
l	Buffer pool					
	Chunk table				Mirror	
	Dbspace table					
	Tblspace table	,	Transacti			
l	Session structur	Session structures Thread		ad struct	tures	
l	UDR cache			SQL statement of		
l	Thread stacks					
l	Big buffers					
l	Global poo					
l	Unallocated memory					
	Client/server IPC message					
				Thread h	eaps	



### Optional -- configuring and starting a demo instance
- You can have the installer create and start a basic instance
  - recommended for first time IDS users to get something running
  - instance data storage capacity is limited
- Kernel tuning is *required* before starting the instance

0 0	Installer
	Do you want to create an IDS demonstration database server instance? • Yes • No You can use a demonstration database server instance to verify that IDS i installed correctly and that the hardware is configured correctly. You can also configure the demonstration database server instance to use it as
	a production instance.
InstallShield	
	< Back Next > Cance



- You have several choices for a configuration file
  - Your own pre-configured file (will be asked for location)
  - a generic default file with minimal instance resources
  - a somewhat customized configuration based on your response to instance load and physical server resource questions



- With the customized option, several screens follow asking for additional information in order to create the instance configuration file
  - Note: default ROOTSIZE is 700 MB which is **much** too large

00	Installer
	Specify your server configuration parameters (Server Number should be in the range of 0 to 255).
	Server NameproductionServer Number1ROOTPATH/opt/IBM/informix/devices/production/rootspaceROOTSIZE (MB)50
InstallShield	
	< Back Next > Cancel

• Enter the number of server processors and memory to use as well as the expected instance load for OLTP and DSS operations

0 0	Installer
	Configuration Setup
	Modify any values if you want to customize database server configuration settings.
	4
	Memory to use (MB)
diana (e) e,	512
Æ	Online Transaction Clients (applications that frequently update databases with multiuser input)
<b>A</b>	150
	Decision Support Clients (applications for querying databases to gather
InstallShield	
	< Back Next > Cancel

- After the instance is configured and started, the installer will ask for a terminal program it can use to open a window and allow you to access the instance
  - the installer will attempt to set environmental parameters in the open terminal so connectivity will occur
  - currently, a defect in the installer prevents this from working properly
    - can set the required parameters as shown later in this presentation and use iTerm to access instance
- The rest of the regular installation process will occur after you specify the parameters for the demo instance

### Setting up an iTerm bookmark to work with dbaccess

With much appreciation to Mark Jamison who figured out what the keystroke problem was!!

- The dbaccess utility is command line tool for IDS administrators to execute SQL operations against databases within an instance
  - it is shipped as part of the IDS software distribution
  - it only "lives" on the server hosting IDS, it is *not* a general client tool
- The default terminal configuration in iTerm is not 100% compatible with the interactive mode in dbaccess
  - the "backspace" key doesn't behave properly
- You can create an iTerm "profile" of terminal and keyboard attributes (called a "bookmark") and either set it as the default whenever you invoke iTerm or you can select it when you open a new window to interact with IDS

• To begin, select the **Bookmarks:Manage Profiles** option from the iTerm menu bar. It will open the window shown below. I have expanded the options you'll be working with.

View	Bookmarks	Window	Help				
	Show Bookm	nark Drawe	er %B	(	900	Profiles	
	Show Bookm Manage Boo Manage Prof Press Option Default Bonjour Open All	hark Drawe kmarks files h for New V	er 策B 企策B <b>C</b> 策B Vindow		<ul> <li>Keyboard Profiles         <ul> <li>Global</li> <li>xterm</li> <li>xterm (OS X)</li> </ul> </li> <li>Terminal Profiles         <ul> <li>Default</li> <li>Display Profiles</li> <li>Image: Second sec</li></ul></li></ul>	Choose a p	rc
at.				No.	Add Duplicate Delete	J	
	AN AN AND AND	No se	PIPS	l.	Und Dopricate Delete		

ofile on the left...

- In the Keyboard Profiles area, select xterm then click the "Duplicate" button at the bottom of the window.
  - will create a new entry called xterm copy. You can rename this by double clicking on it.

	Profiles	
▼Keyboard Profiles Global	Key mapping settings:	
xterm	Key Combination	Action
xterm (OS X)	delete	send hex code 7f
xterm copy	shift-num-cursor up	send ^[ O2A
erminal Profiles	shift-num-cursor down	send ^[ O2B
Default	shift-num-cursor left	send ^[ O2D
Display Profiles	ctrl-num-cursor left	send ^[ O5D (!)
	shift-num-cursor right	send ^[ O2C
	ctrl-num-cursor right	send ^[ O5C (!)
	shift-F1	send ^[ [11;2~
	shift-F2	send ^[ [12;2~
	shift-F3	send ^[ [13;2~
	shift-F4	send ^[ [14;2~
	shift-F5	send ^[ [15;2~
	Mapping	- + 🥖
	Option Key as 💿 No	ormal 🔿 Meta 🛛 +Esc
Add Duplicate	Delete	
Add Duplicate	Delete	



- To reconfigure the command sent by the "backspace" key, click on the your new keyboard profile name and do the following:
  - click on the "delete" key combination
  - click on the pencil "edit" icon
  - change the hex code from 7f to 8
  - click "OK" to save

0	0		Profiles		
	▼Keyboard Profiles	Key :	delete		
	Global				
	Informix_xterm	Modifier :	Option Control	on	
	xterm			d hex code 7f	0
	xterm (OS X)		Shift Command	d ^[ O2A	
	▼Terminal Profiles	Action :	send hex code	d ^[ O2B	
	Default		and the second second lie in	d ^[ O2D	
	▶ Display Profiles		8	d ^[ O5D (!)	
			eg. 7F for backward delete.	d ^[ O2C	
		🗌 High i	interception priority	d ^[ O5C (!)	
			(8:8-7)	d ^[ [11;2~	
		Cancel	) 🗠 🖉 СК	d ^[ [12;2∼	
			(2.2.2)	d ^[ [13;2~	
			shift-F4	send ^[ [14;2~	Ă.
			shift-F5	send ^[ [15;2~	Ŧ
			Mapping -	+ /	
			Option Key as 💿 Nor	mal 🔘 Meta 🛛 +Esc	
(	Add Duplicate	Delete			

- With the keyboard profile set, now create a new terminal profile
  - click on "Default" under Terminal Profiles
  - duplicate it with the "Duplicate" button
  - rename it by double clicking
  - change the terminal "Type" to vt100
- Close this **Profiles** window, you are done with it

⊖ ○ ○	Profiles
▼Keyboard Profiles	
Global	Termina
Informix_xterm	-
xterm	Type
xterm (OS X)	Encoding
▼Terminal Profiles	Lincouni
Default	
Informix_term	Scrollbac
▶ Display Profiles	
	🗹 Silenc
	🗹 Enabl
	🗌 Blinki
	🗹 Close
	🗹 Enabl
	Keep
	✓ Treat
	Disab
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Add Duplicate Delete	

### al Settings:

	vt100			
g	vt100			
	xterm			
	xterm-new			
ck Lir	xterm-256color			
o tor	ansi			
le ter	rxvt			
e Gro	linux			
ng cu	ursor			
the	session when it ends			
e xte	rm mouse reporting			
the c	lefault title with dynamic title			
Non	-ASCII characters as double width			
le session-initiated window resizing				
n idle	, sends ASCII code: 0			

- Create a new iTerm operating profile, called a "bookmark," and join the terminal and keyboard profiles together
  - select **Bookmarks : Manage Bookmarks** from the iTerm menu ring
  - click on the "Default" entry then the pencil edit tool to see the parameters for this operating profile, copy them for later reference and cancel out

View	Bookmarks	Window	Help						
	Show Book	mark Drav	ver %B		Boo	okmarks			
	Manage Bo	okmarks	. 企業B						_
	Manage Pr	ofiles	∕⊂ℋΒ	Name	Command	Terminal	Keyboard	Display ^	Ħ
	Press Optio	on for New	Window	Default	login –fp cdoe	Default	xterm	Default	
		on for new	mindom	▶ Bonjour					
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A STATE		Section 1	State:						

- Create a new "bookmark" by clicking on the "+" and entering the relevant information.
  - some will come from the "Default" entry
  - make sure you select the new Informix-oriented keyboard and terminal profiles
- Once saved, you can highlight this new entry, and put a check mark in the "Set as default" box on the **Bookmarks** window if you want

O O Bookmarks							
Name Default	Name	Informix	d Display ^% Default				
	Command Working Dir	login –fp cdoe /Users/cdoe					
	Terminal	Informix_term					
	Keyboard	Informix_xterm					
	Display	Default					
	Shor	tcut key: ^ ዤ 📄					
(+)	Cancel	ОК	New Window				
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• Now, the backspace key will work properly in the dbaccess's interactive mode

0	0		Informix	
	1 1			
New	Info Customize	Close		Execute
	Informix			
NEW:	ESC = Done editing CTRL-X = Delete chara	CTRL-A cter CTRL-D	= Typeover/Insert = Delete rest of line	CTRL-R = Redraw
	store	s@production	Press CTRL-W f	or Help
create ( (coll in coll vo ) with (	table my_scratch_table nteger not null, archar(30) crcols;			
alter to	able my_scratch_table	add constrai	nt (primary key (col1)	constraint scratch_key
insert insert insert	into my_scratch_table into my_scratch_table into my_scratch_table	values (1,"s values (2, " values (3, "	ome text"); some more text"); even iou <mark>n</mark>	



### The end