

Server Studio & Sentinel

Essential Enterprise Tools for



Informix[®]

Server Studio™ with Sentinel™

Command & Control Center for IBM Informix® DBMS Servers

- A comprehensive multi-platform suite of proven system management tools for IBM Informix® data servers that help database professionals to be more effective and productive by simplifying complexities of daily tasks.
- Highly intuitive graphical console provides a powerful set of seamlessly integrated database management tools.
- Keeps database servers performing at peak levels with an extensive assortment of analytical tools to diagnose and respond to performance and availability problems in real time.
- Improves utilization of data storage resources by efficiently reorganizing vital databases with minimal application downtime.
- Preserves database investment with a comprehensive configuration auditing and change management solution.
- Maximizes availability of vital databases by enabling fully autonomic responses to critical server events.

Maximize Informix

availability • performance • maintainability

Local DBMS Server



Automate real-time 24 x 7 operational monitoring of entire IBM Informix DBMS Infrastructure, and manage autonomic responses to server events.

Remote DBMS Servers



LAN WAN

INTERNET

Manage multiple databases locally, or half-way around the world with ease!

Make error-prone, time-consuming, command-line driven administrative tasks a thing of the past!

Sentinel

DBA

Developer

Server Studio



Advanced Management Tools for IBM Informix®

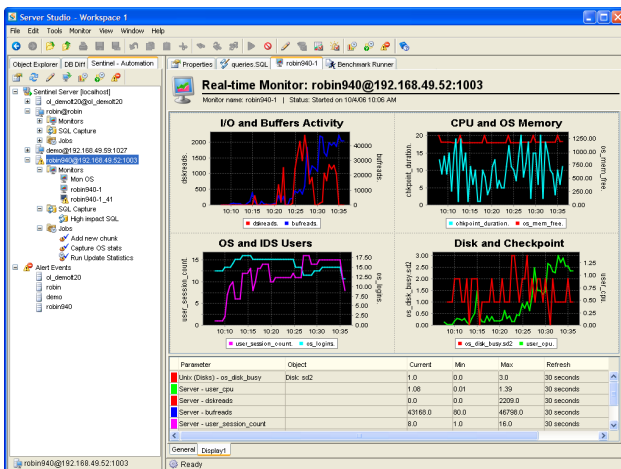
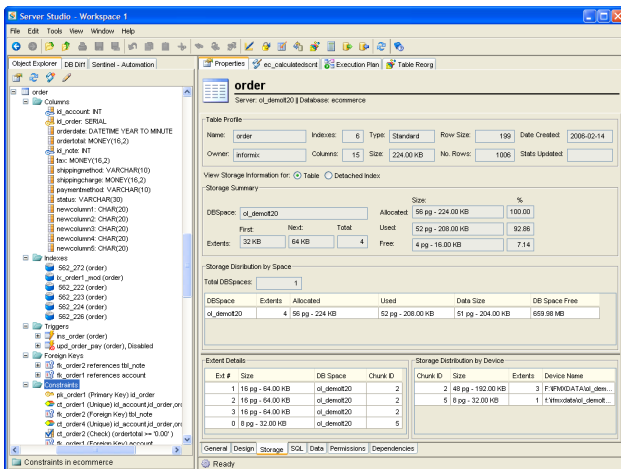
Server Studio™ and **Sentinel™** together provide powerful multi-platform suite of integrated, intuitive tools that help seasoned database professionals and novices alike improve productivity and ensure that critical IBM Informix® DBMS servers remain up and perform at peak levels, manage change, easily execute regulatory compliance audits and assure continuing availability of vital business information.

Server Studio™ provides a comprehensive collection of modern, proven, easy-to-use tools to help DBAs and developers perform efficiently common database tasks such as:

- Database SQL Application Development and Debugging
- Schema Management
- Database Schema Auditing and Change Management
- Performance Tuning
- Data Storage Management and Reorganization
- Database Security Administration

Sentinel™ automates comprehensive proactive management of IBM Informix® environments by providing:

- 24 x 7 operational monitoring of IBM Informix® DBMS servers
- 24 x 7 operational monitoring of the IBM Informix® server host platform
- Continuous time-series measurement data of servers' performance
- Execution of regularly scheduled maintenance tasks
- Highly flexible multi-level performance degradation alerts
- Autonomic response management to server events in real time
- 24 x 7 automated monitoring of databases schema changes and user permissions changes



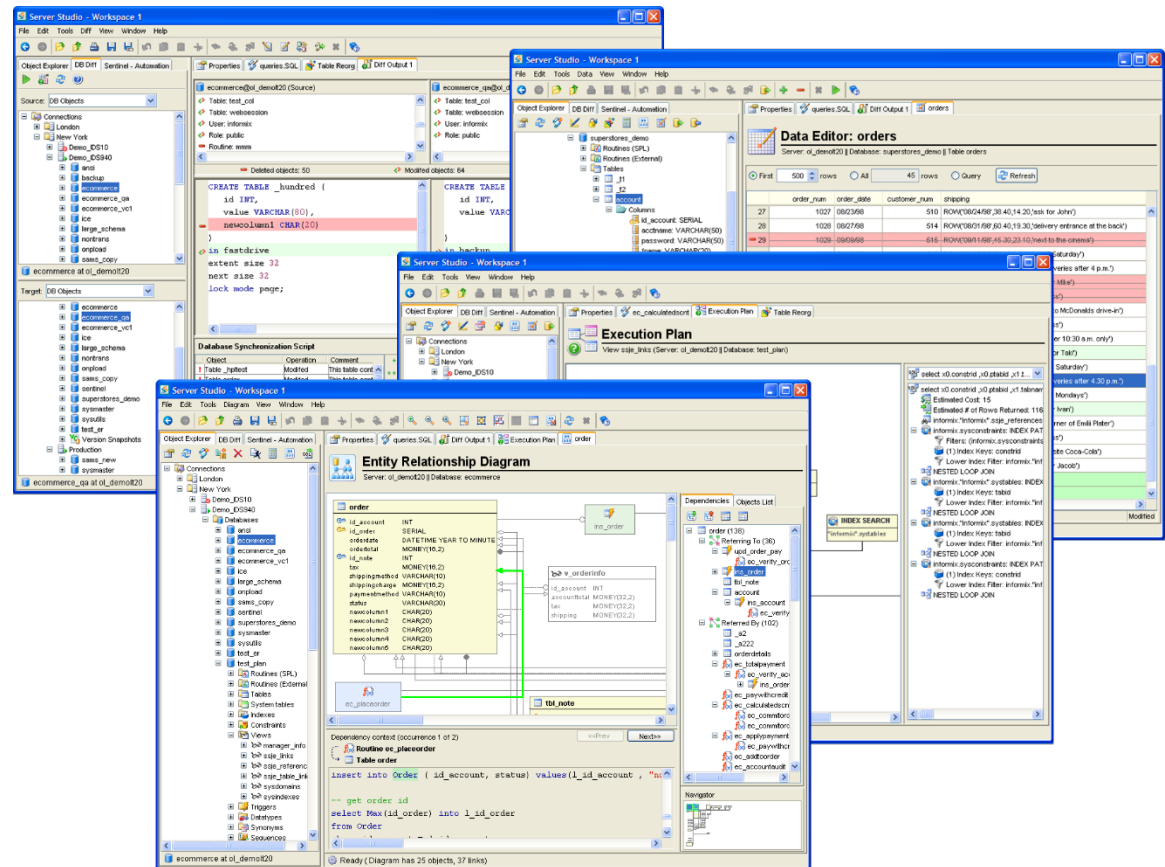
Server Studio™



Server Studio™

The premier multi-platform suite of highly intuitive, integrated system management tools that provide database professionals with extensive functionality to:

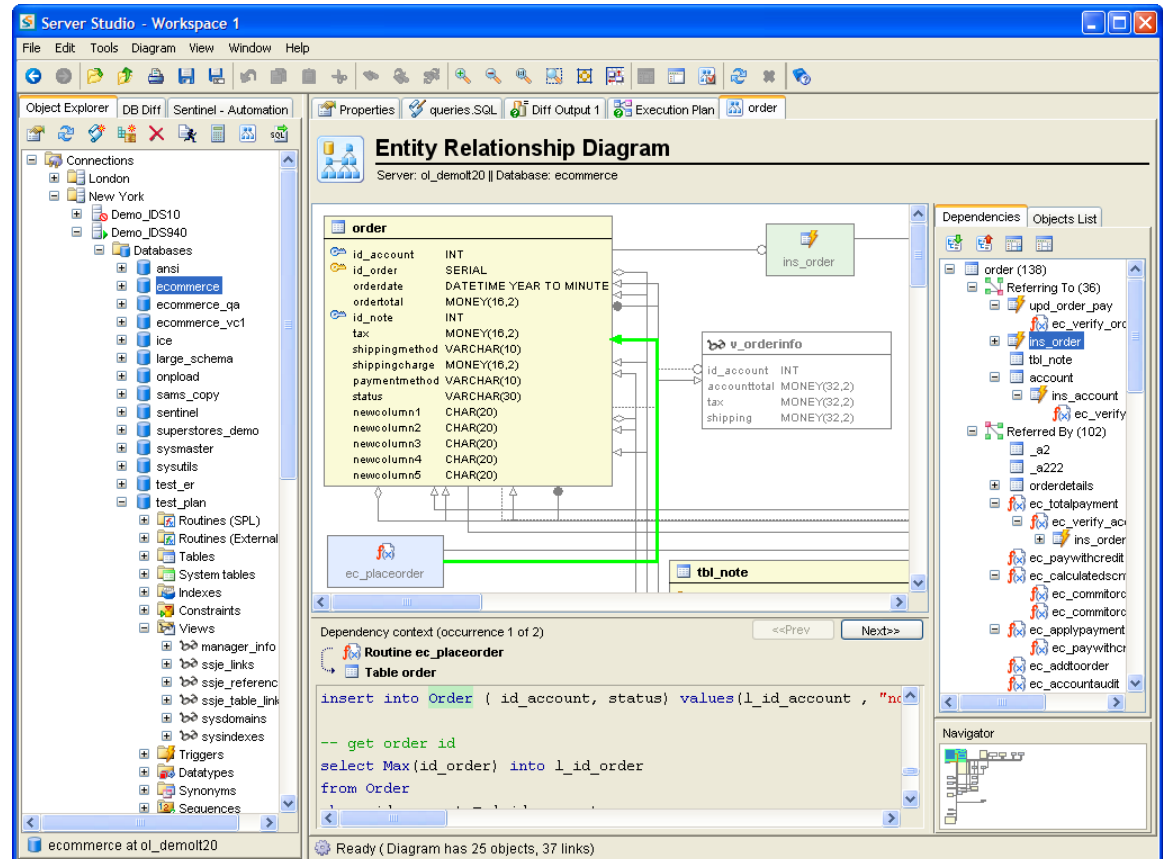
- Consolidate, and manage with ease your entire IBM Informix database servers' infrastructure at a central point of control.
- Improve efficiency of database development, debugging and testing.
- Preserve database investment through automating database schema auditing and change management.
- Proactively diagnose performance and availability problems with extensive analytic tools.
- Obtain maximum leverage from existing data storage investments.
- Resolve performance problems with comprehensive SQL tuning facilities.
- Effectively manage database configuration, security and regulatory compliance.



Server Studio™

Database Development & Administration – Entity Relationship Diagrams

- Entity Relationship Diagrams enable immediate graphical analysis of complex relationships and dependencies between database objects, such as: Tables, Views, Indexes, Stored Procedures and Triggers.
- E/R Diagrams provide vital help in visualizing and documenting databases' logical design and constraints.
- Built-in Dependencies Analyzer displays vital details about database objects' "up" and "down" dependencies, using the Tree view, and provides instant drill-down to the relevant source code that defines each object's relationships and constraints.



Server Studio™

Database Development & Administration – Table Manager

- Interactively create new, or edit existing tables and views.
- Highly granular access to all attributes including:
 - columns
 - datatypes
 - table and index fragmentation definitions
 - referential integrity constraints
 - Primary keys
 - Foreign keys
- Dynamically generate SQL CREATE and ALTER statements, as the modifications to the table or index structure is performed in a visual designer.

The screenshot displays the Microsoft SQL Server Enterprise Manager interface, specifically the Table Manager for the 'order' table in the 'ecommerce' database. The interface is divided into several panes:

- Object Explorer:** Shows the tree view of the database, including the 'order' table and its associated indexes, triggers, and foreign keys.
- Table Profile:** Provides summary statistics for the table, such as Name, Indexes (6), Type (Standard), Row Size (199), Date Created (2006-02-14), Owner (informix), Columns (15), Size (224.00 KB), No. Rows (1006), and Stats Updated.
- Columns:** A table listing the columns of the 'order' table with their respective data types, lengths, scales, nullability, and special attributes.
- Indexes:** A list of indexes on the table, including primary keys and unique indexes.
- Foreign Keys:** A list of foreign key relationships between columns in the 'order' table and other tables in the database.
- Constraints:** A table listing the constraints defined on the table, such as primary keys and unique constraints.
- Triggers:** A list of triggers associated with the table.

No.	Name	Data Type	Length	Scale	Nulls	Special
1	id_account	Int			✓	
2	id_order	Serial				
3	orderdate	Datetime			✓	year to minute
4	ordertotal	Money	16	2	✓	
5	id_note	Int			✓	
6	tax	Money	16	2	✓	

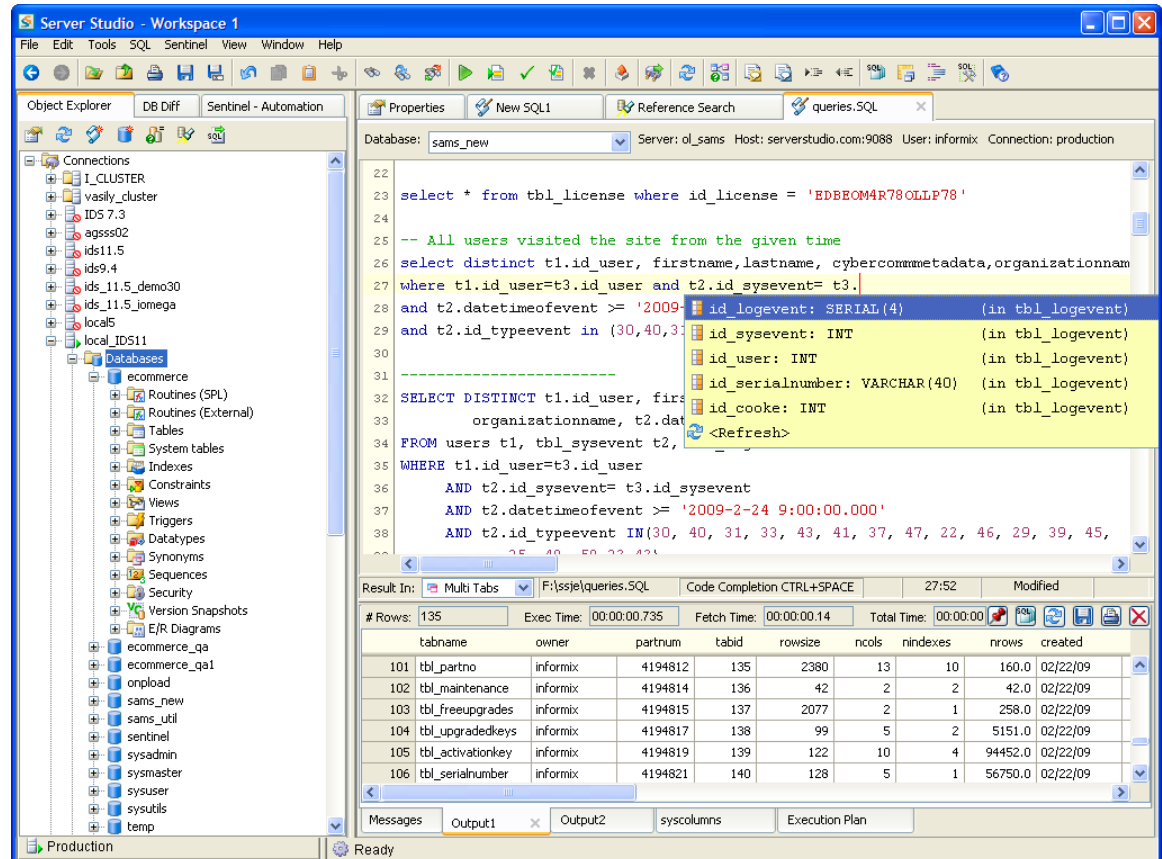
Name	Type	Constraint
pk_order1	Primary Key	id_order
ct_order1	Unique	id_account, id_order, ordertotal
ct_order4	Unique	id_account, id_order, ordertotal
ct_order2	Check	(ordertotal >= '0.00')



Server Studio™

Database Development & Administration – SQL Manager

- A powerful, full-featured editor, customized specifically to support IBM Informix SPL and SQL languages.
- Code Auto Completion
- Visual Query Designer
- Integrated visual Execution Plan Analyzer help tune the performance of SQL queries.
- Fully multi-threaded, non-blocking execution of scripts.
- Multiple result sets in spreadsheet-style grids.
- Fully supports LOAD and UNLOAD statements for data import and export.
- Shows exact position of syntax errors
- Supports Script Substitution Variables



The screenshot displays the Server Studio interface. The main window shows a SQL query editor with the following code:

```
22
23 select * from tbl_license where id_license = 'EDBECOM4R78OLLP78'
24
25 -- All users visited the site from the given time
26 select distinct t1.id_user, firstname,lastname, cybercommentadata,organizationnam
27 where t1.id_user=t3.id_user and t2.id_sysevent= t3.
28 and t2.datetimeofevent >= '2009- id_logevent: SERIAL(4) (in tbl_logevent)
29 and t2.id_typeevent in (30,40,3 id_sysevent: INT (in tbl_logevent)
30
31 ----- id_user: INT (in tbl_logevent)
32 id_serialnumber: VARCHAR(40) (in tbl_logevent)
33 id_cooke: INT (in tbl_logevent)
34
35 SELECT DISTINCT t1.id_user, fir
36 organizationname, t2.dat
37 FROM users t1, tbl_sysevent t2,
38 WHERE t1.id_user=t3.id_user
39
40 AND t2.id_sysevent= t3.id_sysevent
41 AND t2.datetimeofevent >= '2009-2-24 9:00:00.000'
42 AND t2.id_typeevent IN(30, 40, 31, 33, 43, 41, 37, 47, 22, 46, 29, 39, 45,
43 35, 40, 50, 33, 43)
```

The result grid below the query shows the following data:

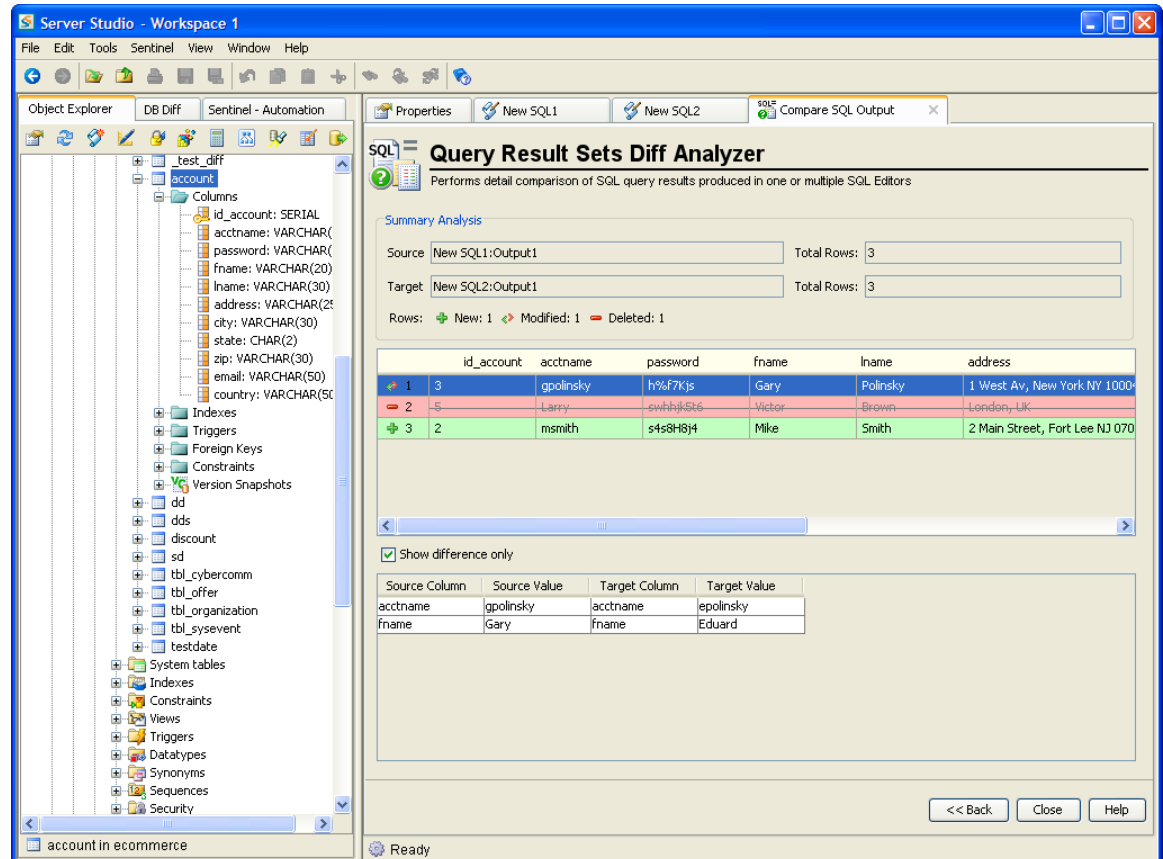
# Rows:	135	Exec Time:	00:00:00.735	Fetch Time:	00:00:00.14	Total Time:	00:00:00	
tabname	owner	partnum	tabid	rowsize	ncols	nindexes	nrows	created
101	tbl_partno	informix	4194812	135	2380	13	10	160.0 02/22/09
102	tbl_maintenance	informix	4194814	136	42	2	2	42.0 02/22/09
103	tbl_freeupgrades	informix	4194815	137	2077	2	1	258.0 02/22/09
104	tbl_upgradedkeys	informix	4194817	138	99	5	2	5151.0 02/22/09
105	tbl_activationkey	informix	4194819	139	122	10	4	94452.0 02/22/09
106	tbl_serialnumber	informix	4194821	140	128	5	1	56750.0 02/22/09



Server Studio™

Database Development & Administration – SQL Manager

- Query Result Sets Difference Analyzer compares SQL query outputs
- SQL Tuner automatically checks SQL statements for basic Informix specific SQL design "rules-of-thumb" violations defined by Informix experts and generates alternative SQL that corrects them. Integrated Index Adviser performs a thorough examination of specified SQL statements and presents index recommendations based on tables which are used by these statements.
- SQL Formatter beautifies SQL scripts and SPL stored procedures with many formatting options
- Describe Object function allows in-place object syntax lookups



The screenshot shows the Server Studio interface with the 'Query Result Sets Diff Analyzer' window open. The window displays a summary analysis of two SQL query outputs and a table of differences.

Summary Analysis

Source: New SQL1:Output1 Total Rows: 3
Target: New SQL2:Output1 Total Rows: 3
Rows: New: 1 Modified: 1 Deleted: 1

	id_account	acctname	password	fname	lname	address
1	3	gpolsinsky	h%f7kjs	Gary	Polinsky	1 West Av, New York NY 1000
2	5	Larry	zwhhjSt6	Victor	Brown	London, UK
3	2	msmith	s4s8H8j4	Mike	Smith	2 Main Street, Fort Lee NJ 070

Show difference only

Source Column	Source Value	Target Column	Target Value
acctname	gpolsinsky	acctname	epolsinsky
fname	Gary	fname	Eduard



Server Studio™

Database Development & Administration – SQL Tuner

- SQL Tuner automatically checks SQL statements for basic Informix specific SQL design "rules-of-thumb" violations defined by Informix experts and generates alternative SQL that corrects them. Integrated Index Adviser performs a thorough examination of specified SQL statements and presents index recommendations based on tables which are used by these statements.
- Ability to manually tune multiple versions of SQL statement by comparing side-by-side execution time, execution plans and produced results.

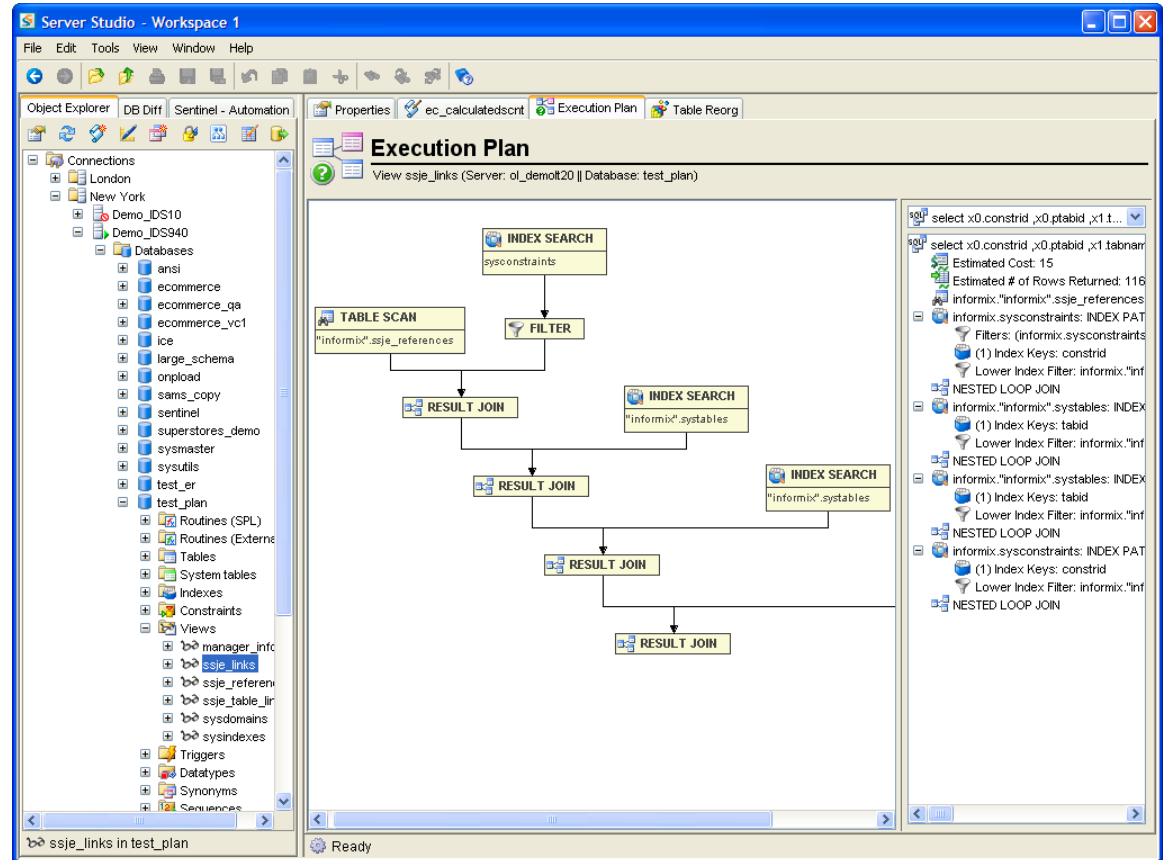
The screenshot displays the Server Studio SQL Tuner interface. The main window shows the 'SQL Tuner' tool with a 'Result of SQL Tuner analysis for statement: Original' section. It lists 'Code Inspection (1 advice(s) were generated)' and 'Index Recommendations (1 advice(s) were generated)'. The index recommendation suggests adding an index to the 'tbl_sysevent' table to improve performance. Below the analysis, two versions of the SQL query are shown side-by-side for comparison. The 'Original' version has a cost of 8928, while 'Version 1' has a cost of 8938. The execution plans for both versions are displayed below the queries, showing a 'TABLE SCAN' on 'tbl_sysevent (t2)' followed by a 'FILTER' and an 'INDEX SEARCH' on 'tbl_logevent (t3)'. The interface also includes a menu bar, a toolbar, and an Object Explorer on the left side.



Server Studio™

Database Development & Administration – Execution Plan Analyzer

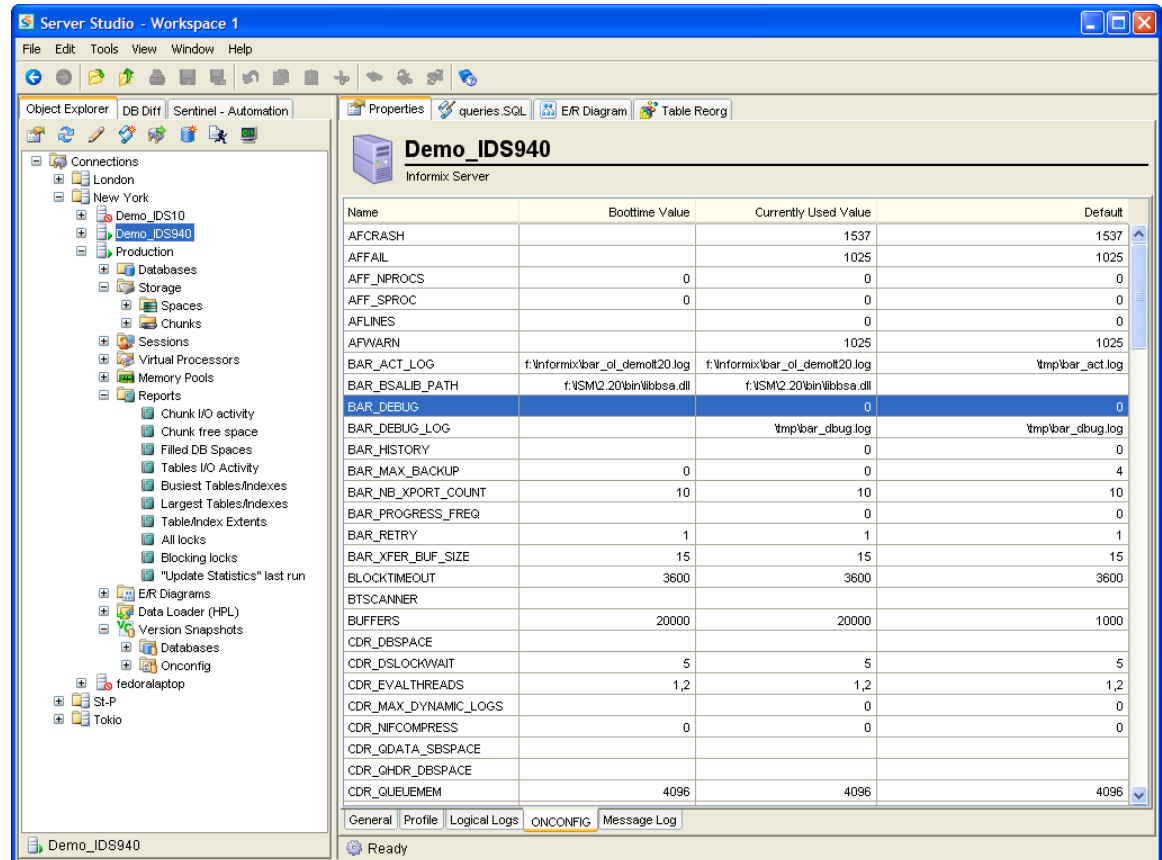
- Execution Plan Analyzer provides comprehensive visualization facilities to examine and efficiently tune complex SQL statements.
- Graphical Diagrams views, in addition to Tree views, support detail examination of execution plans selected by the database engine for:
 - single or multiple SQL statements
 - Stored Procedures (with relevant statistics presented for each distinct SQL statement contained within a stored procedure)
 - Database Views
- Integration with Sentinel's SQL Capture facilities enables analysis of the SQL statements already executed by the database engine.



Server Studio™

Database Development & Administration - Server Administrator

- Server Administrator provides powerful views and many pre-configured performance information reports across multiple databases instances.
- It helps handle everyday tasks such as:
 - Server operational mode management
 - Examination of server profile, ONCONFIG parameters, I/O statistics and details of log files
 - Update statistics on a selected table, group of tables, or entire database.



The screenshot displays the Server Studio interface for an Informix Server named 'Demo_IDS940'. The left pane shows the Object Explorer with a tree view of the server's structure, including connections, databases, and reports. The main pane shows the ONCONFIG parameters table, which lists various server configuration parameters and their current values.

Name	Boottime Value	Currently Used Value	Default
AFCRASH		1537	1537
AFFAIL		1025	1025
AFF_NPROCS	0	0	0
AFF_SPROC	0	0	0
AFLINES		0	0
APFWARN		1025	1025
BAR_ACT_LOG	f:\informix\bar_of_demo\20.log	f:\informix\bar_of_demo\20.log	%tmp%\bar_act.log
BAR_BSALIB_PATH	f:\VSM2.20\bin\libsa.dll	f:\VSM2.20\bin\libsa.dll	
BAR_DEBUG		0	0
BAR_DEBUG_LOG		%tmp%\bar_debug.log	%tmp%\bar_debug.log
BAR_HISTORY		0	0
BAR_MAX_BACKUP	0	0	4
BAR_NB_XPORT_COUNT	10	10	10
BAR_PROGRESS_FREQ		0	0
BAR_RETRY	1	1	1
BAR_XFER_BUF_SIZE	15	15	15
BLOCKTIMEOUT	3600	3600	3600
BTSCANNER			
BUFFERS	20000	20000	1000
CDR_DBSPACE			
CDR_DSLOCKWAIT	5	5	5
CDR_EVALTHREADS	1,2	1,2	1,2
CDR_MAX_DYNAMIC_LOGS		0	0
CDR_NIFCOMPRESS	0	0	0
CDR_QDATA_SBSPACE			
CDR_QHDR_DBSPACE			
CDR_QUEUEMEM	4096	4096	4096



Server Studio™

Database Development & Administration – Session Manager

- Session Manager facilities of the Server Administrator provide ability to analyze database session activity by:
 - Host
 - Database
 - Duration
 - Locks Statistics
 - I/O activity
- Problematic sessions that create server bottlenecks can be easily terminated.
- SQL statements last executed by any session can be captured for subsequent performance tuning with the help of the Execution Plan Analyzer.
- Sessions statistics can be aggregated by user, host, database or PID.

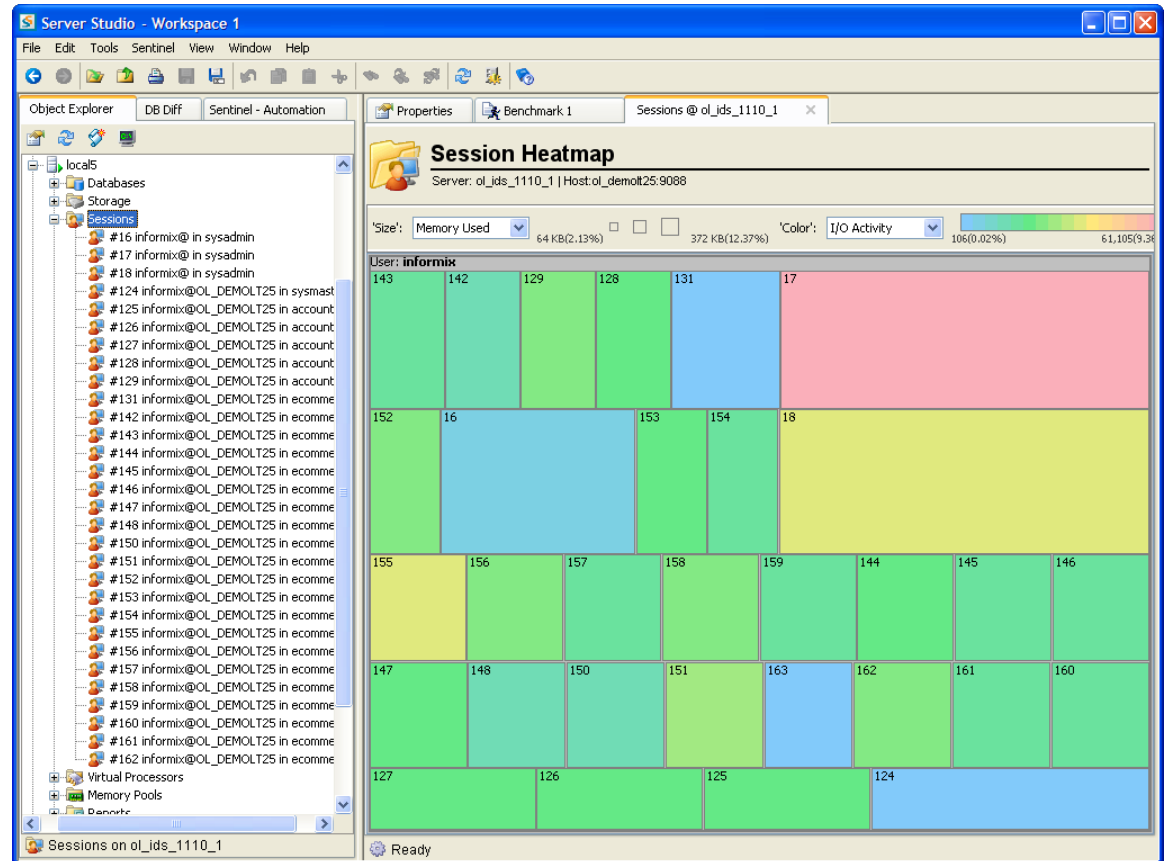
Sess Id	User	Pid	Host Name	Database	Duration	Locks	# Buf Reads	# Reads	# Lock Requests	# Lock Waits
14	informix	-1	DEMOLT20	test_plan	01:26:32	2	256485	18916	88531	0
34	informix	-1	DEMOLT20	ecommerce	00:02:17	1	506	0	1079	0
35	informix	-1	DEMOLT20	ecommerce	00:02:18	1	503	0	1082	0
36	informix	-1	DEMOLT20	ecommerce	00:02:21	1	505	0	1088	0
37	informix	-1	DEMOLT20	ecommerce	00:02:23	1	507	0	1094	0
38	informix	-1	DEMOLT20	ecommerce	00:02:26	1	511	0	1106	0
39	informix	-1	DEMOLT20	ecommerce	00:02:28	1	515	0	1118	0
40	informix	-1	DEMOLT20	ecommerce	00:02:29	1	521	0	1136	0
41	informix	-1	DEMOLT20	ecommerce	00:02:32	1	519	0	1130	0
42	informix	-1	DEMOLT20	ecommerce	00:02:34	1	529	0	1160	0
43	informix	-1	DEMOLT20	ecommerce	00:02:36	1	529	0	1160	0
44	informix	-1	DEMOLT20	ecommerce	00:00:39	1	13763	458	50384	0
45	informix	-1	DEMOLT20	ecommerce	00:00:41	1	14755	1224	53956	0
46	informix	-1	DEMOLT20	ecommerce	00:00:44	1	15856	4	57362	0
47	informix	-1	DEMOLT20	ecommerce	00:00:46	1	16568	16	60746	0
48	informix	-1	DEMOLT20	ecommerce	00:00:48	1	17531	12	64319	0
49	informix	-1	DEMOLT20	ecommerce	00:00:49	1	18457	0	67722	0
50	informix	-1	DEMOLT20	ecommerce	00:00:51	1	19429	4	71282	0
51	informix	-1	DEMOLT20	ecommerce	00:00:53	1	20406	8	74844	0
52	informix	-1	DEMOLT20	ecommerce	00:00:55	1	21378	440	78413	0
53	informix	-1	DEMOLT20	ecommerce	00:00:57	1	22302	8	81797	0
54	informix	-1	DEMOLT20	ecommerce	00:00:58	1	23290	540	85358	0
55	informix	-1	DEMOLT20	ecommerce	00:01:01	1	24342	1256	88943	0
56	informix	-1	DEMOLT20	ecommerce	00:01:03	1	25310	880	92515	0
57	informix	-1	DEMOLT20	ecommerce	00:01:04	1	26145	148	95919	0
58	informix	-1	DEMOLT20	ecommerce	00:01:06	1	27062	16	99312	0
59	informix	-1	DEMOLT20	ecommerce	00:01:09	1	27985	0	102704	0
60	informix	-1	DEMOLT20	ecommerce	00:01:11	1	28911	0	106300	0



Server Studio™

Database Development & Administration – Session Manager

- Heatmap is a technique for visual data presentation, in which area and color of rectangles represent two different metrics, for example, user session memory consumption and I/O activity level.
- Heatmap also uses nested rectangles to represent hierarchical relationships, for example, sessions originated by the same user or from the same host.

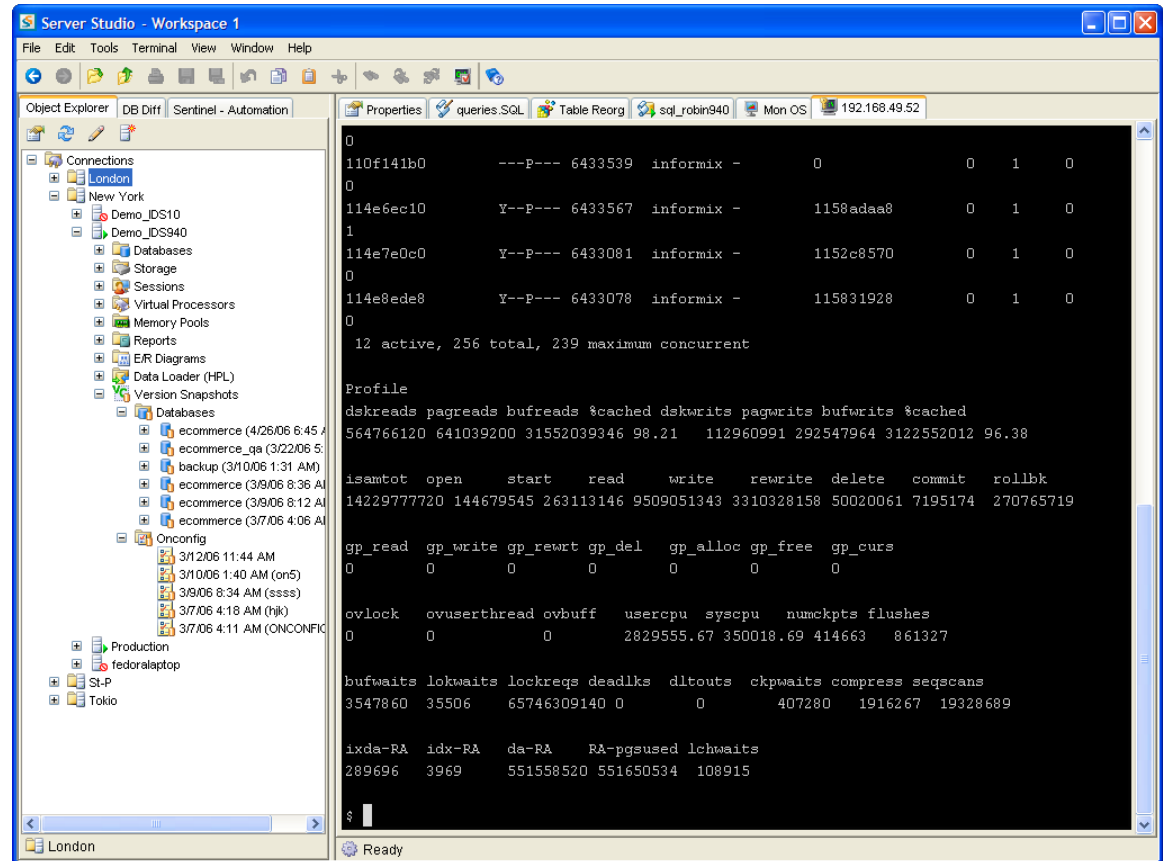


Server Studio™

Database Development & Administration - Server Administrator

- The Server Administrator's built-in secure terminal automatically connects to the desired server host and sets all required environment variables, enabling you to execute transparently any server-side script or shell command, as well as your favorite IBM Informix® native utilities, such as:

- ONSTAT
- ONMODE
- ONTAPE
- ONBAR



The screenshot shows the Server Studio interface with a terminal window displaying the output of the ONSTAT command. The terminal output includes a table of active processes, a profile section with various performance metrics, and a section for lock-related statistics.

```
0
110f141b0 ---P--- 6433539 informix - 0 0 1 0
0
114e6ec10 Y--P--- 6433567 informix - 1158adaa8 0 1 0
1
114e7e0c0 Y--P--- 6433081 informix - 1152c8570 0 1 0
0
114e8ede8 Y--P--- 6433078 informix - 115831928 0 1 0
0
12 active, 256 total, 239 maximum concurrent

Profile
dskreads pagreads bufreads %cached dskwrits pagwrits bufwrits %cached
564766120 641039200 31552039346 98.21 112960991 292547964 3122552012 96.38

lsamtot open start read write rewrite delete commit rollbk
14229777720 144679545 263113146 9509051343 3310328158 50020061 7195174 270765719

gp_read gp_write gp_rewrt gp_del gp_alloc gp_free gp_curs
0 0 0 0 0 0 0

ovlock ovuserthread ovbuff usercpu syscpu numckpts flushes
0 0 0 2829555.67 350018.69 414663 861327

bufwaits lokwaits lockreqs deadlks dltouts ckpwaits compress seqscans
3547860 35506 65746309140 0 0 407280 1916267 19328689

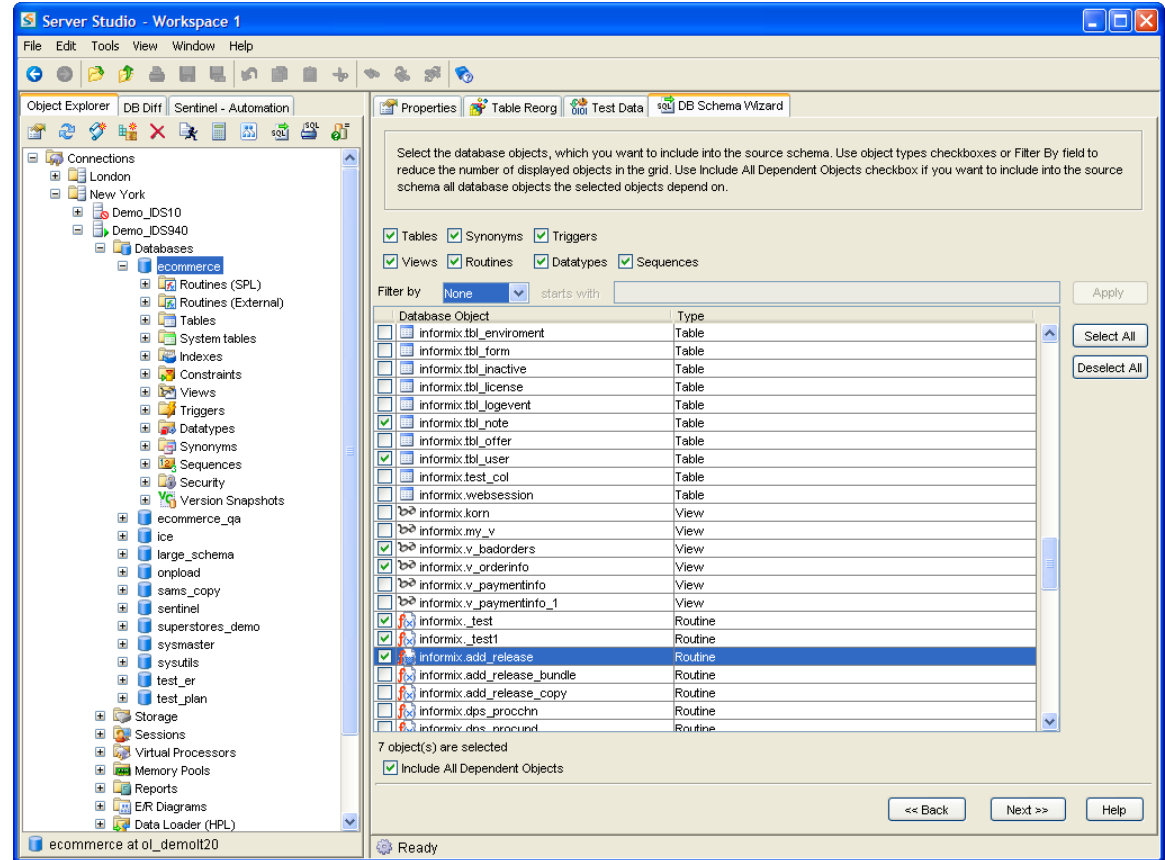
ixda-RA idx-RA da-RA RA-pgsused lchwaits
289696 3969 551558520 551650534 108915

$
```



Configuration & Change Management – Schema Manager

- Manage DDL scripts for either entire database schemas, or user-defined sub-schemas that may be comprised of either particular types or groups of database objects.
- Full support for managing all dependent database objects to maintain the integrity of the user-defined sub-schemas is built-in.
- Directly deploy database schemas or sub-schemas and specify how to map DB spaces and BLOB spaces from the source to the target server.



Server Studio™

Configuration & Change Management – DB Difference Analyzer

- A powerful change management tool that compares entire databases, located on the same or on different servers.
- Perform comparative analysis of all database objects' properties including:
 - table structures
 - referential integrity
 - Fragmentation
 - syntax of stored procedures, triggers and views
- Entire databases, individual database objects or groups of objects can be examined for changes.
- Generate synchronization scripts based on database comparison results.
- Full integration with automated DB Schema Audit Jobs provided by Sentinel server

The screenshot displays the Server Studio interface for a database difference analysis. The main window is titled "Server Studio - Workspace 1" and features a menu bar (File, Edit, Tools, Diff, View, Window, Help) and a toolbar. The interface is divided into several panes:

- Object Explorer:** Shows a tree view of database connections. The "Source" is set to "DB Objects" and the "Target" is also "DB Objects". The tree shows a hierarchy of connections (London, New York) and databases (Demo_IDS10, Demo_IDS40) with various objects like tables and schemas.
- Properties:** Two panes show properties for the "Source" and "Target" databases. The "Source" properties include: Table: test_col, Table: websession, User: informix, Role: public, Routine: mmm. The "Target" properties are identical.
- Diff Output:** Shows the results of the comparison. It indicates "Deleted objects: 50", "Modified objects: 64", and "Added objects: 0". Below this, SQL code is displayed for a table named "table_hundred". The "Source" code shows a table with columns "id INT", "value VARCHAR(80)", and "newcolumn1 CHAR(20)". The "Target" code shows a table with columns "id INT" and "value VARCHAR(80)".
- Database Synchronization Script:** A table lists the changes found during the comparison. The table has columns "Object", "Operation", and "Comment". The script below the table shows the SQL code for creating a unique index "ix_hundred1" on the "table_hundred" table.
- Progress Bar:** A blue progress bar at the bottom indicates that the process is "Finished" at 100%.



Server Studio™

Data Management – Data Manager

- Spreadsheet-style grid facilitates interactive examination and editing of the data in the tables, synonyms and views.
- Flexible rules, based on user-defined filters, sorts or rows retrieval limits, help in defining working data sets.
- Powerful Data Import and Export Wizards assist in mapping multiple external data files to database objects and defining complex data transformation rules.
- Support for simultaneous non-blocking execution of multiple data loading and unloading jobs against a single or multiple databases.

Server Studio - Workspace 1

Object Explorer: superstores_demo, Routines (SPL), Routines (External), Tables (_i1, _i2), account (Columns: id_account, acctname, password, fname, lname, address, city, state, zip, email, country; Indexes: 126_73; Triggers; Foreign Keys; Constraints; Version Snapshots; call_type, cat_hits_log, catalog, cust_calls, customer, customer_2, customer_log, datadiff1, datadiff2, discount)

Data Editor: orders

Server: ol_demolt20 | Database: superstores_demo | Table orders

First 500 rows | All 45 rows | Query | Refresh

order_num	order_date	customer_num	shipping
27	1027	08/23/98	510 ROW("08/24/98",38.40,14.20,'ask for John')
28	1028	08/27/98	514 ROW("08/31/98",60.40,19.30,'delivery entrance at the back')
29	1029	09/09/98	515 ROW("09/11/98",45.30,23.10,'next to the cinema')
30	1030	09/12/98	515 ROW("09/17/98",78.40,9.00,'closed Saturday')
31	1031	09/15/98	516 ROW("09/17/98",84.30,11.10,'no deliveries after 4 p.m.')
32	1032	09/19/98	517 ROW("09/23/98",65.60,12.20,'ask for Mike')
33	1033	10/03/98	518 ROW("10/06/98",43.20,13.40,'express')
34	1034	10/05/98	519 ROW("10/08/98",110.00,17.00,'next to McDonalds drive-in')
35	1035	10/07/98	520 ROW("10/12/98",92.30,21.00,'express')
36	1036	10/11/98	521 ROW("10/13/98",54.70,16.00,'call after 10:30 a.m. only')
37	1037	10/16/98	600 ROW("10/19/98",112.30,26.30,'ask for Taki')
38	1038	10/21/98	525 ROW("10/23/98",33.50,22.00,'closed Saturday')
39	1039	10/23/98	526 ROW("10/27/98",42.30,11.00,'no deliveries after 4:30 p.m.')
40	1040	10/29/98	527 ROW("10/31/98",35.60,17.00,'closed Mondays')
41	1041	11/05/99	615 ROW("11/09/98",27.50,12.00,'ask for Ivan')
42	1042	11/12/98	529 ROW("11/14/98",66.70,24.00,'NW corner of Emilli Plater')
43	1043	11/19/98	530 ROW("11/24/98",20.30,13.10,'express')
44	1044	11/25/98	532 ROW("11/29/98",113.00,35.10,'opposite Coca-Cola')
45	1045	12/04/98	533 ROW("12/08/98",52.50,19.20,'ask for Jacob')
46	10000	12/2/2006	1000 NULL
47	10001	12/4/2006	1002 NULL

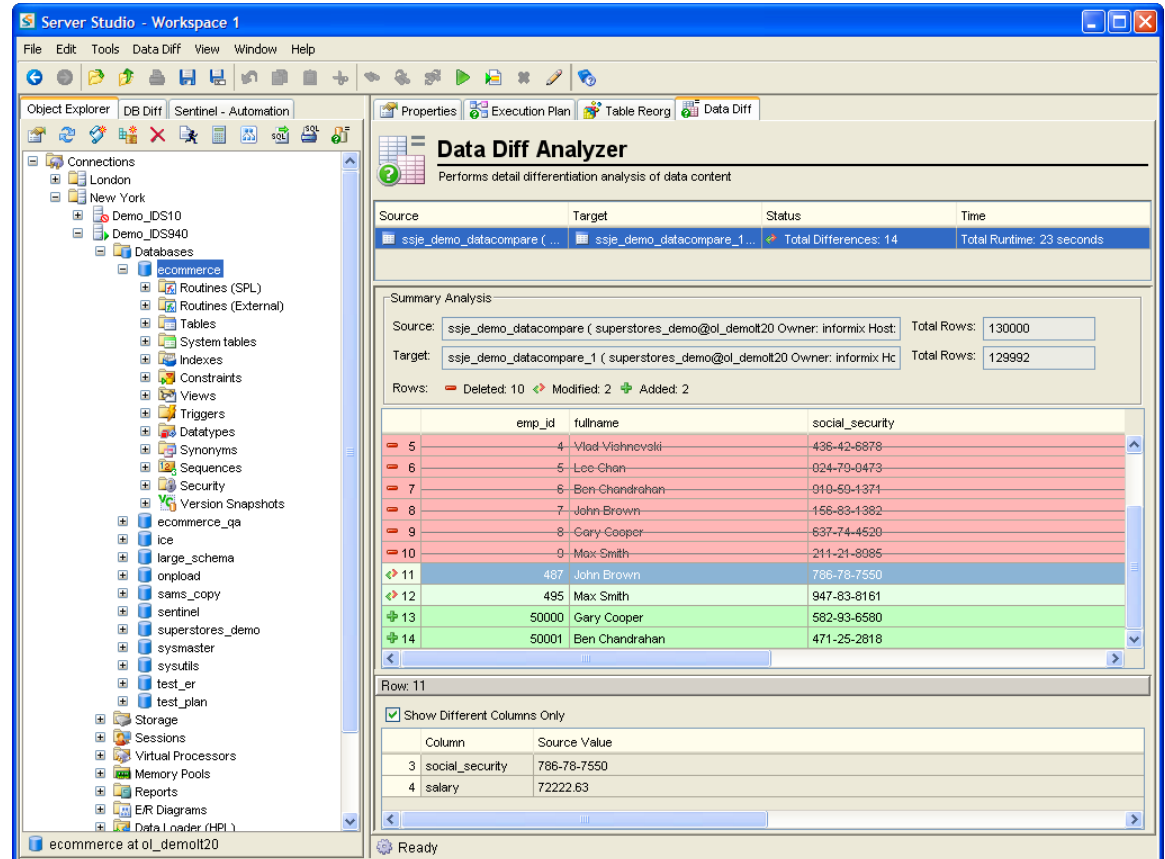
Double click on the cell to open Cell Editor. | Retrieved 45 rows | Modified

Ready



Data Management – Data Difference Analyzer

- Compare data in tables with compatible structures.
- Compared tables can be located within the same database, on the same server or on different servers.
- Highly efficient comparison algorithm - millions of records can be compared within minutes.
- Detail graphical analysis of data changes that covers added, deleted and modified data records.
- Ability to store lists of compared tables, such as list of tables with meta-data, for repetitive analysis.



The screenshot shows the Server Studio - Workspace 1 interface. The main window is titled "Data Diff Analyzer" and displays a comparison between two data sources. The summary analysis shows the following details:

Source	Target	Status	Time
ssje_demo_datacompare (...)	ssje_demo_datacompare_1...	Total Differences: 14	Total Runtime: 23 seconds

Summary Analysis:

Source	Total Rows
ssje_demo_datacompare (superstores_demo@ol_demolt20 Owner: informix Host:	130000
Target	Total Rows
ssje_demo_datacompare_1 (superstores_demo@ol_demolt20 Owner: informix Hc	129992

Rows: Deleted: 10 Modified: 2 Added: 2

emp_id	fullname	social_security
5	Vlad Vlahnovski	436-42-6878
6	Lee Chan	024-70-0473
7	Ben Chandrahan	010-60-1371
8	John Brown	156-83-1382
9	Gary Cooper	637-74-4520
10	Max Smith	214-21-8985
11	487 John Brown	786-78-7550
12	495 Max Smith	947-83-8161
13	50000 Gary Cooper	582-93-6580
14	50001 Ben Chandrahan	471-25-2818

Row: 11

Show Different Columns Only

Column	Source Value
3 social_security	786-78-7550
4 salary	72222.63



Server Studio™

Data Management – High Performance Loader

- Provides highly intuitive multi-platform user interface for IDS High Performance Loader
- Streamlines creation of new HPL data load and unload jobs
- Simplifies maintenance of existing HPL jobs
- Allows to group multiple HPL jobs into logical containers

High Performance Loader

HPL Project Name: <Temporary>

Run	Source	Target	Rows	Saved	Status
<input checked="" type="checkbox"/>	discount (DB: ecommerce Owner: informi...	Device Array	696315		
<input checked="" type="checkbox"/>	account (DB: ecommerce Owner: informi...)	Device Array	1000		

Check All Uncheck All Move Up Move Down

JOB 2 - [HPL Job name: <Generate Name>]

Map Name: <Generate Name>

Format Name: <Generate Name>

Format Type: Delimited

Field Separator: pipe Record End: newline Advanced...

Field Name	Field Type	Column Name	Column Type	Mapping Options
id_account	char	id_account	serial	
acctname	char	acctname	varchar(50)	Left Justify, Upper Case;
password	char	password	varchar(50)	
fname	char	fname	varchar(20)	Left Justify, Proper Noun C..
lname	char	lname	varchar(30)	
address	char	address	varchar(255)	
city	char	city	varchar(30)	
state	char	state	char(2)	
zip	char	zip	varchar(30)	
email	char	email	varchar(50)	

Number Of Fields: 11 Apply

<< Back Next >> Help



Server Studio™

Data Management – Data Masking

- The most common use of data masking is to create test data for non-production environments, such as application development and QA, while protecting personally identifiable, personally sensitive or commercially sensitive data.
- Server Studio provides a number of data masking methods, such as Random Substitution, Substitution from Database objects and Files, Shuffling, Number and Date Variance, Masking Out parts of text data, and more.
- There are options to export obfuscated data into text files or obfuscate data directly in tables.

Data Masking: export masked data to a file

Mask data from the specified tables and export the resulting data into text files. Original table data will not be affected.

Run	Job #	Table	File	Masking E...	Rows	Status
<input checked="" type="checkbox"/>	1	_t1 (DB: idsgam...	C:\Program Files...		1202...	
<input checked="" type="checkbox"/>	2	employee (DB: i...	C:\Program Files...		140	
<input checked="" type="checkbox"/>	3	hardware (DB: i...	C:\Program Files...		140	

... Unselect All Move Up Move Down Add Tables Remove Show: All Failures Warnings Find:

JOB 3 OF 6: Define column-level data masking methods for a table: hardware

Mask	Column Name	Type	Key
	employee_id	CHAR(6)	Foreign
<input checked="" type="checkbox"/>	location	CHAR(6)	
	hardware_in	CHAR(8)	
	hardware_sn	CHAR(8)	Primary

location CHAR(6)

Data Masking Method: Masking out

Mask data by substituting: <Select>

Select the Custom option: Random Substitution

regular expression to substitute: Substitution From Database Object

below to specify the text to substitute: Substitution From File

Replace: Shuffling

Pre-Defined Formats: Masking out

Replace With: Keep Data Unchanged

You can generate any text by using the following format:

- [0-9] generates any number
- [A-Z] generates any upper case letter
- [a-z] lower case letter
- [AB] letter A or letter B

Any text outside of the square brackets is a text constant. For example: [AB][12] will generate A-1,A-2,B-1,B-2

For more information, see Help ->Server Studio Help->Data Masking Wizard help topic.

Data Sample

Refresh

23-268
22-762
22-123
24-324
22-462
21-422
23-252
24-222
21-772
21-742

Next >> Help



Server Studio™

Storage Space Management – Table Fragmentation (Partitioning)

- Create, modify and manage with ease data partitioning strategies to improve:
 - Single-user response time
 - Concurrency
 - Availability
 - Backup-and-restore strategy
 - Loading of data
- Full support for:
 - Expression-based fragmentation
 - Round-robin fragmentation
 - Detached Indexes
- Instantaneously analyze:
 - Number of table extents
 - Data size distribution by:
 - Table extent
 - Dbspace
 - chunk

Server Studio - Workspace 1

Object Explorer DB Diff Sentinel - Automation

Properties ec_calculatedscrt Execution Plan Table Reorg

order
Server: ol_demott20 || Database: ecommerce

Table Profile

Name: order Indexes: 6 Type: Standard Row Size: 199 Date Created: 2006-02-14
Owner: informix Columns: 15 Size: 224.00 KB No. Rows: 1006 Stats Updated:

View Storage Information for: Table Detached Index

Storage Summary

DBSpace:	Allocated:	Size:	%
ol_demott20	56 pg - 224.00 KB	56 pg - 224.00 KB	100.00

First:	Next:	Total:	Used:	%
32 KB	64 KB	4	52 pg - 208.00 KB	92.86

Extents:	Free:	%
4	4 pg - 16.00 KB	7.14

Storage Distribution by Space

Total DBSpaces: 1

DBSpace	Extents	Allocated	Used	Data Size	DB Space Free
ol_demott20	4	56 pg - 224.00 KB	52 pg - 208.00 KB	51 pg - 204.00 KB	659.98 MB

Extent Details

Ext #	Size	DB Space	Chunk ID
1	16 pg - 64.00 KB	ol_demott20	2
2	16 pg - 64.00 KB	ol_demott20	2
3	16 pg - 64.00 KB	ol_demott20	2
0	8 pg - 32.00 KB	ol_demott20	5

Storage Distribution by Device

Chunk ID	Size	Extents	Device Name
2	48 pg - 192.00 KB	3	F:\MxDATA\ol_dem...
5	8 pg - 32.00 KB	1	f:\Mxdata\ol_demott...

General Design Storage SQL Data Permissions Dependencies

Ready



Server Studio™

Storage Space Management – Table and Index Reorganization

- Improve utilization efficiency of scarce data storage resources and optimize database performance by:
 - reorganizing tables' structure and data allocation to reduce the number of table extents and reclaiming wasted space
 - moving data to a different DB Spaces or fragmenting it across multiple DB Spaces.
- Support of simultaneous reorganization of multiple tables or indexes.
- Full integration with Informix High Performance Loader to minimize application downtime.
- Support of Table Compression feature

The screenshot shows the Server Studio interface with the 'Table Reorg' dialog box open for the 'discount1' table. The dialog is divided into several sections:

- Table Reorg Table:** A table listing the tables to be reorganized.
- Storage Options:** Fields for 'First Extent Size' (62000 KB), 'Next Extent Size' (1024 KB), and 'Lock Mode' (Page). A 'Calculate Optimum Extent Size' button is present.
- Table Location:** A dropdown menu set to 'Fragmented' and a checkbox for 'With ROWIDs'. An 'Apply Location to Other Tables ...' button is also visible.
- Distribution Scheme:** A dropdown menu set to 'Expression' and a table for defining the scheme.
- Data Unload Options:** A section for configuring data unload options, including a temporary file directory path and a checkbox for 'Leave data file and scripts on server'.

Table	Reorg Method	Extents	Rows	Status
beta_licenses (DB: ecommerce Owner: inf...	Export/Re-Create/Import (HPL Deluxe)	1	4092	Not Executed
discount1 (DB: ecommerce Owner: informix)	Export/Re-Create/Import (HPL Deluxe)	3	698315	Not Executed
order (DB: ecommerce Owner: informix)	In-Place	4	1006	Not Executed

DBSpace	Expression
backup	
demo	
ol_demo20	



Server Studio™

Storage Space Management

- Identify easily which storage spaces are getting filled and may require additional chunks. Examine in detail:

- DbSpaces
- BLOBSpaces
- Chunks
- Percentage of used and free space.
- List of database objects residing in a given Dbspace and chunk.
- Other vital storage spaces related information.

Storage
Server: ol_demo120 | Host: demot20

Space	Space No.	Type	Size Total	Size Free	% Used
demo	7	DB Space	5120 pg - 20 MB	0 pg - 0 KB	100
fastdrive	4	DB Space	332800 pg - 1.27 GB	57223 pg - 223.53 MB	82
ol_demo120	2	DB Space	391500 pg - 1.49 GB	169034 pg - 660.29 MB	56
rootdbs	1	DB Space	115200 pg - 450 MB	58303 pg - 227.75 MB	48
backup	5	DB Space	276480 pg - 1.05 GB	154867 pg - 604.95 MB	43
s9_sbspc	6	Smart BLOB Space	3060 pg - 11.95 MB	2379 pg - 9.29 MB	22

Chunk Device	...	DBSpace	Type	Total Page I/O	Size Total	Size Free	% Used
f:\fmx\data\ol_demo120\ol...	18	demo	Chunk	52	2560 pg - 10 MB	0 pg - 0 KB	100
f:\fmx\data\ol_demo120\ol...	19	demo	Chunk	1	2560 pg - 10 MB	0 pg - 0 KB	100
f:\fmx\data\ol_demo120\fa...	9	fastdrive	Chunk	1	128000 pg - 500 MB	3 pg - 12 KB	100
f:\fmx\data\ol_demo120\fa...	10	fastdrive	Chunk	651	76800 pg - 300 MB	27 pg - 108 KB	99.96
f:\fmx\data\ol_demo120\fa...	8	fastdrive	Chunk	307	25600 pg - 100 MB	35 pg - 140 KB	99.86
f:\fmx\data\ol_demo120\ro...	13	rootdbs	Chunk	1684	25600 pg - 100 MB	37 pg - 148 KB	99.66
F:\VFMXDATA\ol_demo120...	2	ol_demo1...	Chunk	101	25600 pg - 100 MB	115 pg - 460 KB	99.55
f:\fmx\data\ol_demo120\ol...	4	ol_demo1...	Chunk	1	25600 pg - 100 MB	273 pg - 1.07 MB	98.93
f:\fmx\data\ol_demo120\b...	14	backup	Chunk	1	97280 pg - 380 MB	4277 pg - 16.71 MB	95.6
F:\VFMXDATA\ol_demo120...	16	s9_sbspc	Smart Blob	16	500 pg - 1.95 MB	24 pg - 96 KB	95.2
F:\VFMXDATA\ol_demo120...	1	rootdbs	Chunk	2042	12800 pg - 50 MB	1552 pg - 6.06 MB	87.88
F:\VFMXDATA\ol_demo120...	17	rootdbs	Chunk	522	25600 pg - 100 MB	5517 pg - 21.55 MB	76.45
f:\fmx\data\ol_demo120\ol...	5	ol_demo1...	Chunk	2	25600 pg - 100 MB	6385 pg - 24.94 MB	75.06
f:\fmx\data\ol_demo120\ol...	7	ol_demo1...	Chunk	13043	256000 pg - 1000 ...	106067 pg - 414.3...	58.57
f:\fmx\data\ol_demo120\fa...	24	fastdrive	Chunk	33	25600 pg - 100 MB	11365 pg - 44.47 ...	55.53
f:\fmx\data\ol_demo120\fa...	27	fastdrive	Chunk	1	64000 pg - 250 MB	32976 pg - 128.81 ...	48.48
f:\fmx\data\ol_demo120\b...	12	backup	Chunk	1062	51200 pg - 200 MB	29890 pg - 116.76...	41.62



Server Studio™

Storage Space Management

- Identify easily which storage spaces are getting filled and may require additional chunks.
- Examine in detail:
 - DbSpaces
 - BLOBSpaces
 - Chunks
 - Percentage of used and free space.
 - List of database objects residing in a given DbSpace and chunk.
 - Other vital storage spaces related information.
 - DBSpace data fragmentation map

The screenshot displays the Server Studio interface. On the left, the Object Explorer shows a tree view of the server structure, including Connections, Databases, and Storage. The right pane shows the properties for 'Chunk #5'. A pie chart indicates that 75% of the space is used (red) and 25% is free (green). The properties table is as follows:

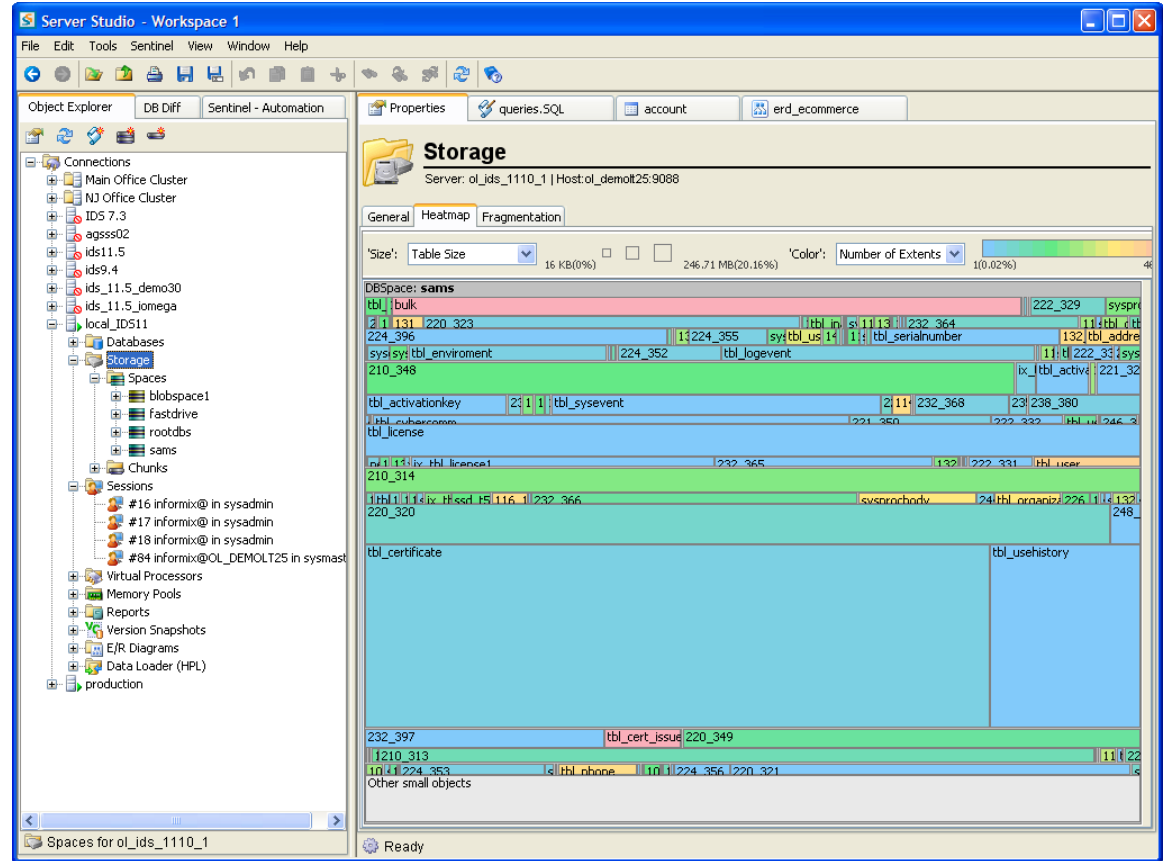
Property	Value
Device:	f:\fmx\data\ol_demoit20\ol_demoit20.002
Chunk Number:	5
DBSpace:	Chunks
Offset:	0
Size:	25600 pages - 100 MB
Free Size:	6385 pages - 24.94 MB
Offline:	No
Recovering:	No
Inconsistent:	No
Blob Chunk:	No
Mirror:	
Device:	
Offline:	
Recovering:	



Server Studio™

Storage Space Management – Heatmaps

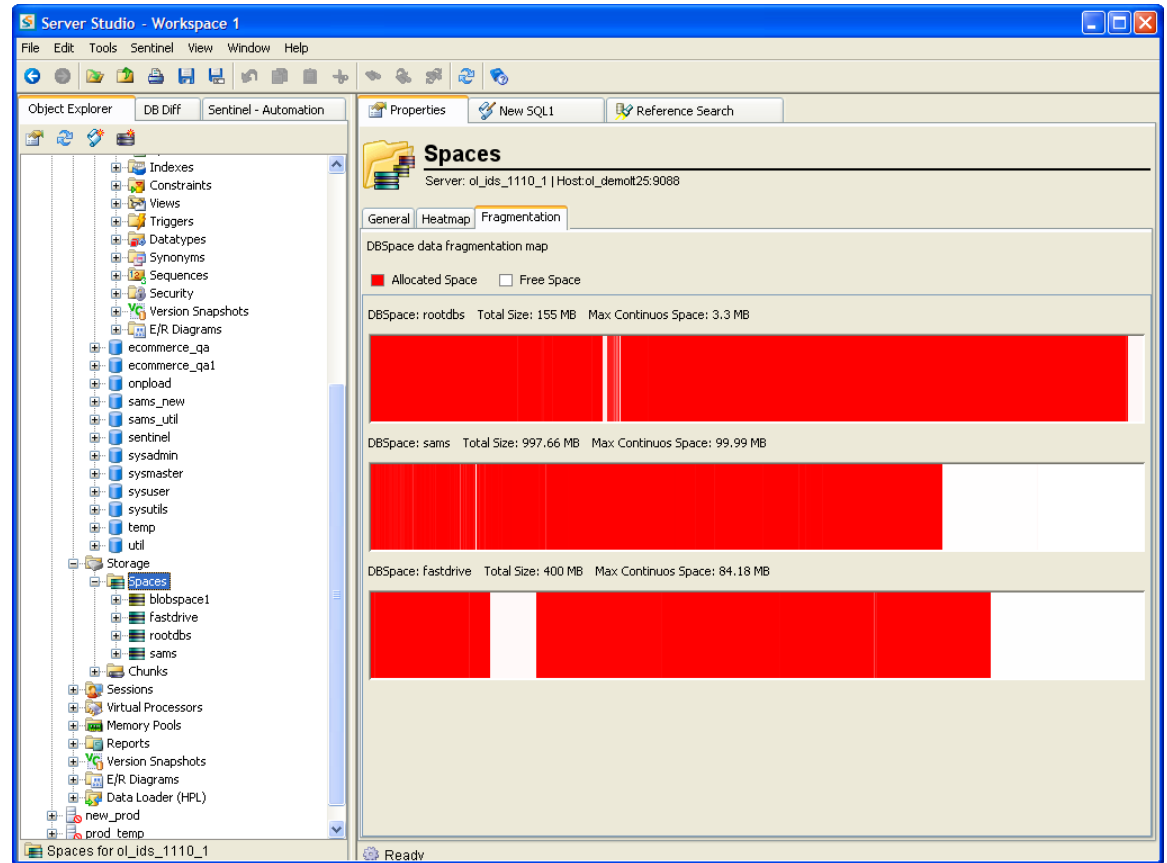
- Heatmap is a technique for visual representing data, in which area and color of rectangles represent two different metrics, for example, database table's storage size and I/O activity level.
- Heatmap also uses nested rectangles to represent hierarchical relationships, for example, tables residing in a dbspace or in a database.



Server Studio™

Storage Space Management – Fragmentation Map

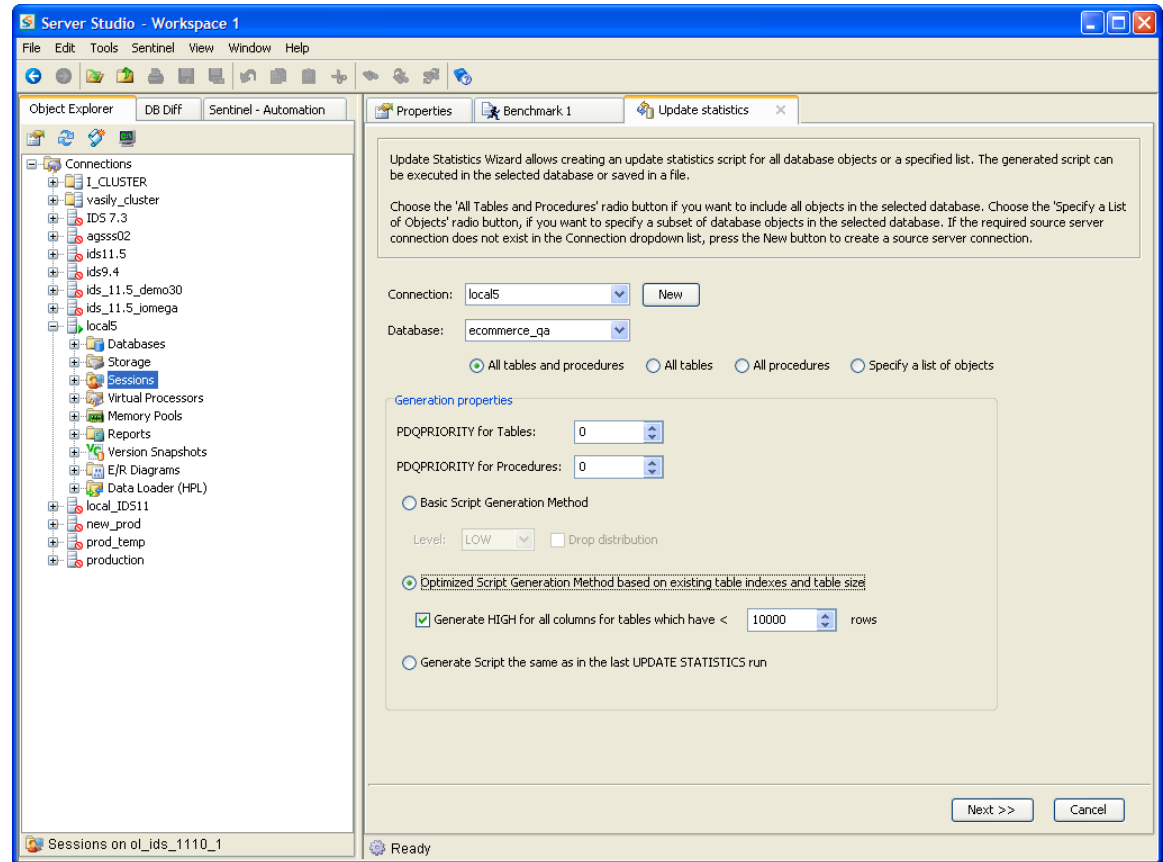
- DBSpace data fragmentation map shows map of dbspace's free and available extents for all or selected dbspaces.
- Fragmentation map helps to analyze the storage utilization efficiency and look for maximum available continuous free space.



Server Studio™

Storage Space Management – Update Statistics Wizard

- Optimized algorithm of UPDATE STATISTICS script generation based on existing table indexes and data size allows to reduce execution time
- Ability to generate a script using the same parameters as the last executed UPDATE STATISTICS script
- Generated script can be manually customized for each individual table
- Ability to run generated script in the Sentinel's scheduler



Server Studio™

Pre-Deployment Testing

Extensive pre-deployment testing facilities of Server Studio™ help DBAs and application developers pinpoint DBMS system bottlenecks and set operational benchmarks to help achieve required levels of database performance and availability.

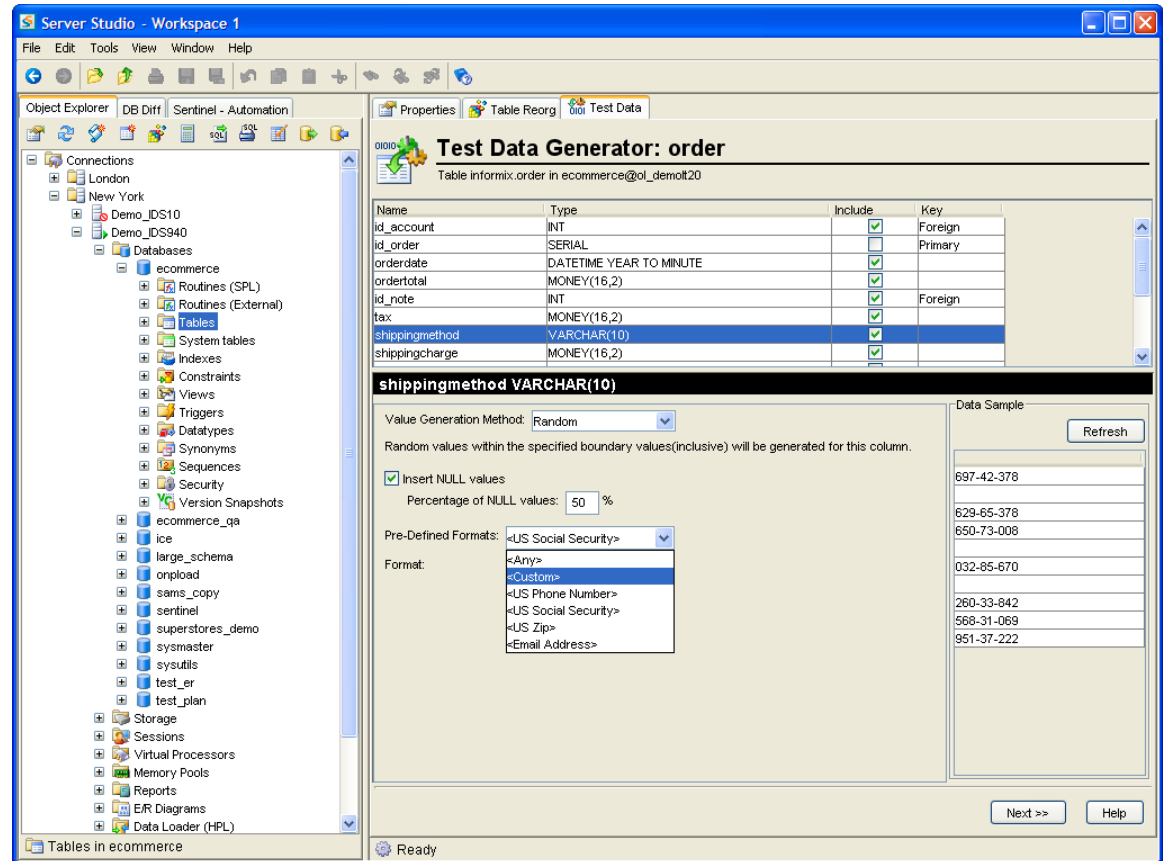
Transparent integration with Sentinel enables real-time monitoring and gathering of the server operational performance parameters matrix under real-life load scenarios needed to identify and correct point-of-system failures.



Server Studio™

Pre-Deployment Testing – Test Data Generator

- Populate test databases with millions of rows of meaningful, syntactically correct test data, unique indexes and other dependencies, while fully maintaining referential integrity constraints.
- Supports a broad range of data value generation options:
 - text file-based
 - text data patterns
 - values obtained from a database
 - ability to specify data ranges
 - sequential, BLOB and CLOB data generation methods



Server Studio™

Pre-Deployment Testing – Benchmark Runner

- A comprehensive testing solution that effectively simulates real-life load scenarios of hundreds or thousands of users accessing the database simultaneously.
- Measures application's client-side response times automatically.
- Enable creation of consistent performance benchmark tests with fully parametric queries for variety of transactions types (i.e. OLTP, decision support, etc.) to test database applications throughout the expected range of operational conditions.

The screenshot displays the Server Studio - Benchmark Runner interface. The left pane shows a tree view of server connections, including 'Production' and 'Demo_IDS940'. The main window is titled 'Benchmark Runner' and shows the following configuration:

- Save: F:\SS\EM\myloadtest.its
- Settings: Connection: Demo_IDS940, Database: ecommerce, Description: QA Testing of Online Sales application
- Max Errors: 100, Duration: Unlimited, Interval: 45 minutes
- Tasks table:

Name	Sessions	Interval	Executions	Avg (s)	Min (s)	Max (s)	Errors
Insert Order	20	2 sec random	0				0
Accounting Queries	3	70 sec random	0				0
Sales Queries	50	7 sec random	0				0
ATM Transactions	10	7 sec random	0				0
Export for Data Warehouse	1	300 sec random	0				0

Task name: Accounting Queries
Number of sessions: 3
Interval between executions: 70 seconds Random

SQL Script:

```
select * from order
where id_order in (100,200,256)
and order_date between '12/1/2005' and TODAY
and totalamount > 1000
```



Sentinel™

Essential Enterprise Performance & Availability
Management Solution for IBM Informix Servers



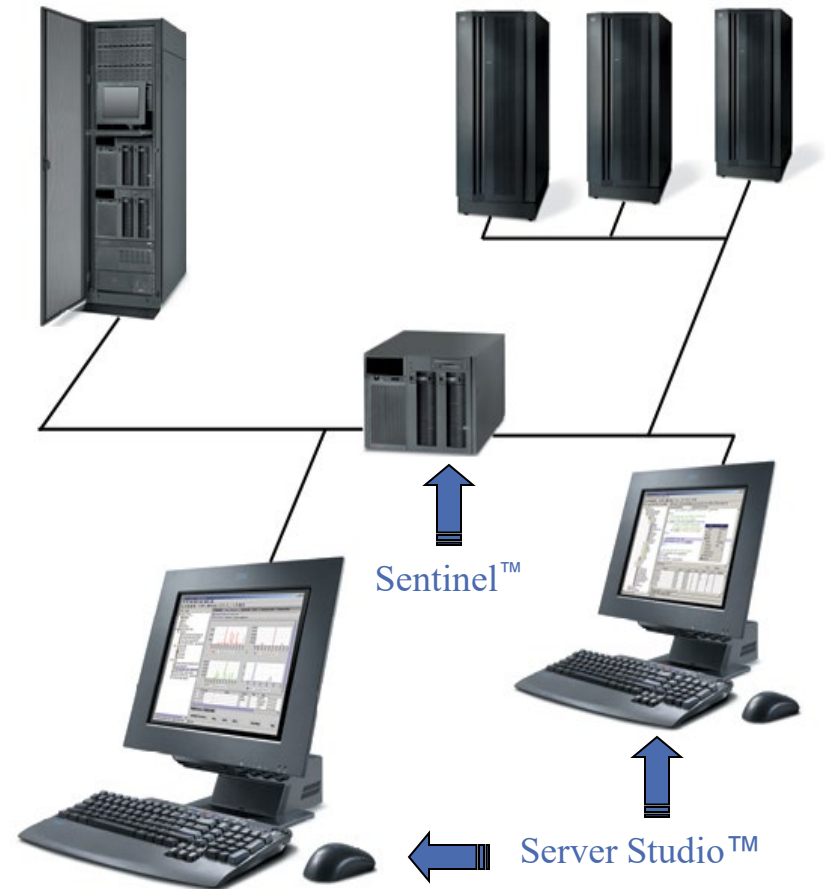
Enterprise Performance & Availability Monitoring & Management of Informix Data Servers by AGS' Sentinel™

- Sentinel™ Architecture Overview
 - Enterprise Performance Monitoring (EPM) System Data Flow
- Performance Management Option (PMO)
 - Real-Time Performance and Event Monitoring
 - **Server-level** Monitors
 - **Object-level** Monitors
 - Historical Performance Data Time-Series Analysis
 - Event Alerts and Autonomic Response
- Task Automation
- Configuration Management Option (CMO)



Flexible Multi-Platform Command & Control Center for Effective Management of IBM Informix® Data Servers

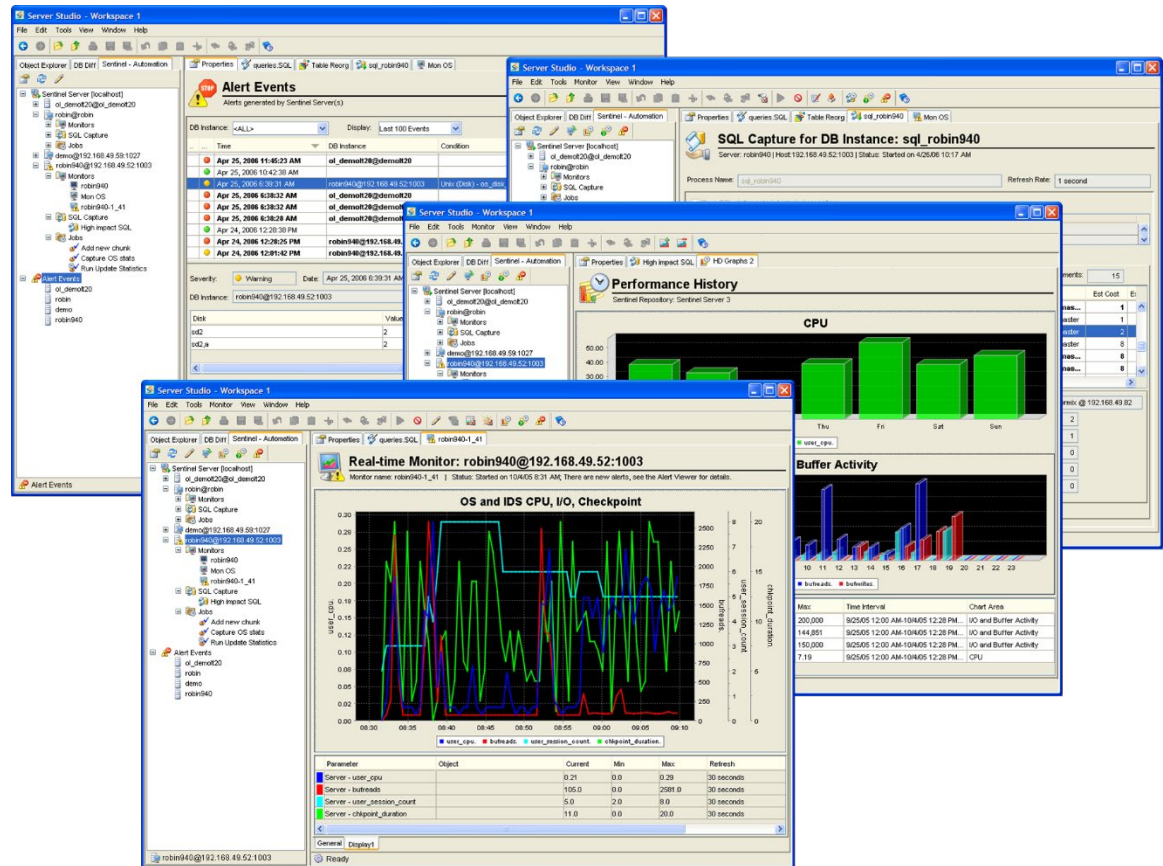
- Manage your entire IBM Informix® infrastructure from a centralized point of control, regardless of whether your servers are all in one location, or at remote sites half-way around the world.
- **Agent-less** architecture enables painless and rapid deployment of flexible and effective DBMS command and control solutions.
- Assure availability, maintainability and peak performance of your vital databases with ease.



Sentinel™

Performance and Availability of Informix Data Servers

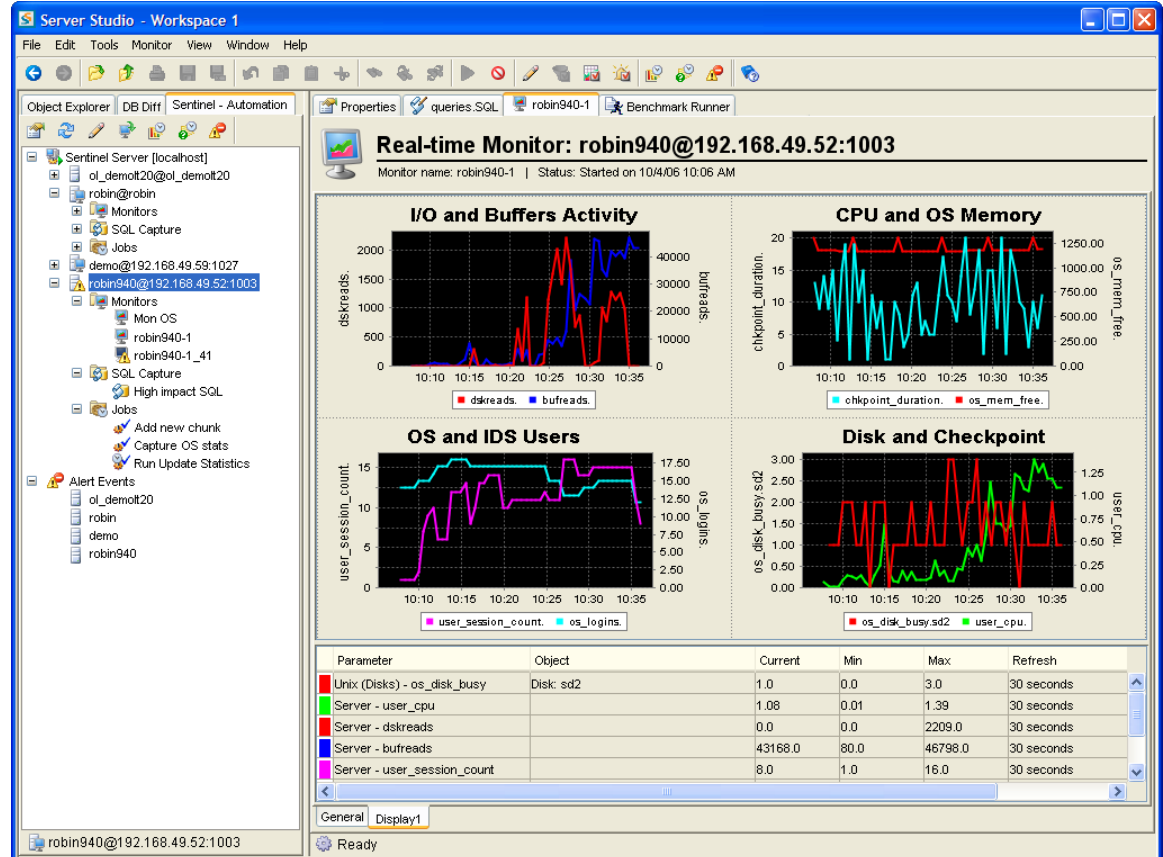
- Automate real-time 24×7 monitoring of vital Informix DBMS operational parameters.
- Capture continuous time-series measurement data of the server performance in an integrated SQL-compliant repository.
- Exploit extensive assortment of analytical tools to help diagnose and quickly respond to performance degradation problems.
- Use highly flexible multi-level alerts to flag availability degradation problems.
- Execute regular database systems maintenance tasks with a flexible Job Scheduler.
- Maximize availability of vital databases with fully autonomic responses to critical server events.
- Conduct performance stress testing under real-life server loads.
- Retrieve dynamically SQL statements running on the server with robust SQL Capture facilities.



Sentinel™

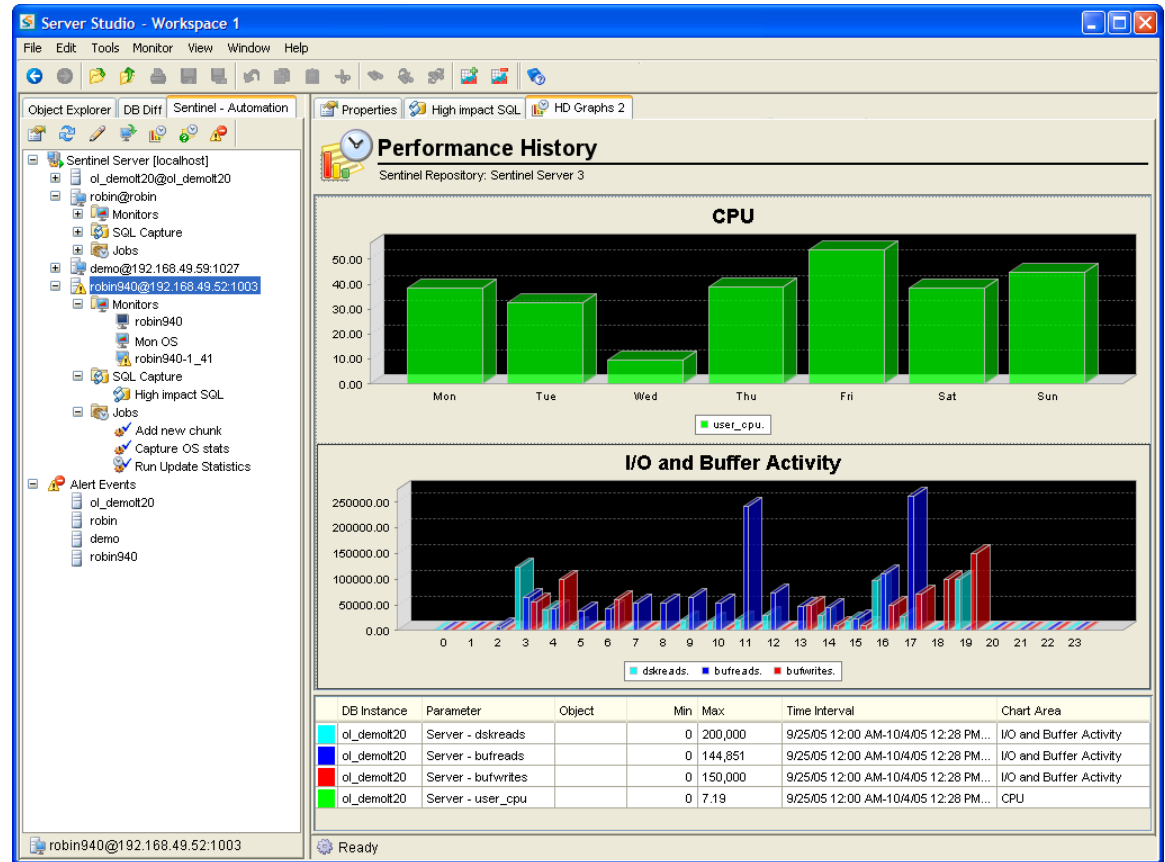
Real-Time Performance and Event Monitoring

- New fully integrated support for monitoring host operating parameters.
- Create customized performance tracking monitors from nearly 200 Informix DBMS-specific and host operating system parameters.
- For each Informix DBMS instance, real-time monitors can be defined at the level of:
 - Server
 - Chunk
 - Dbspace
 - Table
 - Index
 - Session
 - CPU
 - Physical and Virtual Memory
 - Storage Devices
 - Network I/O
- Multi-parametric performance graphs for correlation analysis



Performance Data Time-Series Analysis

- For all Informix DBMS instances under monitoring, the time-series repository stores in its own built-in SQL-compliant database:
 - performance parameters data
 - Event Alerts history
 - SQL scripts captured from user sessions
 - Result sets captured from autonomic execution of administration scripts or Informix DBMS native utilities
- Correlation analysis can be easily performed over any available time interval to spot performance bottlenecks and anomalies.
- Run SQL queries against the time-series repository to export complex performance parameters data sets for further external analysis.



Sentinel™

Event Alerts and Autonomic Response

- Assign multi-level threshold Alerts to each performance parameter being monitored.
- Centralized console for managing all alert events.
- Notification via email, pager, cell phone, etc.
- Supports 'Blackout Periods' for scheduled Informix DBMS server's maintenance down-time
- Autonomic response to system events by:
 - User-defined administration scripts
 - OS commands
 - SQL scripts
 - Stored procedures
 - Informix DBMS native utilities

Server Studio - Workspace 1

Alert Events

Alerts generated by Sentinel Server(s)

DB Instance: <ALL> Display: Last 100 Events

Time	DB Instance	Condition	Source
Apr 25, 2006 11:45:23 AM	ol_demo20@demo20		System
Apr 25, 2006 10:42:38 AM			System
Apr 25, 2006 6:39:31 AM	robin940@192.168.49.52:1003	Unix (Disk) - os_disk_busy > 0	Mon OS
Apr 25, 2006 6:38:32 AM	ol_demo20@demo20		mon2
Apr 25, 2006 6:38:32 AM	ol_demo20@demo20		active_trans
Apr 25, 2006 6:38:28 AM	ol_demo20@demo20		System
Apr 24, 2006 12:28:38 PM			System
Apr 24, 2006 12:28:25 PM	robin940@192.168.49.52:1003		System
Apr 24, 2006 12:01:42 PM	robin940@192.168.49.52:1003	Unix (Disk) - os_disk_busy > 0	Mon OS

Severity: Warning Date: Apr 25, 2006 6:39:31 AM Source: Mon OS Sentinel: Sentinel Server

DB Instance: robin940@192.168.49.52:1003 Condition: Unix (Disk) - os_disk_busy > 0

Disk	Value
sd2	2
sd2,a	2

Job Status: Job: Details...

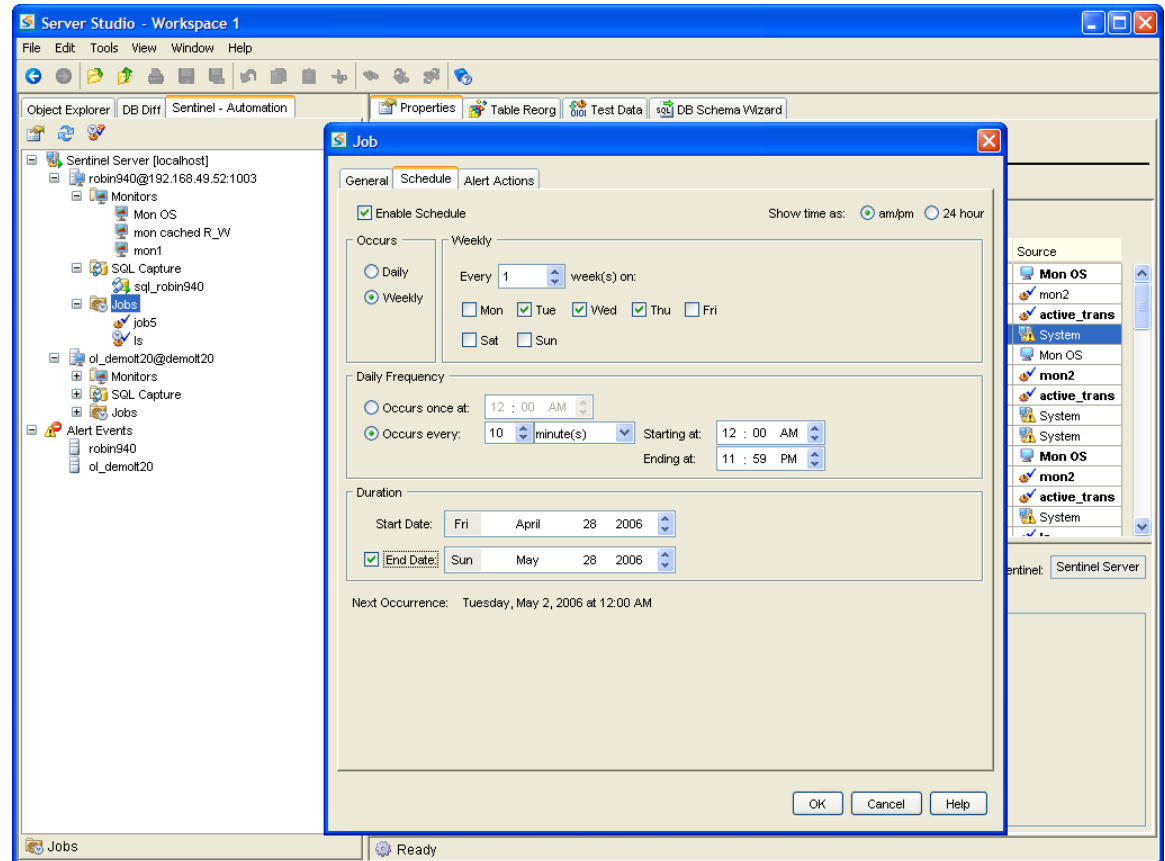
User Defined Message:



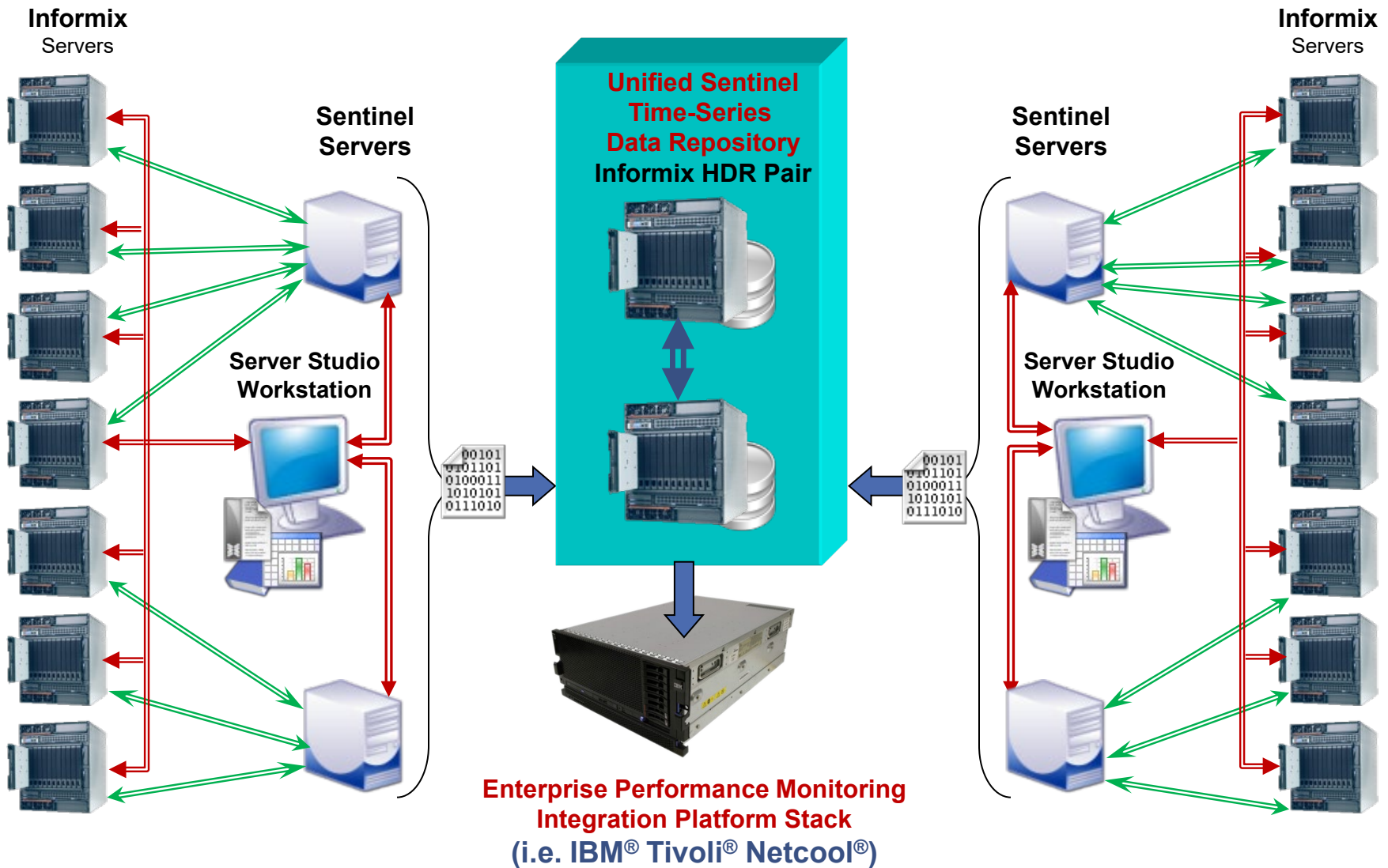
Sentinel™

Task Automation

- Automation of regular maintenance tasks via scheduled custom-defined jobs.
- Define OS commands and SQL scripts as jobs.
- Highly flexible job scheduler.
- Map existing administration scripts and Informix DBMS utilities as jobs.
- Execute jobs as responses to user-defined alert events.
- Output produced by jobs is logged into built-in data repository for future analysis.



Enterprise Monitoring System (EMS) Data Flow



Sentinel™

Performance Management Option *typical monitors configuration*



Host Platform (OS) sensors: *CPU, Memory, Load*

Parameter Sensor	Description
cpu	CPU identifier
os_cpu_sys	Percentage of time CPU was running in system mode
os_cpu_user	Percentage of time CPU was running in user mode
os_cpu_wio	Percentage of time CPU was idle waiting for I/O
os_cpu_busy	Percentage of time CPU was busy
os_cpu_idle	Percentage of time CPU was idle
os_mp_busy	Percentage of time CPU is busy (per-CPU)
os_mp_idle	Percentage of time CPU is idle (per-CPU)
os_cpu_runq	Average length of the CPU run queue
os_cpu_scalls	Number of system calls of per second
os_forks	Number of forks per second
os_mem_phys_free	Free physical memory in MB
os_mem_phys_used	Used physical memory in MB
os_mem_swap_free	Free swap space in MB
os_mem_swap_used	Used swap space in MB
os_mem_pgin	Paging activity (in per second)
os_mem_pgout	Paging activity (out per second)
os_load_avg_1	Load average for the past minute
os_load_avg_5	Load average for the past 5 minutes
os_load_avg_15	Load average for the past 15 minutes



Host Platform (OS) sensors: *Network, Disk, Volume*

Parameter Sensor	Description
os_logins	Number of interactive logins
os_net_conns	Number of concurrent established TCP connections
os_net_pks_in	Number of network packets received (per second)
os_net_err_in	Number of bad network packets received (per second)
os_net_pks_out	Number of network packets sent (per second)
os_net_err_out	Number of bad network packets sent (per second)
disk	Disk name
os_disk_wr_sec	Number of writes (per second)
os_disk_rd_sec	Number of reads (per second)
os_disk_rdwr_sec	Number of read and write operations (per second)
os_disk_busy	Percentage of time disk was busy servicing a request
os_disk_avserv	Average disk service time (in milliseconds)
os_disk_avque	Average number of requests outstanding for the disk
volume	Volume or file system name
os_vol_free	Free space on disk volume (in MB)
os_vol_used	Used space on disk volume (in MB)
os_vol_free_pct	Free space on disk volume (in % of volume size)
os_vol_used_pct	Used space on disk volume (in % of volume size)



Informix DBMS sensors: *Server Level*

Parameter Sensor	Description
isAlive	Flag designating that the connection to the server instance can be established
user_session_count	Number of users connected to the server
active_trans	Active transactions
memory_sessions	Amount of memory pools used by user sessions (in Kb)
memory_pools	Total amount used by all memory pools (in Kb)
active_threads	Number of running threads
ready_threads	Number of ready threads
res_util_ratio	Active ready threads ratio [expressed as: $(\text{sqlexec}/\text{sqlexec})$]
user_cpu	Total user CPU time used by all user threads (expressed in seconds)
system_cpu	Total system CPU time used by all user threads (expressed in seconds)
vp_class_syscpu	System CPU used by a processor
vp_class_usercpu	User CPU used by a processor
vp_class_rdtype	Number of ready queues
bufreads	Number of reads from shared memory
bufwrites	Number of writes to the shared memory buffers
buffwts	Number of times user threads have to wait for a buffer
flushes	Number of times that the buffer pool has been flushed to the disk
latchwts	Latch waits - Increments when a thread waits to gain access to a shared-memory resource
perc_cached_read	Read cache percentage [expressed as: $(100 * (\text{bufreads} - \text{dskreads}) / \text{bufreads})$]
perc_cached_write	Write cache percentage [expressed as: $(100 * (\text{bufwrites} - \text{dskwrites}) / \text{bufwrites})$]
bufreads_writes_ratio	Buffered reads to buffered writes ratio [expressed as: $(\text{bufreads} / \text{bufwrites})$]
buffer_wait_ratio	Buffer wait ratio [expressed as: $(\text{buffwts} / (\text{pagreads} + \text{bufwrites})) * 100$]



Informix DBMS sensors: **Server Level**

Parameter Sensor	Description
isamtot	Total number of ISAM calls made
isopens	Number of times a tablespace is opened
isstarts	Number of times an index position was changed
isreads	Number of times the ISAM read function is called
iswrites	Number of times the ISAM write function is called
isrewrites	Number of times the ISAM update function is called
isdeletes	Number of times the ISAM delete function is called
iscommits	Number of times the ISAM iscommit() function was called
isrollbacks	Number of times transactions rolled back
rollback_commits_ratio	Rollback to commit ratio [expressed as: (isrollbacks/iscommits)]
seqscans	Number of sequential scans executed
isam_seqscan_ratio	ISAM total to sequential scan ratio [expressed as: (seqscans/isamtot)]
pagreads	Number of pages read
pagwrites	Number of pages written
dskreads	Number of actual reads from disk
dskwrites	Number of actual physical writes to disk (includes the writes for physical and logical logs)
plgpagewrites	Physical-log pages written
plgwrites	Physical-log writes
perc_phys_log_used	Percentage of Physical-log used
llgreccs	Logical-log records
llgpagewrites	Logical-log pages written
llgwrites	Logical-log writes
perc_lgcl_log_used	Percentage of Logical-log used
compress	Number of pages compressions



Parameter Sensor	Description
bufreads	Number of reads from shared memory
bufwrites	Number of writes to the shared memory buffers
buffwts	Number of times user threads have to wait for a buffer
flushes	Number of times that the buffer pool has been flushed to the disk
latchwts	Increments when a thread waits to gain access to a shared-memory resource
perc_cached_read	Read cache percentage [expressed as: $(100 * (\text{bufreads} - \text{dskreads}) / \text{bufreads})$]
perc_cached_write	Write cache percentage [expressed as: $(100 * (\text{bufwrites} - \text{dskwrites}) / \text{bufwrites})$]
bufreads_writes_ratio	Buffered reads to buffered writes ratio [expressed as: $(\text{bufreads} / \text{bufwrites})$]
buffer_wait_ratio	Buffer wait ratio [expressed as: $(\text{buffwts} / (\text{pagreads} + \text{bufwrites})) * 100$]
totalsorts	Total number of sorts
memsorts	Number of memory sorts (sorts that fit in memory)
disksorts	Number of disk sorts (sorts that did not fit in memory)
maxsortspace	Maximum disk space used by a sort
btradata	Data pages read ahead though leaf
btraidx	Leaf read ahead though leaf
dpra	Data-page read aheads
rapgs_used	Read-ahead pages used
lruwrites	Least-recently used (LRU) writes



Parameter Sensor	Description
lockreqs	Number of total requests for locks
lockwts	Number of times user threads wait to acquire a lock
deadlks	Number of times that deadlocks were detected and cured
lktouts	Number of deadlock timeouts
ovlock	Number of times database server attempted to exceed the maximum number of locks
ovuser	Number of times that user attempted to exceed the maximum number of user threads
ovtrans	Overflow transaction table
chkpoint_duration	Checkpoint duration
ckptwts	Number of times checkpoint waits
chunkwrites	Writes during a checkpoint



Informix DBMS sensors: *Session Level*

Parameter Sensor	Description
sq_s_session_duration	The length of time (in minutes) a user session has been connected to Informix server
sq_s_total_memory_used	Total amount of memory used by a session in KB
sq_s_reads	Number of the ISAM read function calls
sq_s_writes	Number of ISAM write function calls
sq_s_buffwrts	Number of buffer writes
sq_s_buffrds	Number of buffer reads
sq_s_pagerds	Number of page reads
sq_s_pgwrts	Number of page writes
sq_s_rewrts	Number of rewrites
sq_s_dels	Number of deletes
sq_s_commits	Number of commits
sq_s_rollback	Number of rollbacks
sq_s_sorts	Number of total sorts
sq_s_disksorts	Number of disk sorts
sq_s_max_sort_space	Maximum space used by a sort
sq_s_scans	Number of sequential scans
sq_s_lckreq	Number of locks requested by the session
sq_s_lock_held	Number of locks currently held by the session
sq_s_lock_waits	Number of times waited for a lock
sq_s_ovlock	Number of times a session ran out of locks
sq_s_dead_locks	Number of deadlocks detected at the session
sq_s_longtran	Number of long transactions for the session
sq_s_log_recs	Number of logical-log records written by the session
sq_s crt_log_space	Number of bytes of the logical-log space used by the current transaction of the session
sq_s_max_log_space	Maximum number of bytes of the logical-log space ever used by the session



Informix DBMS sensors: **Session Level** (...continued)

Parameter Sensor	Description
session_id	ID of an IDS session
sqs_statement	SQL statements executed by user session
sqs_estcst	Estimated Cost
sqs_estrws	Estimated number of rows
sqs_seqscn	Number of sequantial scans
sqs_autoidx	Number of auto indexes
sqs_tempfls	Number of temporary files
sqs_dbname	Nome of the database in which SQL statement is executed

Informix DBMS sensors: **Storage Level** (dbspaces & chunks)

Parameter Sensor	Description
sp_used_page_size	Number of used pages in the dbspace
sp_perc_used	Percent of the dbspace used
sp_is_online	Status of a dbspace: (online or offline)
ch_free_pages	Number of free pages in the chunk
ch_perc_free	Percentage of the chunk free
ch_reads	Number of chunk physical reads
ch_writes	Number of chunk physical writes
ch_pagesread	Number of chunk page reads
ch_pageswritten	Number of chunk page writes
ch_is_online	Status of a chunk: (online or offline)



Parameter Sensor	Description
tb_nrows	Number of rows in a table
tb_exts_count	Number of table extents
tb_pg_allocated	Pages allocated
tb_pg_used	Pages used
tb_pgwrites	Number of page writes
tb_pgreads	Number of page reads
tb_reads	Number of read function calls
tb_writes	Number of write function calls
tb_deletes	Number of delete function calls
tb_bufreads	Number of buffer reads
tb_bufwrites	Number of buffer writes
tb_lockrq	Number of lock requests
tb_wtlock	Number of lock waits
tb_deadlocks	Number of deadlocks
tb_seqscans	Number of sequential scans



- Monitoring of critical virtual processors allows to determine when the IDS server is under stress and proactively take remedial actions to prevent degradation of the server's performance.
- To create **VP Monitor**, select the following parameter sensors:
 - `vp_class_syscpu` → System CPU used by a processor
 - `vp_class_usercpu` → User CPU used by a processor
 - `os_cpu_busy` → Processor percent busy
 - `os_cpu_idle` → Processor percent idle
- Plot the monitor data on the real-time graphs to have instant visualization of the IDS server's critical virtual processors stress level state.
- Choose to “Save” the monitor's Time-Series data to perform historical trends analysis and to predict future system resource requirements.



- Monitoring of the IDS server for transaction volume peaks through observation of critical performance metrics (such as logs, buffers and cache) allows to determine when the system is under stress, receive corresponding notifications and proactively take corrective actions to prevent degradation of the server's availability.
- To create **IDS Health Monitor**, select the following parameter sensors:
 - `perc_phys_log_used` → Percentage of the physical log used
 - `perc_lgcl_log_used` → Percentage of logical logs used
 - `buffer_wait_ratio` → Percentage of buffer accesses that encounter latch waits
 - `perc_cached_read` → Percentage of Read cache hits
 - `perc_cached_write` → Percentage of Write cache hits



- Set up alerts to be notified immediately when IDS server's logs, buffers or cache resources exceed recommended threshold levels to take remedial actions needed to prevent degradation of the server's availability.
- Alerts recommended to create for the **IDS Health Monitor**:
 - Physical log used => 70% → **Warning**
 - Physical log used => 74% → **Critical**
 - Buffer waits => 6% → **Warning**
 - Buffer waits => 10% → **Critical**
- Plot the monitor data on the real-time graphs to have instant visualization of the IDS server's logs, buffers and cache resources' current state.
- Choose to "Save" the monitor's Time-Series data to perform historical trends analysis of the logical and physical logs utilization, or to tune buffer performance.



- Monitoring of resource hog conditions allows to determine and notify timely when the IDS server is under stress and its lack of responsiveness negatively impacts the application server's performance and availability.
- To create **IDS Stress Factors Monitor**, select the following parameter sensors:
 - **ready_threads** → Number of user threads waiting to execute
 - **active_threads** → Number of running user threads
 - **seqscans** → Number of sequential scans
 - **memsorts** → Number of sorts executed in memory
 - **disksorts** → Number of sorts that needed to spool to disk

(...continued)



- Alerts recommended to create for the **IDS Stress Factors Monitor**:
 - ready_threads => 3 → **Warning**
 - active_threads => 5 → **Critical**
- Plot the monitor data on the real-time graphs to have instant visualization of the IDS server's critical resources constraints' current state.
- Choose to “Save” the monitor's Time-Series data to perform historical trends analysis and to predict future system resource requirements.



- Monitoring of the storage spaces capacity allows to identify impending shortage of data storage resources before they negatively impact IDS server's availability and to take proactive corrective actions need to prevent degradation of the system's performance.
 - For IDS servers that have been set up for automatic expansion of DBSpaces, it is also important to track, at the host platform level, the availability of free storage space on disk volumes to avoid collisions with physical resources constraints.
- To create **DBSpaces Monitor**, select the following parameter sensors:
 - `sp_perc_used` → Percent of dbspace storage available
 - `os_vol_free_pct` → Percent of OS disk volumes remaining unused

(...continued)



- Alerts recommended to create for the **DBSpace Monitor**:
 - DBSpace percent used => 90% → **Warning**
 - DBSpace percent used => 95% → **Critical**
 - Volume percent free < 15% → **Warning**
 - Volume percent free < 10% → **Critical**
- Plot the monitor data on the real-time graphs to have instant visualization of the DBSpace current free storage state.
- Choose to “Save” the monitor’s Time-Series data to perform historical trends analysis to identify rates of storage consumption and to predict when additional storage resources must be added to the dbspaces.



Storage-level Monitor: **Disk (OS)**

- Monitoring of the disk performance at the host platform level allows to identify storage hot spots before they negatively impact IDS server's responsiveness and to take proactive remedial actions need to prevent degradation of the system's performance.
- To create **Disk (OS) Monitor**, select the following parameter sensors:
 - `os_disk_avque` → Average queue length by disk/lun
 - `os_disk_avserv` → Average service time by disk/lun
- Alerts recommended to create for the **Disk (OS) Monitor**:
 - Average service time => 10 ms → **Warning**
 - Average service time => 20 ms → **Critical**
- Plot the monitor data on the real-time graphs to have instant visualization of the disk current performance at the host platform level.
- Choose to "Save" the monitor's Time-Series data to perform historical trends analysis to identify when storage disk structures are becoming stressed and resident data may need to be moved to an alternate storage resource.



Sentinel™

Change Management Option



Sentinel™ - *Change Management Option*

Sentinel – Change Management Option is a powerful solution for automating database schema change management across multiple Informix DBMS servers from a central point of control. It streamlines and simplifies the tedious and error-prone task of maintaining traceable records of database schema state changes and automatically notifies administrators when a change from a baseline schema is detected. Change Management subsystem allows to maintain traceable record of database security states, such as user's and role's permissions and track security changes for audit purposes. It also enables capturing periodic database schema version control snapshots ("VCS") and retaining them in the built-in repository for easy roll-out, roll-back and recovery of lost or damaged database objects.



Sentinel™ - *Change Management Option*

Database Schema Audit

- Schema audit tasks can be scheduled to run on the specific time or run periodically, acting as a schema audit tool
- Using a single audit task, you can choose to compare multiple databases or compare the same 'baseline' database schema against multiple target databases residing on different Informix DBMS servers
- Schema comparison reports can be automatically emailed to you or to several DBAs when changes from a baseline schema are found. These reports include detailed difference analysis in HTML format and pre-generated synchronization script required to rollback all or a subset of changes
- Schema Audit Tasks allow to report changes in database schema object syntax as well as changes in users' and roles' permissions



Sentinel™ - Change Management Option

Version Control Subsystem

- Database Change Management and Version Control
 - Report on databases that are inconsistent with a standard, baseline schema
 - Highlight what specific changes have been made to a schema between any two snapshots
 - Roll back to any previous version of a database schema
- Simplified Roll-out of Database Changes
 - Roll out schema changes to existing databases
 - Replace objects in one database with objects from another database
 - Add objects to one or multiple databases
 - Create multiple new databases based on a standard schema
- Rapid Recovery of Lost or Damaged Database Objects
 - Roll back a database schema to a previous version using a schema snapshot or another database as a source
 - Restore lost or damaged objects from a snapshot or another database

The screenshot displays the Microsoft SQL Server Enterprise Manager interface. The left pane shows the Object Explorer with a tree view of the 'Demo_IDS940' server. Under 'Version Snapshots', several snapshots are listed, including '4/26/06 6:45 AM (BETA1)'. The right pane shows the 'Properties' window for the selected snapshot, titled 'Version Snapshot of database: ecommerce'. It includes fields for Date (Apr 26, 2006 6:45:17 AM), Label (BETA1), and User (Developer15 SIP). A description box states: 'Schema for Accounting application. Beta 1 is delivered for testing to Department SAF.' Below this, a table lists the objects contained in the snapshot.

Name	Owner	Type
aaa55	informix	Table
aaa_torn	informix	Table
account	informix	Table
add_release	informix	Routine
add_release_bundle	informix	Routine
add_release_copy	informix	Routine
asdf	informix	Sequence
beta_licenses	informix	Table
brivdiena	informix	Table
brivdiena_up (brivdiena)	informix	Trigger
customer_f1	informix	Datatype
discount	informix	Table
discount1	informix	Table
discount2	informix	Table
dps_procchn	informix	Routine
dps_procupd	informix	Routine



Some of the Companies using Server Studio™ and Sentinel™



What Do IBM Informix Customers Have to Say?

“The latest release of Server Studio and Sentinel provide a collection of integrated, highly productive system management tools that developers and DBAs working with IBM's Informix data servers have been demanding and waiting for. Informix now has very powerful graphical tools that exceed the capabilities of native and third party offerings available for any other database platform. Couple this with outstanding technical support and you get products with excellent value and a quick ROI. In our large distributed environment, Server Studio and Sentinel have simplified and automated many DBA tasks. With these additions, IBM's Informix data servers have been made significantly easier to administer and monitor.”

Kevin Kleinhomer

Vice President
Bank of America

“I love Server Studio! As a software developer and DBA, it is a tool that I use every day. And it is exactly what I demand from my tools - stable, reliable, and powerful. Even the ‘small’ features of Server Studio are big timesavers. I can't imagine working with Informix and not using Server Studio. I won't work with anything less!”

Sean Durity

The Home Depot

“Server Studio brings Informix Database Administration into the 21st Century, replacing ancient command line tools with modern graphical tools. I really can't image how Informix DBAs survived without it!”

Kevin Godsman

Musto Ltd, UK



Server Studio™ *with* Sentinel™

Contact Us

Server Studio™ together with Sentinel™ provide a powerful solutions infrastructure that helps both seasoned database professionals and novices alike manage IBM Informix® data servers environment complexities with unprecedented ease and ensure that critical databases remain up and perform at peak levels, manage change and assure availability of vital business information. To learn more about this multi-platform suite of integrated, highly intuitive system management tools, please visit:

➤ www.serverstudio.com

