

Solving Complex IDS Management and Performance Optimization Challenges

Presented by: Anatole Vishon



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



Partnership: IBM + AGS = Powerful Informix Tools

- IBM and AGS have been closely cooperating on DBMS tools since 1999.
- IBM ships Server Studio™ and Sentinel™ with all Informix Data Servers.
- Server Studio™ had 7 major releases since September 2000.
- Sentinel™ had 5 major releases since January 2004

IBM is Committed to Informix Customers

*“IBM is dedicated to supporting and enhancing Informix database products to meet the needs of our customers now and in the future. The new release of **Server Studio™** with **Sentinel™** represents a significant addition to the IBM Informix product offering and demonstrates IBM’s unwavering commitment to provide our customers with the best-of-bread, state-of-the-art database application development, management and optimization tools to improve ease-of-use and productivity, help ensure that vital databases remain up and perform at peak levels, reduce total cost of ownership and protect considerable investments IBM customers have made in Informix data server infrastructure.”*

Bernie Spang

Director – IBM Data Servers



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

Manager of IT
CornerCap Investment Counsel

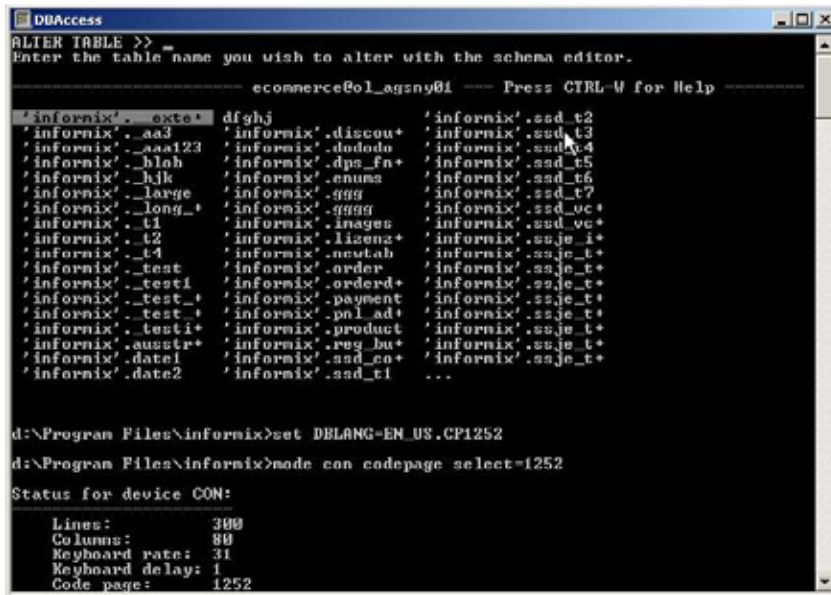
“Server Studio brings Informix Database Administration into the 21st Century, replacing ancient command line tools with modern graphical tools. I really can't image how Informix DBAs survived without it!”

Kevin Godzman

Musto Ltd, UK



The Choice Facing Users of IBM Informix® Data Servers



```
DBAccess
ALTER TABLE >>
Enter the table name you wish to alter with the schema editor.

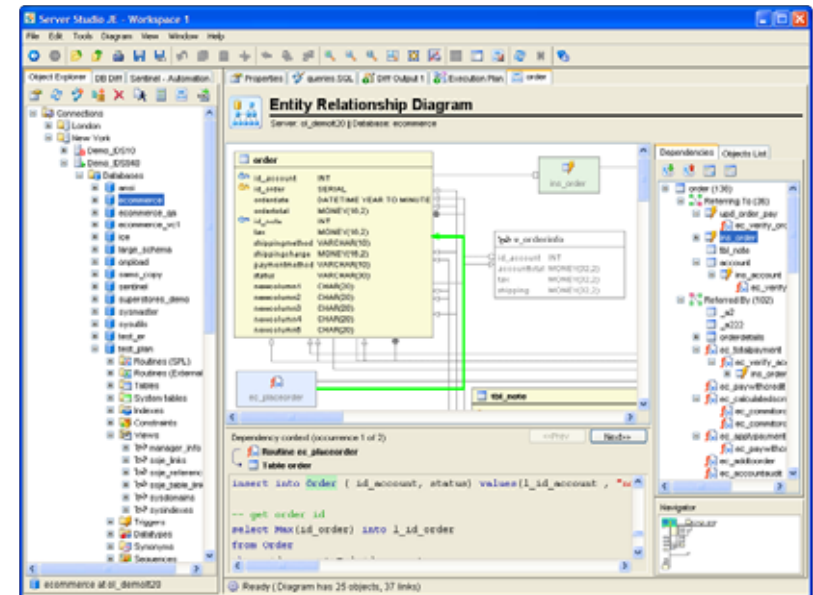
----- ecommerce@ol_agsny01 ----- Press CTRL-M for Help

'informix'.exte  dfgbj      'informix'.ssd_t2
'informix'.aa3   'informix'.discou+  'informix'.ssd_t3
'informix'.aaa123 'informix'.dododo+  'informix'.ssd_t4
'informix'.blab  'informix'.dps_fn+  'informix'.ssd_t5
'informix'.hjk   'informix'.enums  'informix'.ssd_t6
'informix'.large 'informix'.ggg    'informix'.ssd_t7
'informix'.long_+ 'informix'.gggg    'informix'.ssd_vc+
'informix'.t1    'informix'.inages  'informix'.ssje_i+
'informix'.t2    'informix'.lizenz+  'informix'.ssje_t+
'informix'.t4    'informix'.ncutab  'informix'.ssje_t+
'informix'.test  'informix'.order  'informix'.ssje_t+
'informix'.test1 'informix'.orderd+  'informix'.ssje_t+
'informix'.test_+ 'informix'.payment  'informix'.ssje_t+
'informix'.test_+ 'informix'.pnl_ad+  'informix'.ssje_t+
'informix'.testi+ 'informix'.product 'informix'.ssje_t+
'informix'.austre 'informix'.reg_bu+ 'informix'.ssje_t+
'informix'.date1 'informix'.ssd_cn+  'informix'.ssje_t+
'informix'.date2 'informix'.ssd_t1  ...

d:\Program Files\informix>set DBLANG=EN_US.CP1252
d:\Program Files\informix>mode con codepage select=1252

Status for device CON:

Lines:      300
Columns:    80
Keyboard rate: 31
Keyboard delay: 1
Code page:  1252
```

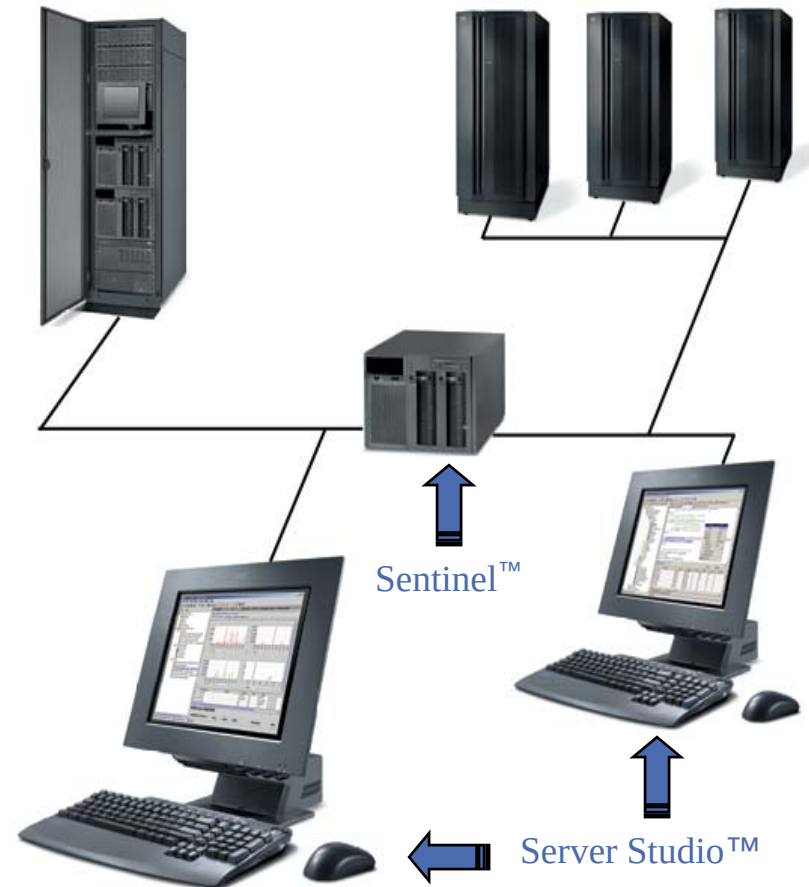


- A sparse collection of command-line, difficult to use, unintuitive, error-prone native tools - circa 1999.
- IT management is concerned with the lack of available qualified personnel capable of operating in such complicated environment.
- Valuable DBA skills acquired on other DBMS platforms are not readily transferable to Informix.
- New generation of DBAs expect modern, intuitive graphical tools and may not have the requisite skills to operate effectively at the command line prompt.
- **Server Studio™ with Sentinel™** is the premier graphical development and management environment for IBM Informix® DBMS servers that features a rich collection of modern, easy-to-use, and highly intuitive tools.
- **Server Studio™ with Sentinel™** provide wide-ranging functionality to support customers' vital IBM Informix® databases — from initial design, development and testing — all the way through to production deployment and successful operational service.



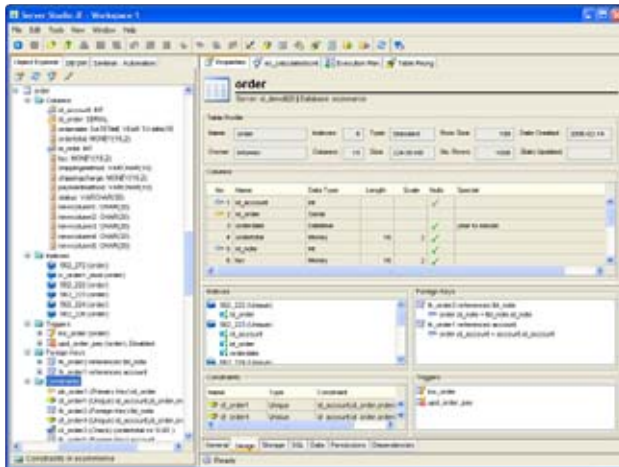
Flexible Multi-Platform Command & Control Center for Effective Management of IBM Informix® Data Servers

- 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.



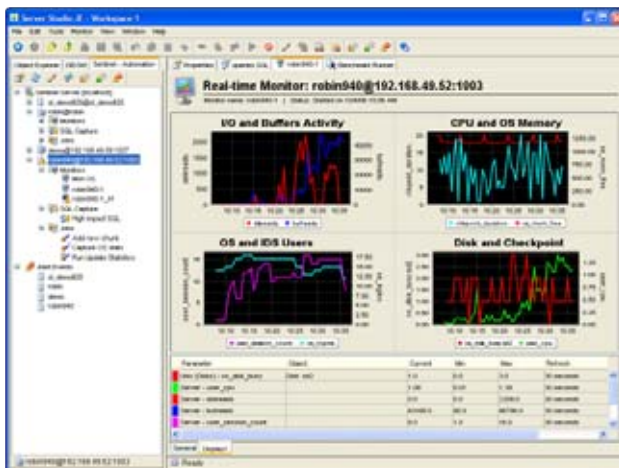
Avant-garde Management Tools for IBM Informix® DBMS

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® databases 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
- Configuration 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 × 7 operational monitoring of IBM Informix® DBMS servers
- 24 × 7 operational monitoring of the IDS' 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 × 7 automated auditing of servers and databases configurations



Agenda

- What's new in the Release 7 of Server Studio™ with Sentinel™
- **Overview of Server Studio™ - Suite Edition**
 - Database Development & Administration
 - Configuration & Change Management
 - Data Management
 - Storage Space Management
- **Overview of Sentinel™ - Performance Edition**
 - Real-Time Performance and Event Monitoring
 - Event Alerts and Autonomic Responses
 - SQL Capture
 - Task Automation
 - Performance Data Time-Series Analysis
- **Overview of Sentinel™ - Compliance Edition (*coming soon*)**
 - Version Control Subsystem
 - Server Audit Subsystem



Server Studio™ with Sentinel™ Release 7



The most feature-rich, productive and capable release ever!

- Full support for Informix® Dynamic Server – codename “Cheetah”
- Full E/R Diagramming and Object Dependencies Analysis
- Graphical Explain Plan Analyzer to help tune SQL performance
- Graphical Query Designer has been added
- Data Difference Analyzer has been added to manage data integrity
- Comprehensive Database Configuration and Change Management
- Vastly Improved Database Reorganization Facilities
- Integrated intuitive management of IDS’ High Performance Loader
- Comprehensive host platform monitoring has been added to Sentinel
- Autonomic Management Facilities have been substantially enhanced
- Integrated Version Control System for Databases
- Automated Configuration and Regulatory Compliance Audits



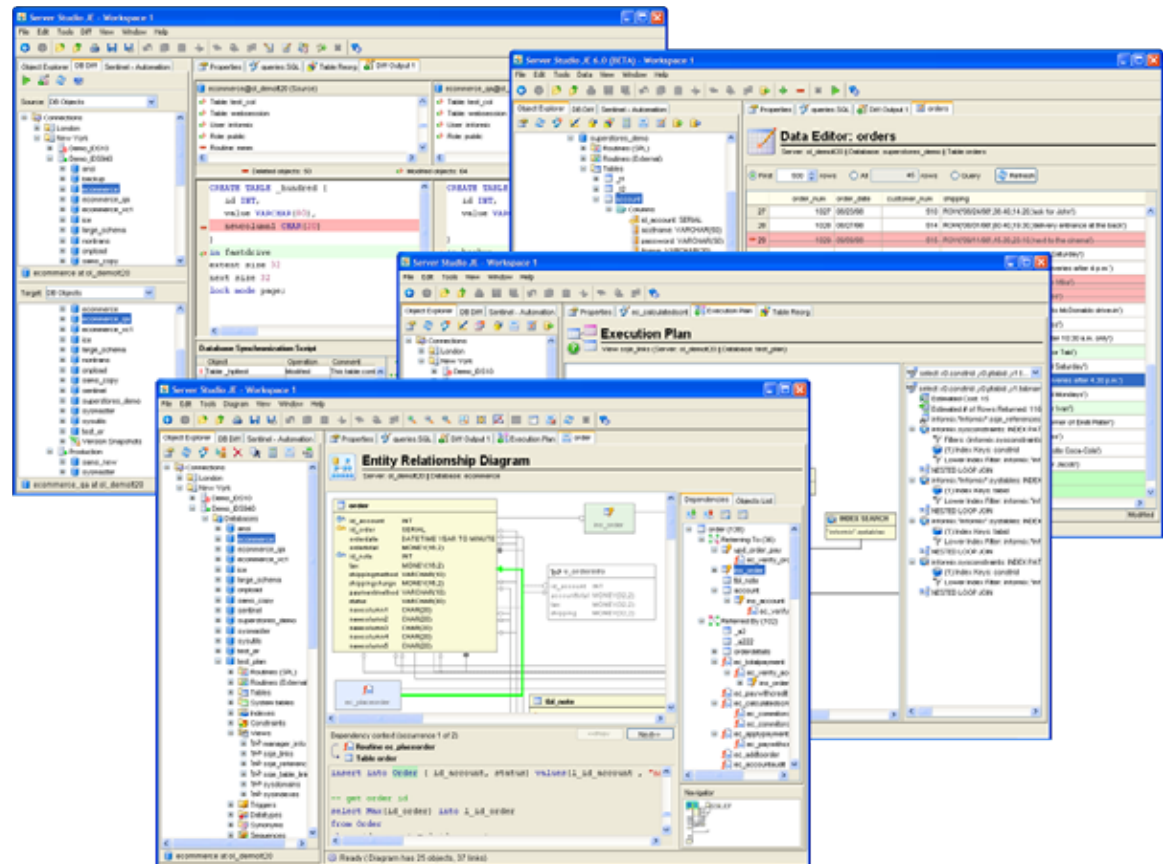
Server Studio™



Server Studio™

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

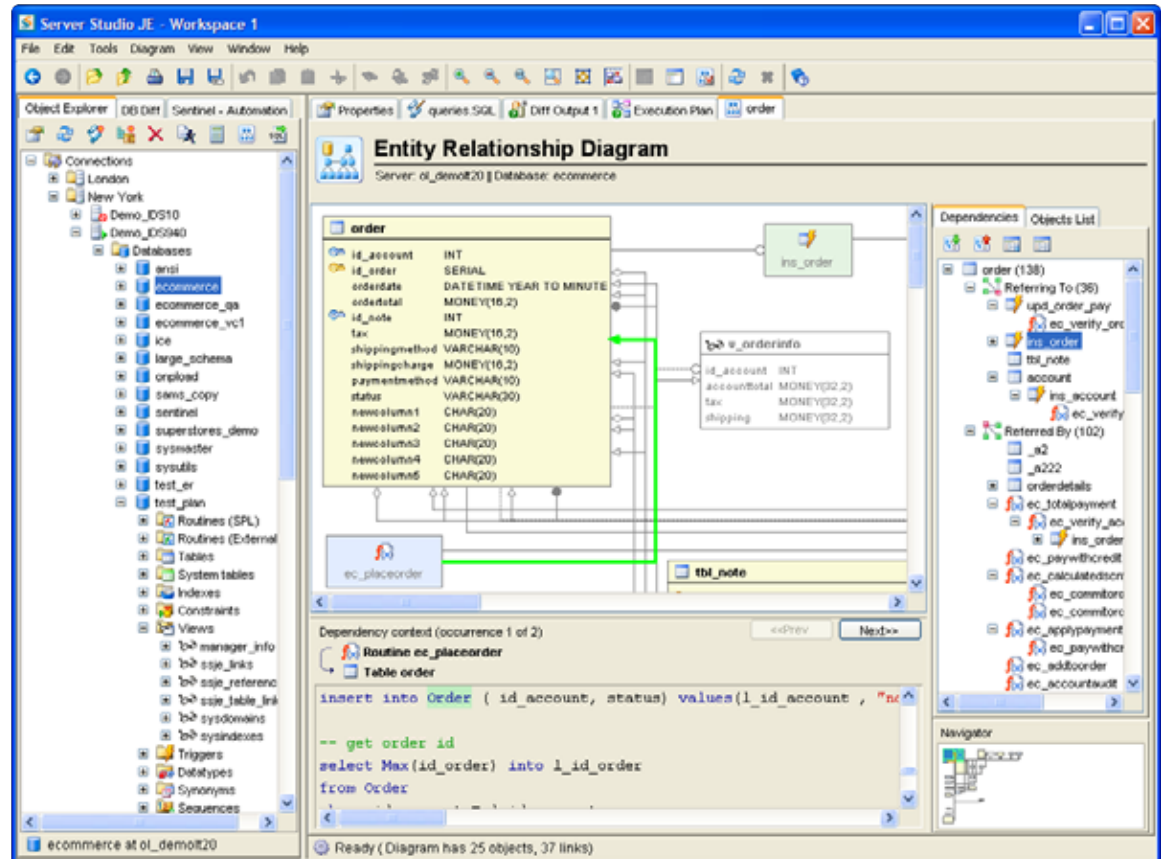
- Consolidate, and manage with ease your entire IBM Informix database servers' infrastructure at a central point of control.
- Improve efficiency of database development, debugging and testing.
- Preserve database investment through automating database configuration auditing and change management.
- 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

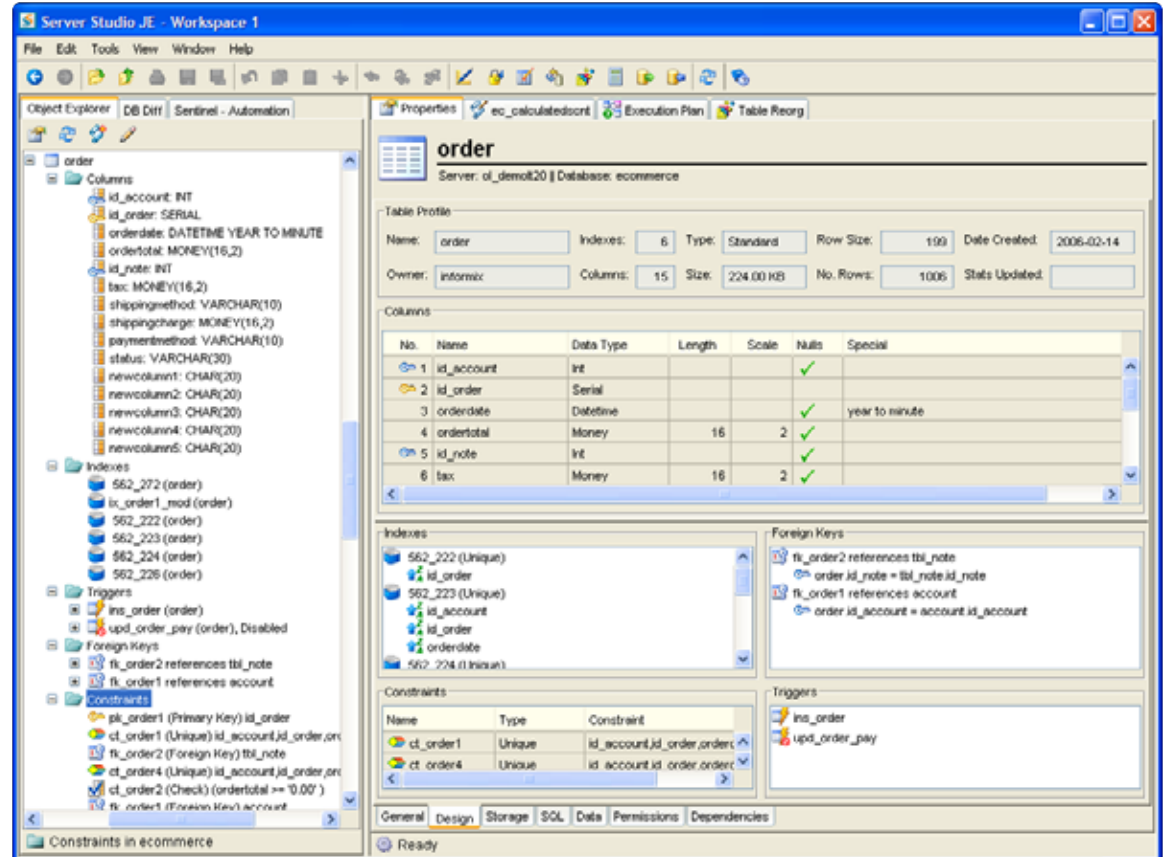
- Entity Relationship Diagrams enable immediate graphical analysis of complex relationships and dependencies between database objects, such as: Tables, Views, Indexes, Stored Procedures and Triggers.
- E/R Diagrams provide vital help in visualizing and documenting databases' logical design and constraints.
- 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.



Server Studio™

Database Development & Administration – SQL Manager

- A powerful, full-featured color-coded editor, customized specifically to support IBM Informix SPL and SQL languages.
- Fully multi-threaded, non-blocking execution of scripts.
- Multiple result sets in spreadsheet-style grids.
- Statistics for the executed SQL statements:
 - number of rows affected by the operation
 - execution and fetch times
- Fully supports LOAD and UNLOAD statements for data import and export.
- Integrated visual Execution Plan Analyzer help tune the performance of SQL queries.

The screenshot displays the Server Studio JE - Workspace 1 interface. The top menu bar includes File, Edit, Tools, SQL, View, Window, and Help. The left pane shows the Object Explorer with a tree view of the database structure, including Connections, Databases, Spaces, Chunks, Sessions, Virtual Processors, Memory Pools, and Reports. The main pane shows a SQL query editor with the following code:

```
select * from tbl_sysevent t1, tbl_logevent t2
where t1.id_sysevent = t2.id_sysevent
and t1.datetimeofevent > '2005-2-9 13:00:00.000'
order by t1.id_sysevent desc

-- All users visited the site from the given time
select distinct t1.id_user, firstname, lastname, cybercommetadata, organizationname
from users t1, tbl_sysevent t2, tbl_logevent t3
where t1.id_user=t3.id_user and t2.id_sysevent= t3.id_sysevent
and t2.datetimeofevent >= '2006-4-26 0:00:00.000'
and t2.id_typeevent in (30,40,31,33,43,41,37,47,22,46,29,39,45,35,48,58)

select distinct firstname, lastname, organizationname, cybercommetadata
from users t1, tbl_logevent t2 where t1.id_user=t2.id_user and t2.id_sysevent in (
select id_sysevent from tbl_usehistory where id_release=173)
```

The bottom pane shows the execution results in a grid format. The grid has columns: tablename, owner, partnum, tabid, rowsize, ncols, nindexes, nrows, created, and version. The data is as follows:

tablename	owner	partnum	tabid	rowsize	ncols	nindexes	nrows	created	version
sysables	informix	2097276	1	469	20	2	116	11/03/01	65545
syscolumns	informix	2097311	2	151	8	2	840	11/03/01	65545
sysindexes	informix	2097319	3	3271	13	2	255	11/03/01	65545
sysabauth	informix	2097327	4	77	4	2	118	11/03/01	65545
syscolauth	informix	2097332	5	73	5	2	23	11/03/01	65545
sysviews	informix	2097333	6	70	3	1	55	11/03/01	65545
sysusers	informix	2097341	7	51	4	1	3	11/03/01	65545
sysdepend	informix	2097348	8	10	4	2	20	11/03/01	65545
sysdynom...	informix	2097354	9	169	4	2	0	11/03/01	65545

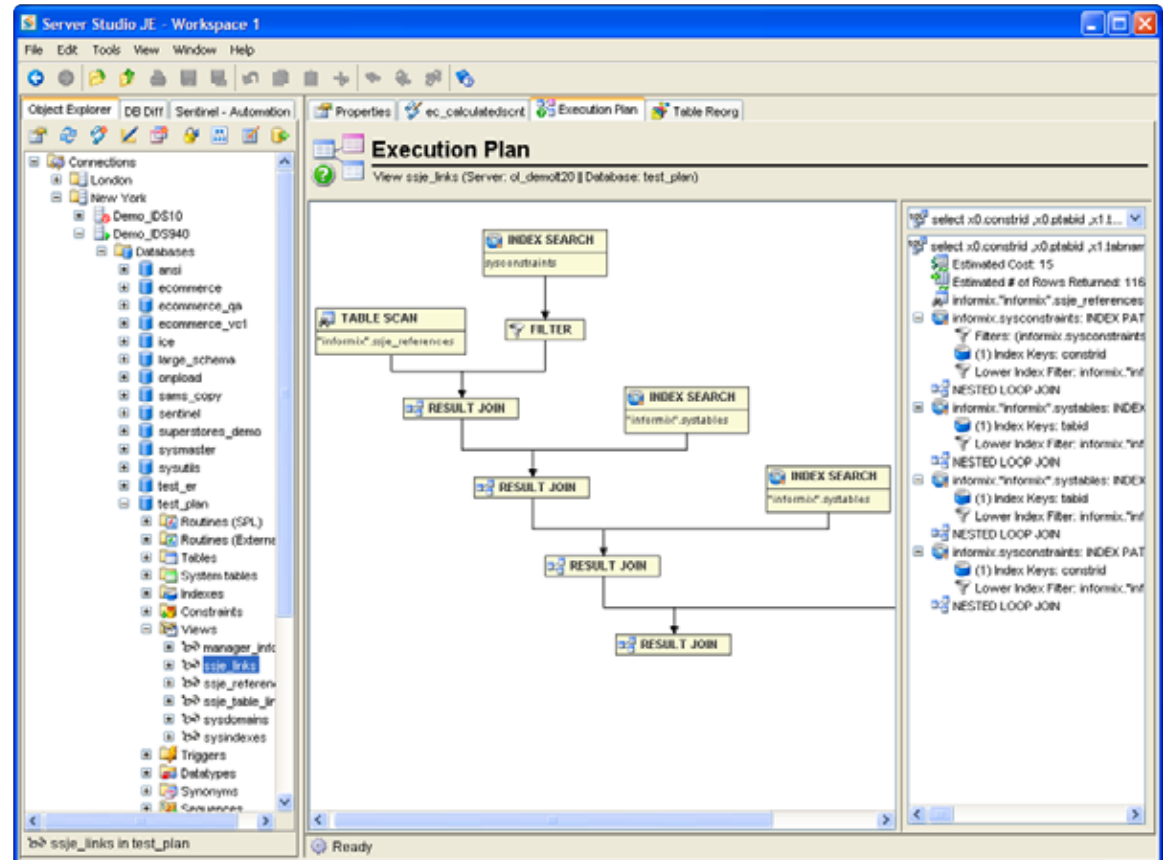
The bottom status bar shows the execution time: 0.831 sec, Fetch Time: 0.24 sec, Total Time: 1.071 sec. The bottom right corner shows the status: Ready.



Server Studio™

Database Development & Administration – Execution Plan Analyzer

- Redesigned 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.

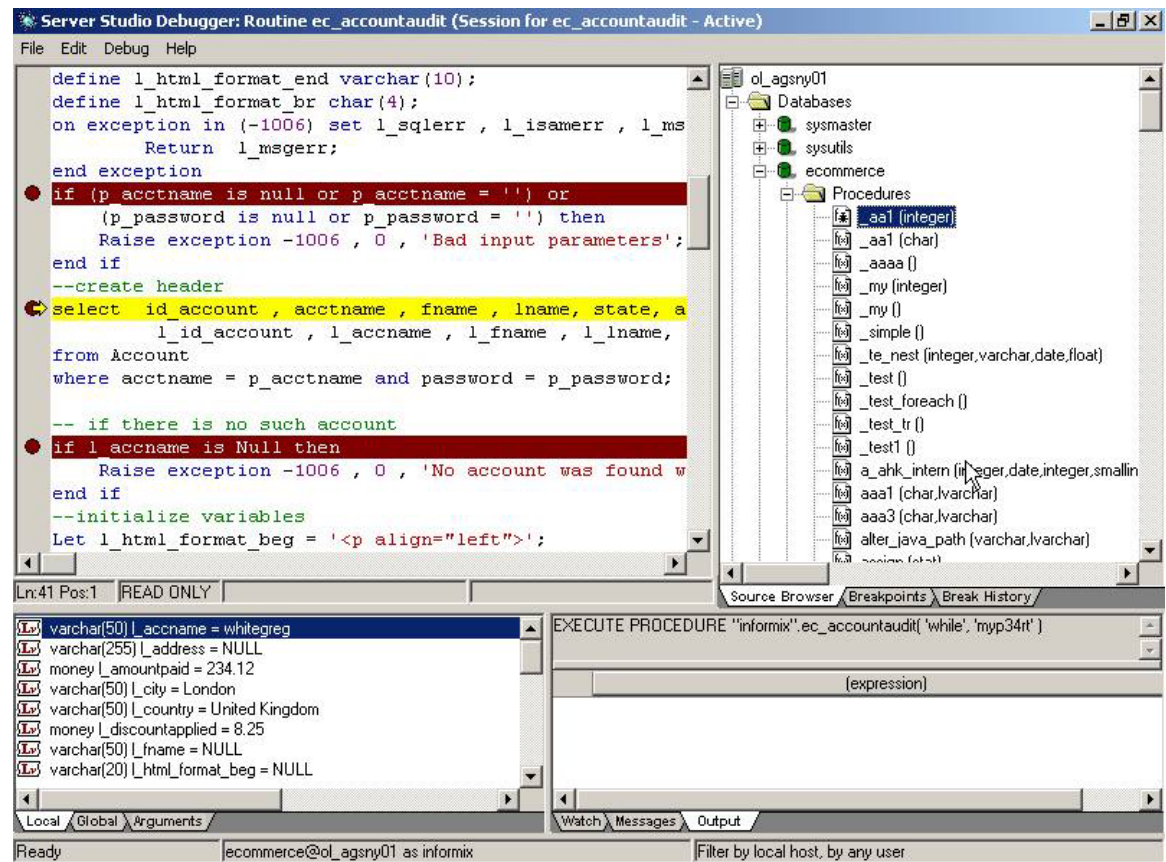


Server Studio™

Database Development & Administration – SPL Debugger

The only interactive debugger for IBM Informix® database servers' stored procedures and triggers available anywhere. SPL Debugger enables you to:

- Execute stored procedures and triggers line-by-line.
- Step into nested procedures or fired triggers.
- Set execution breakpoints.
- Watch and to modify values of procedures' variables and calling arguments.
- Break infinite loops.
- “Hook” into a stored procedure or trigger already executing on the server.



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's operational modes management
 - Examination of server's 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 JE - Workspace 1 interface. On the left, the Object Explorer shows a tree structure with 'Connections' expanded, showing 'London' and 'New York'. Under 'New York', 'Demo_IDS940' is selected. The main pane shows the 'Properties' tab for 'Demo_IDS940', which is an 'Informix Server'. Below the title bar, there are tabs for 'Properties', 'queries.SQL', 'EIR Diagram', and 'Table Reorg'. The main content area displays a table of ONCONFIG parameters. The table has four columns: 'Name', 'Boottime Value', 'Currently Used Value', and 'Default'. The parameters listed include AFPCrash, AFFail, AFF_NPROCS, AFF_SPROC, AFLINES, APWARN, BAR_ACT_LOG, BAR_BSALIB_PATH, BAR_DEBUG, BAR_DEBUG_LOG, BAR_HISTORY, BAR_MAX_BACKUP, BAR_NB_XPORT_COUNT, BAR_PROGRESS_FREQ, BAR_RETRY, BAR_XFER_BUF_SIZE, BLOCKTIMEOUT, BTSCANNER, BUFFERS, CDR_DSPACE, CDR_DSLOCWAIT, CDR_EVALTHREADS, CDR_MAX_DYNAMIC_LOGS, CDR_NFCOMPRESS, CDR_ODATA_SPACE, CDR_QHDR_DSPACE, and CDR_QUEUEMEM. The 'ONCONFIG' tab is selected at the bottom.

Name	Boottime Value	Currently Used Value	Default
AFPCrash		1537	1537
AFFail		1025	1025
AFF_NPROCS	0	0	0
AFF_SPROC	0	0	0
AFLINES		0	0
APWARN		1025	1025
BAR_ACT_LOG	t:\informix\bar_of_demo20.log	t:\informix\bar_of_demo20.log	tmp\bar_act.log
BAR_BSALIB_PATH	t:\SMQ.20\bin\libsa.dll	t:\SMQ.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_DSPACE			
CDR_DSLOCWAIT	5	5	5
CDR_EVALTHREADS	1,2	1,2	1,2
CDR_MAX_DYNAMIC_LOGS		0	0
CDR_NFCOMPRESS	0	0	0
CDR_ODATA_SPACE			
CDR_QHDR_DSPACE			
CDR_QUEUEMEM	4096	4096	4096



Server Studio™

Database Development & Administration – Sessions Manager

- Sessions Manager facilities of the Server Administrator provide ability to analyze database sessions' 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.

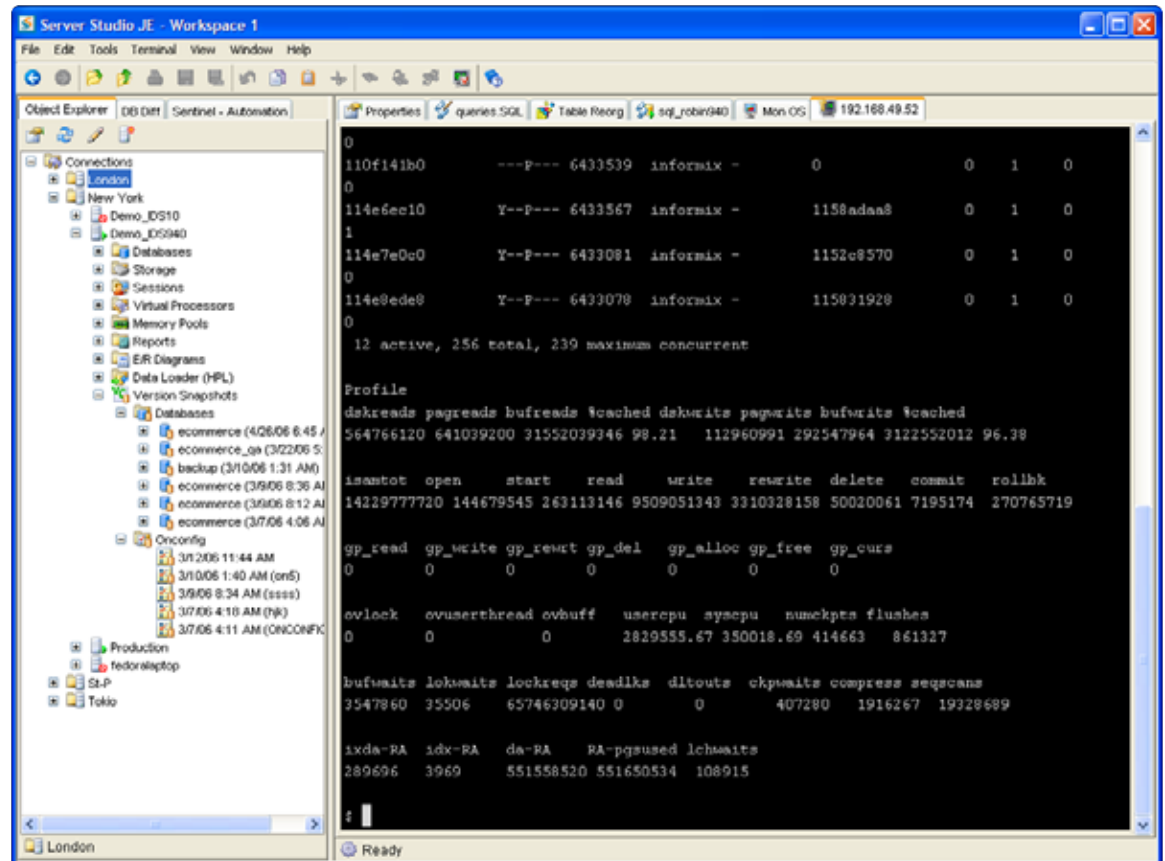
Sess Id	User	Pid	Host Name	Database	Duration	Locks	# Buf Reads	# Reads	# Lock Requests	# Lock Waits
14	informix	-1	DEMOLT20	test_plan	01:26:32	2	256485	10916	89531	0
34	informix	-1	DEMOLT20	ecommerce	00:02:17	1	506	0	1079	0
35	informix	-1	DEMOLT20	ecommerce	00:02:18	1	503	0	1082	0
36	informix	-1	DEMOLT20	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	16666	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	71262	0
51	informix	-1	DEMOLT20	ecommerce	00:00:53	1	20408	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
31	informix	-1	DEMOLT20	ecommerce	00:01:11	1	28911	0	106000	0



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



```
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 - 1152e8570 0 1 0
0
114e8ede8 Y--P--- 6433078 informix - 115831928 0 1 0
0
12 active, 256 total, 239 maximum concurrent

Profile
dskreeds pagreads bufreads %cached dskwrites pagwrites bufwrites %cached
564766120 641039200 31552039346 98.21 112960991 292547964 3122552012 96.38

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

gp_read gp_write gp_rewrite gp_del gp_alloc gp_free gp_curs
0 0 0 0 0 0 0

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

bufwrits lckwrits lockreqs deadlks dltouts ckpwrits compress seqscans
3547860 35506 65746309140 0 0 407280 1916267 19328689

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

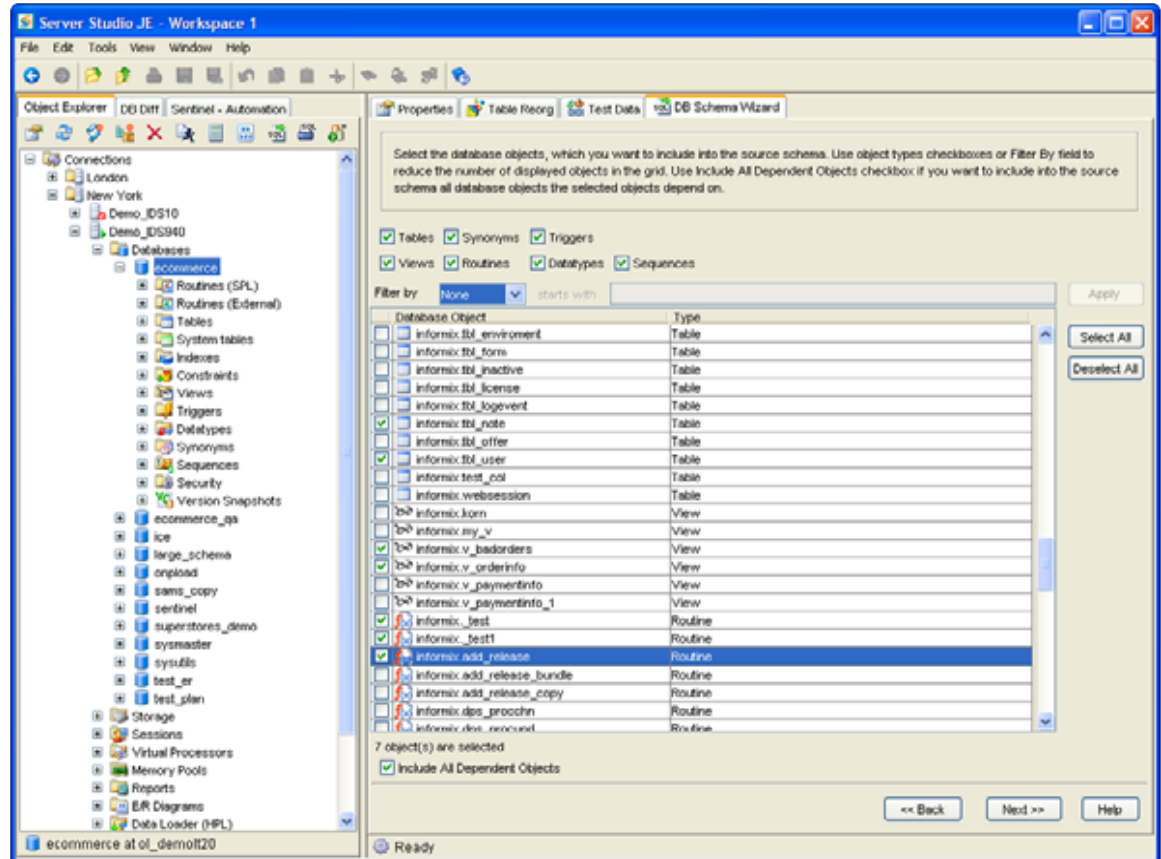
#
```



Server Studio™

Configuration & Change Management – Schema Manager

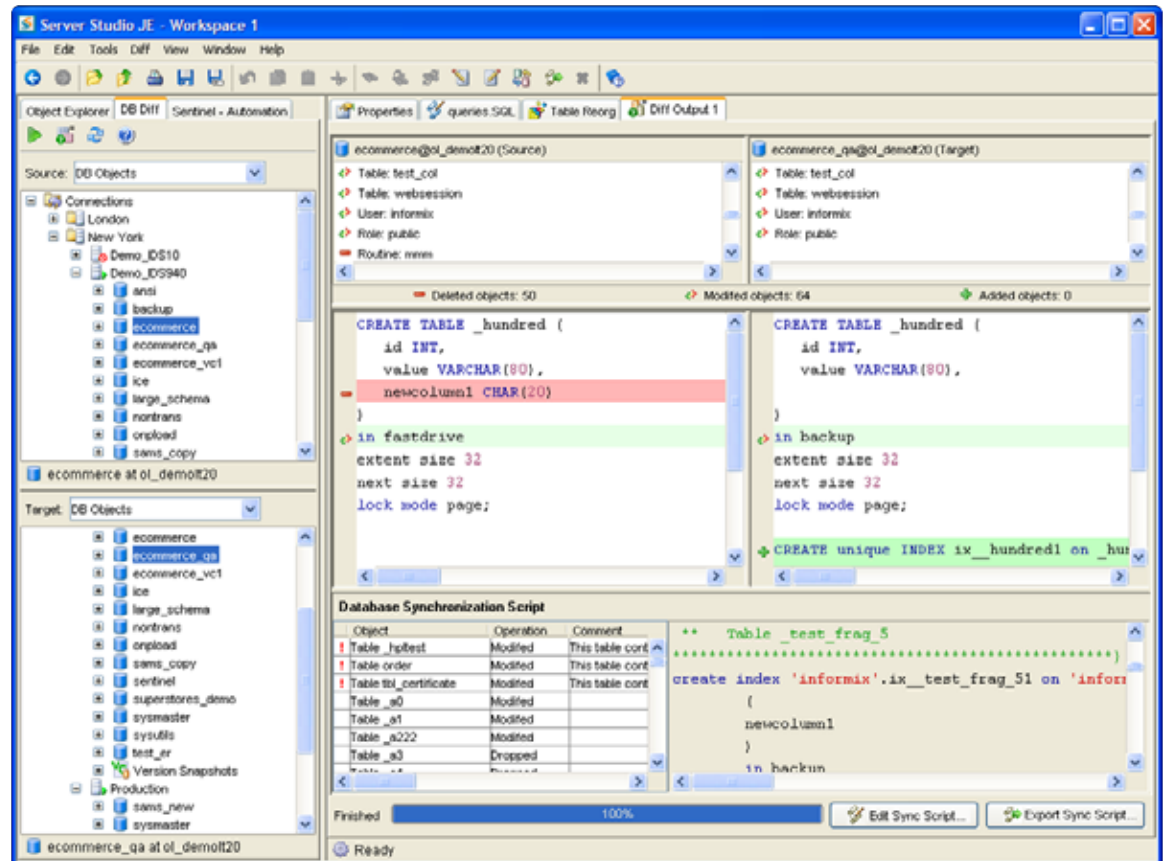
- Manage DDL scripts for either entire database schemas, or user-defined sub-schemas that may be comprised of either particular types or groups of database objects.
- Full support for managing all dependent database objects to maintain the integrity of the user-defined sub-schemas is built-in.
- Directly 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 Version Control Snapshots repository.



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.

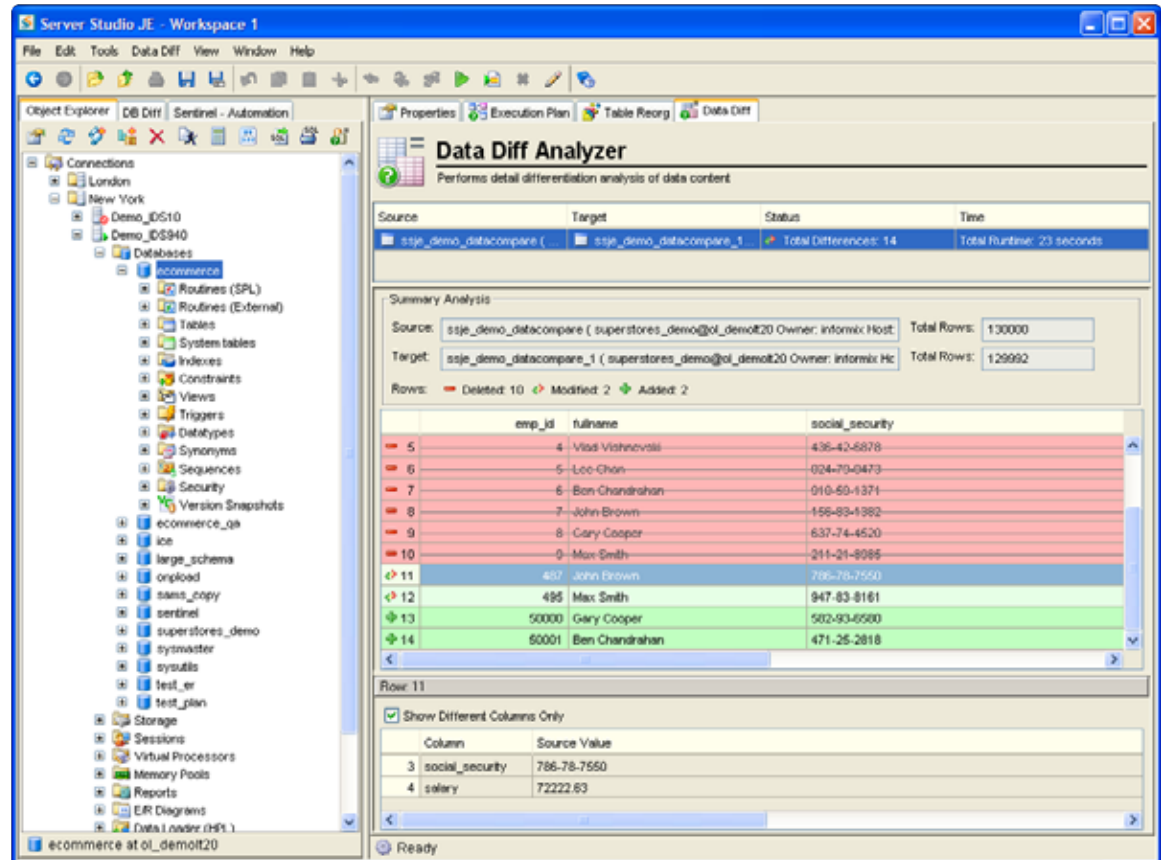
The screenshot displays the Server Studio JE 6.0 (BETA) - Workspace 1 interface. On the left, the Object Explorer shows a tree view of the 'superstores_demo' database, including tables, columns, indexes, triggers, foreign keys, constraints, and version snapshots. The 'orders' table is selected. The main window shows the 'Data Editor: orders' with a grid of data. The grid has columns: order_num, order_date, customer_num, and shipping. The data is displayed in a spreadsheet-like format with row numbers and various icons for editing. The status bar at the bottom indicates 'Ready' and 'Retrieved 45 rows'.

order_num	order_date	customer_num	shipping
27	1027	08/23/98	510 ROM("08/24/98",38.40,14.20,"ask for John")
28	1028	08/27/98	514 ROM("08/31/98",60.40,19.30,"delivery entrance at the back")
29	1029	08/09/98	515 ROM("09/11/98",45.30,23.10,"next to the cinema")
30	1030	09/12/98	515 ROM("09/17/98",78.40,9.00,"closed Saturday")
31	1031	09/15/98	516 ROM("09/17/98",84.30,11.10,"no deliveries after 4 p.m.")
32	1032	09/19/98	517 ROM("09/23/98",65.60,52.20,"ask for Mike")
33	1033	10/03/98	518 ROM("10/06/98",43.20,13.10,"express")
34	1034	10/05/98	519 ROM("10/08/98",110.00,17.00,"next to McDonalds drive-in")
35	1035	10/07/98	520 ROM("10/12/98",92.30,21.00,"express")
36	1036	10/11/98	521 ROM("10/13/98",54.70,16.00,"call after 10:30 a.m. only")
37	1037	10/16/98	600 ROM("10/19/98",112.30,26.30,"ask for Tami")
38	1038	10/21/98	525 ROM("10/23/98",33.50,22.00,"closed Saturday")
39	1039	10/23/98	526 ROM("10/27/98",42.30,11.00,"no deliveries after 4:30 p.m.")
40	1040	10/29/98	527 ROM("10/31/98",35.60,17.00,"closed Mondays")
41	1041	11/05/98	615 ROM("11/09/98",27.50,12.00,"ask for Ivan")
42	1042	11/12/98	529 ROM("11/14/98",66.70,24.00,"M&V corner of Enfil Plater")
43	1043	11/19/98	530 ROM("11/24/98",20.30,13.10,"express")
44	1044	11/25/98	532 ROM("11/29/98",113.00,35.10,"opposite Coca-Cola")
45	1045	12/04/98	533 ROM("12/08/98",52.50,19.20,"ask for Jacob")
46	10000	12/2/2006	1000 null
47	10001	12/4/2006	1002 null



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.



Server Studio JE - Workspace 1

File Edit Tools Data Diff View Window Help

Object Explorer DB Diff Sentinel - Automation

Connections
London
New York
Demo_DS10
Demo_DS140
Databases
ecommerce
Routines (SQL)
Routines (External)
Tables
System tables
Indexes
Constraints
Views
Triggers
Datatypes
Synonyms
Sequences
Security
Version Snapshots
ecommerce_ql
ice
large_schema
onload
sales_copy
sentinel
superstores_demo
systemmaster
sysutils
test_er
test_plan
Storage
Sessions
Virtual Processors
Memory Pools
Reports
ER Diagrams
Data Loader (HPL)

Properties Execution Plan Table Reorg Data Diff

Data Diff Analyzer

Performs detail differentiation analysis of data content

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

Summary Analysis

Source: ssje_demo_datacompare (superstores_demo@ol_demo120 Owner: Informix Host: Total Rows: 130000

Target: ssje_demo_datacompare_1 (superstores_demo@ol_demo120 Owner: Informix Host: Total Rows: 129992

Rows: Deleted: 10 Modified: 2 Added: 2

emp_id	fullname	social_security
5	4 Vlad Voinovskii	436-42-6878
6	5 Lee Chan	024-70-0473
7	6 Ben Chandirahan	010-60-1371
8	7 John Brown	156-83-1382
9	8 Gary Cooper	637-74-4520
10	9 Max Smith	211-21-8085
11	497 John Brown	786-78-7550
12	495 Max Smith	947-83-8161
13	50000 Gary Cooper	502-93-0580
14	50001 Ben Chandirahan	471-26-2818

Row 11

☒ Show Different Columns Only

Column	Source Value
3 social_security	786-78-7550
4 salary	72222.83

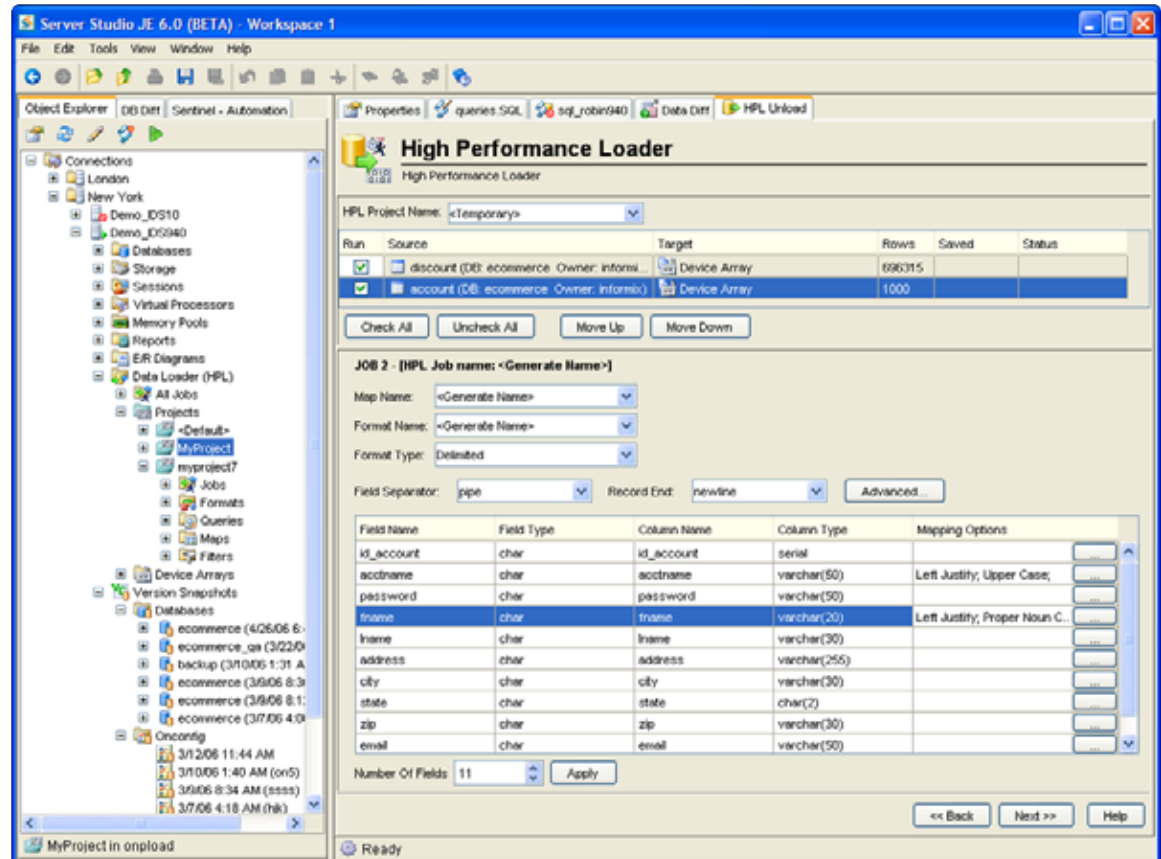
Ready



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



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

The screenshot displays the 'order' table properties in Server Studio JE. The left pane shows the Object Explorer with the 'order' table selected, listing columns (id_account, id_order, orderdate, ordertotal, id_note, tax, shippingmethod, shippingcharge, paymentmethod, status, newcolumn1, newcolumn2, newcolumn3, newcolumn4, newcolumn5) and indexes (562_202, 562_222, 562_223, 562_224, 562_225). The right pane shows the 'order' table profile and storage information.

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	First	Next	Total	Used	Size	%
ol_demo20				52 pg - 208.00 KB	56 pg - 224.00 KB	100.00
Extents:	32 KB	64 KB	4	4 pg - 16.00 KB		7.14

Storage Distribution by Space

DBSpace	Extents	Allocated	Used	Data Size	DB Space Free
ol_demo20	4	56 pg - 224 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_demo20	2
2	16 pg - 64.00 KB	ol_demo20	2
3	16 pg - 64.00 KB	ol_demo20	2
0	8 pg - 32.00 KB	ol_demo20	5

Storage Distribution by Device

Chunk ID	Size	Extents	Device Name
2	48 pg - 192.00 KB	3	F:\MMDATA\ol_demo...
5	8 pg - 32.00 KB	1	F:\MMDATA\ol_demo...

General | Design | **Storage** | SQL | Data | Permissions | Dependencies

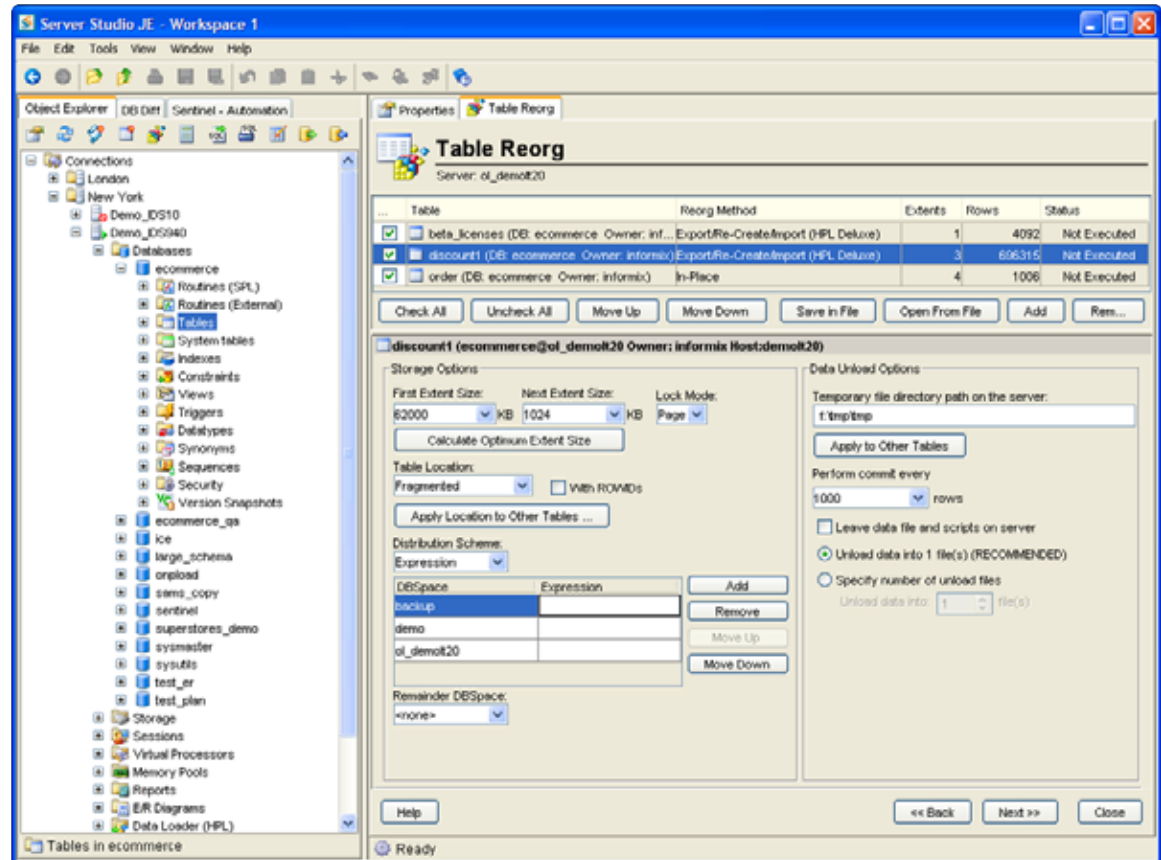
Ready



Server Studio™

Storage Space Management – Table Reorg

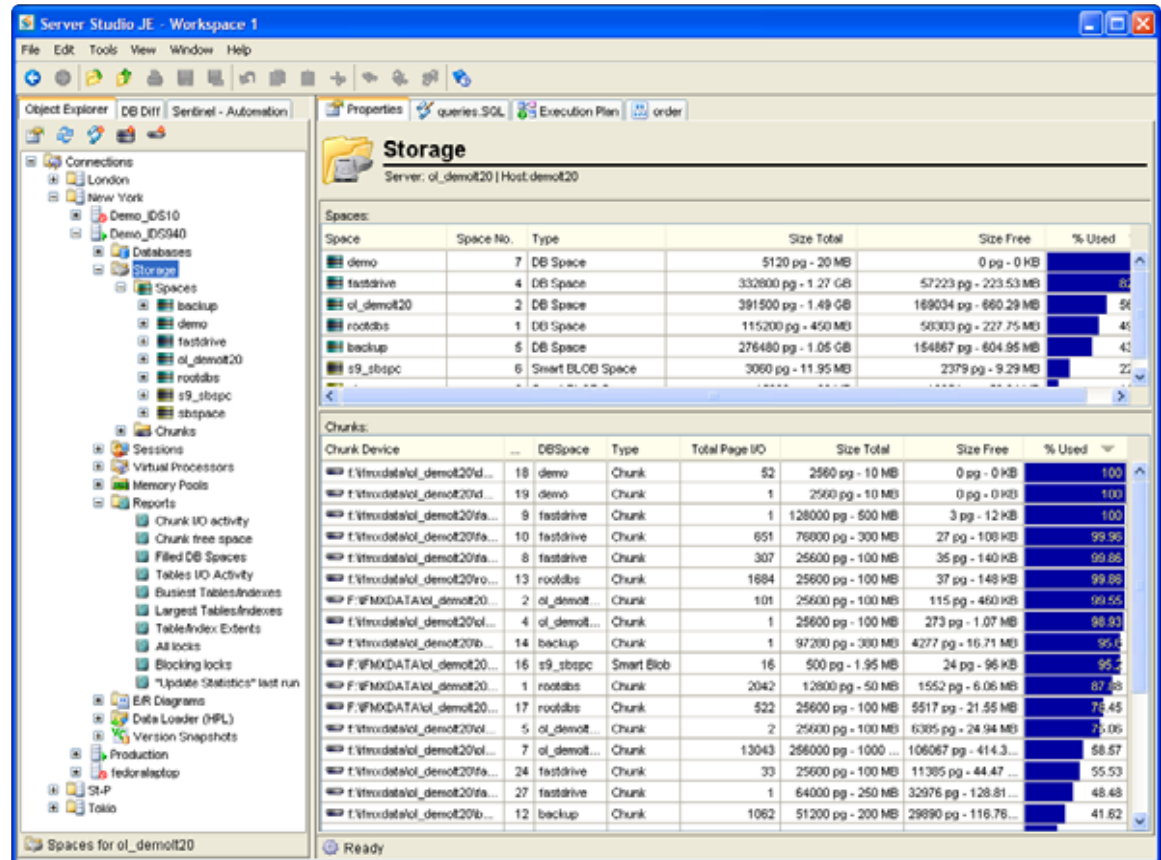
- Improve utilization efficiency of scarce data storage resources and optimize database performance by:
 - reorganizing tables' structure and data allocation to reduce the number of table extents and reclaiming wasted space
 - moving data to a different DB Spaces or fragmenting it across multiple DB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



Server Studio™

Storage Space Management

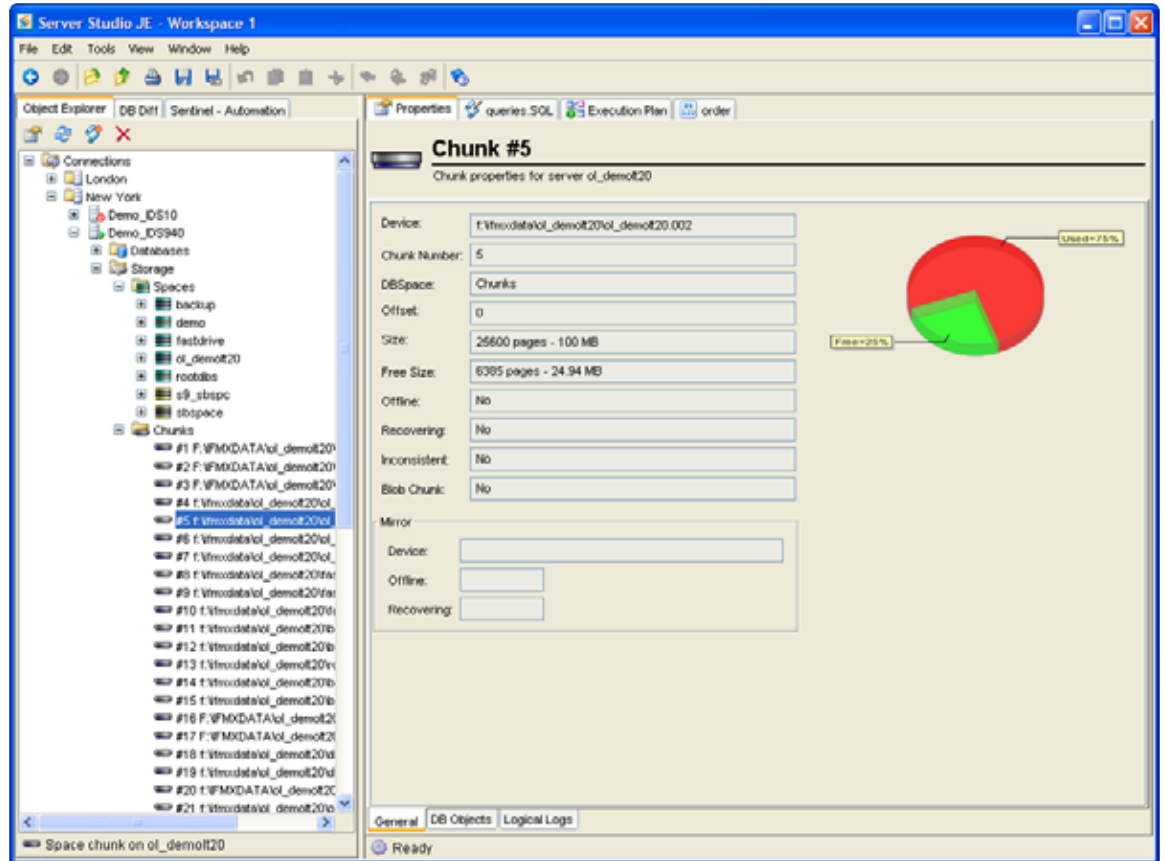
- Identify easily which storage spaces are getting filled and may require additional chunks. Examine in detail:
 - DbSpaces
 - BLOBSpaces
 - Chunks
 - Percentage of used and free space.
 - List of database objects residing in a given Dbspace and chunk.
 - Other vital storage spaces related information.



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.



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.

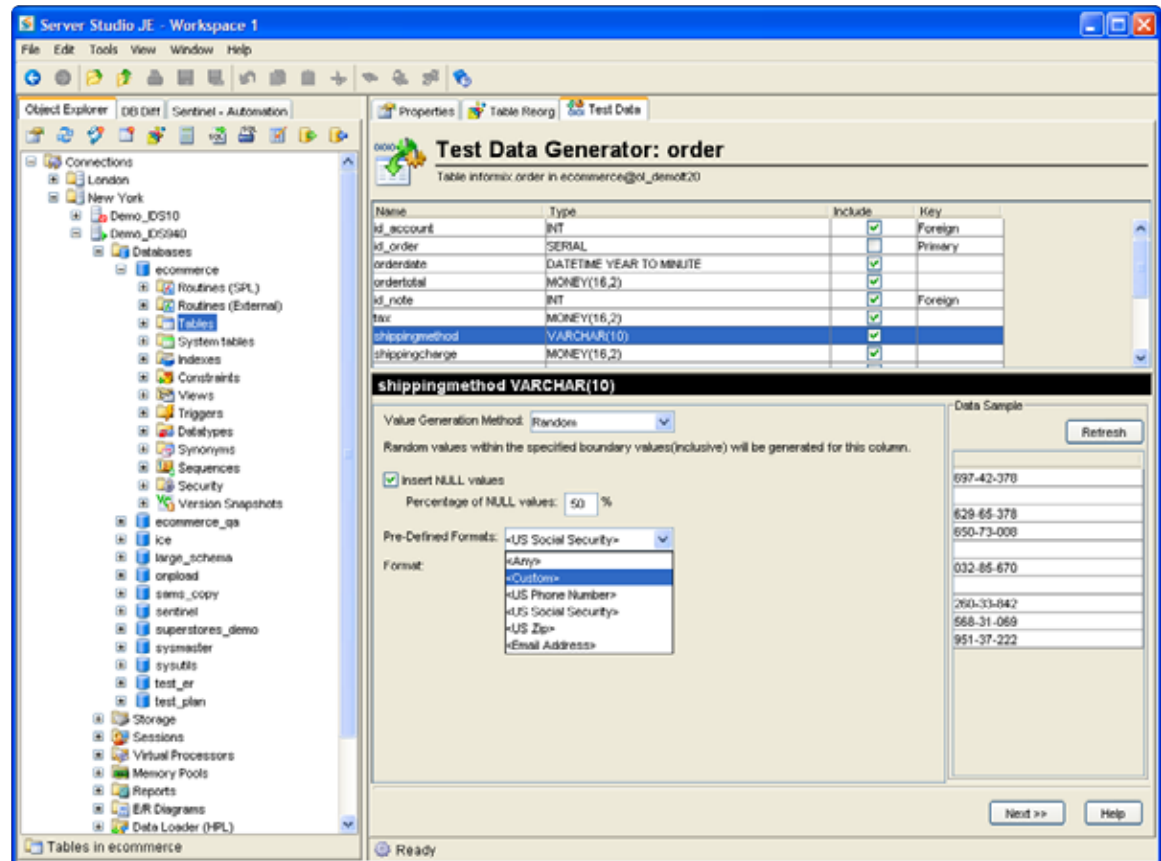
Transparent integration with Sentinel enables real-time monitoring and gathering of the server's operational performance parameters matrix under real-life load scenarios needed to identify and correct point-of-system failures.



Server Studio™

Pre-Deployment Testing – Test Data Generator

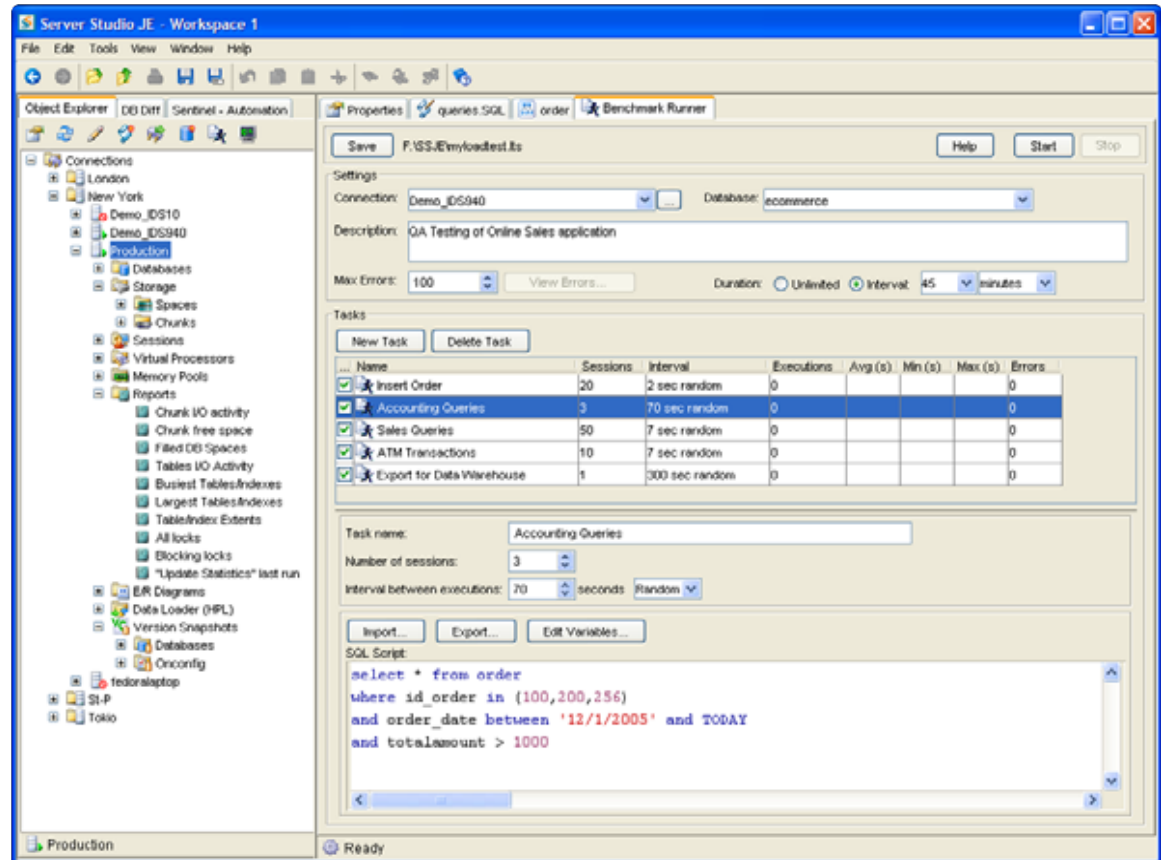
- Populate test databases with millions of rows of meaningful, syntactically correct test data, unique indexes and other dependencies, while fully maintaining referential integrity constraints.
- Supports a broad range of data value generation options:
 - text file-based
 - text data patterns
 - values 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.



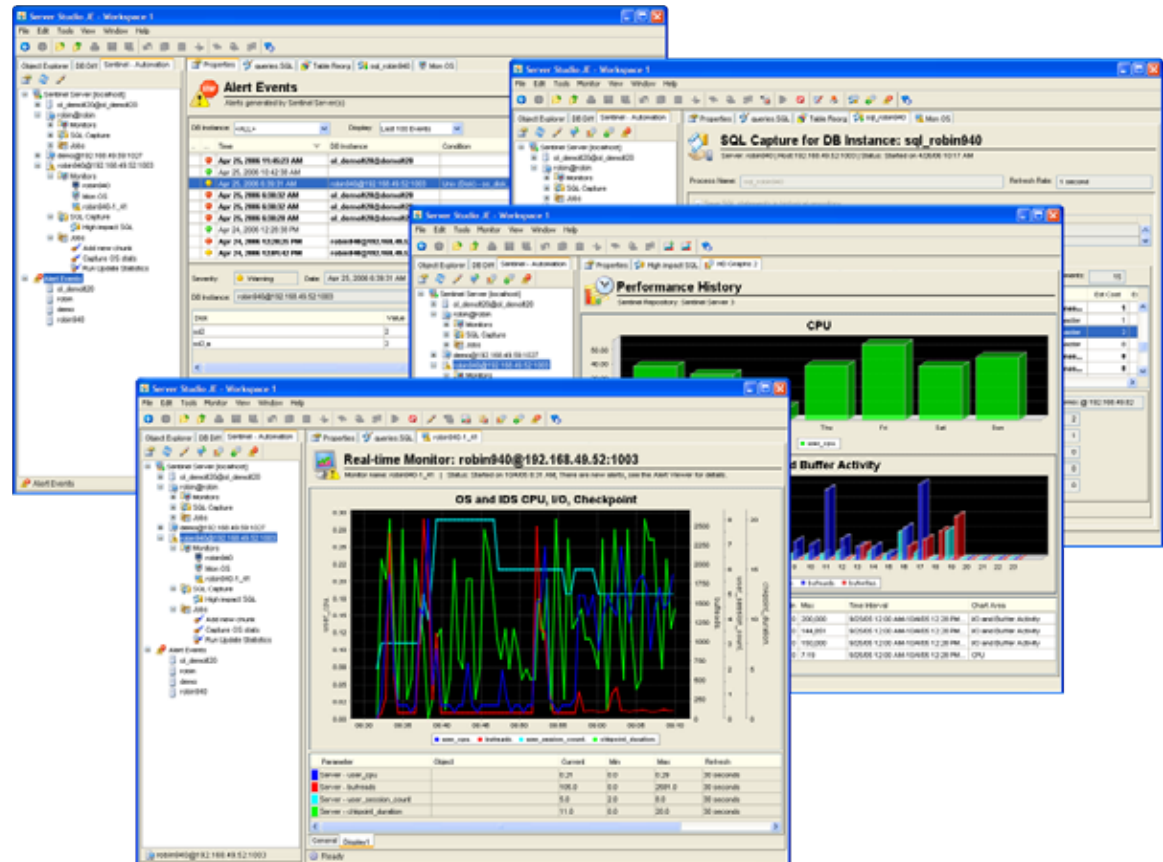
Sentinel™ - Performance Edition



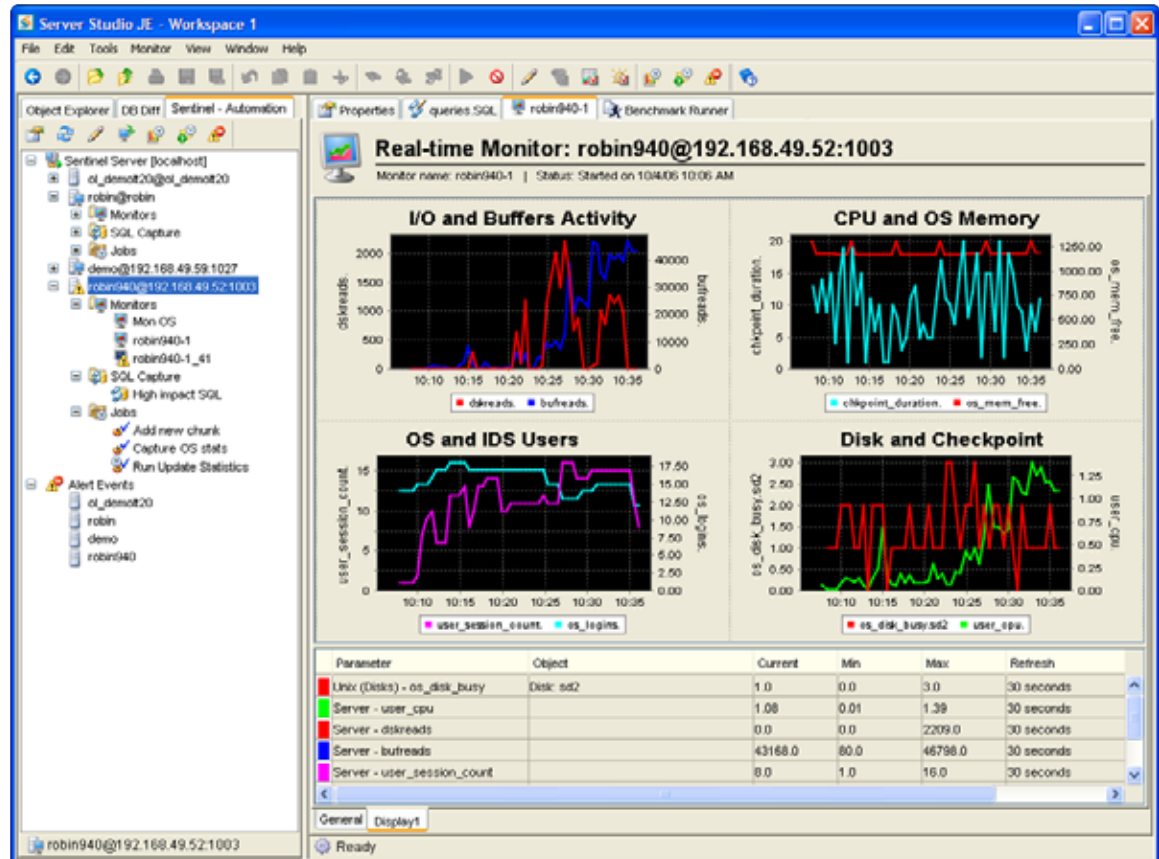
Sentinel™

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's performance in an integrated SQL-compliant repository.
- Retrieve dynamically SQL statements running on the server with robust SQL Capture facilities.
- 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 automatic responses to critical server events.
- Conduct performance stress testing under real-life server loads.



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



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.
- Autonomic response to system events by:
 - User-defined administration scripts
 - OS commands
 - SQL scripts
 - Stored procedures
 - IDS native utilities

The screenshot displays the Sentinel Server GUI, titled "Server Studio JE - Workspace 1". The interface includes a menu bar (File, Edit, Tools, View, Window, Help) and a toolbar. On the left, the "Object Explorer" shows a tree structure of the Sentinel Server configuration, including "Alert Events" and "Monitors". The main window is titled "Alert Events" and displays a table of alerts generated by the Sentinel Server(s). The table has columns for Time, DB Instance, Condition, and Source. Below the table, there are fields for Severity (Warning), Date (Apr 25, 2006 6:39:31 AM), Source (Mon OS), and Sentinel (Sentinel Server). A detailed view of a specific alert is shown, including the DB Instance (robin940@192.168.49.52:1003), Condition (Unix (Disk) - os_disk_busy > 0), and a table of disk usage statistics.

Time	DB Instance	Condition	Source
Apr 25, 2006 11:45:23 AM	ol_demo020@demo020		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_demo020@demo020		mon2
Apr 25, 2006 6:38:32 AM	ol_demo020@demo020		active_trans
Apr 25, 2006 6:38:28 AM	ol_demo020@demo020		System
Apr 24, 2006 12:28:30 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
sd2a	2

Job Status: Job: Details...

User Defined Message:



Sentinel™

SQL Capture

- Capture SQL statements for:
 - selected user sessions
 - specified user
 - statements originating from a specified host
- Review captured SQL in real-time
- Store captured SQL in the built-in data repository for future analysis.
- Use captured SQL for performing query analysis and optimization.

SQL Capture for DB Instance: sql_robin940
 Server: robin940 | Host: 192.168.49.52:1003 | Status: Started on 4/26/06 10:17 AM

Process Name: sql_robin940 | Refresh Rate: 1 second

☒ Save SQL statements in historical repository

Filter by Session Stats
 Estimated Cost >= 0
 Estimated Rows >= 0

Filter by User nor Session ID

All Statements | Statistics

Filter By Session: <none> | Total SQL Statements: 30 | Unique SQL Statements: 15

Time	Session	SQL	DB	Est Cost	Rows
4/26/06 10:18:09 AM	#6433078: informix @ 192.16...	set lock mode to wait 5	sysmas...	1	
4/26/06 10:18:09 AM	#6433081: informix @ 192.168...	set lock mode to wait 5	sysmaster	1	
4/26/06 10:18:09 AM	#6433078: informix @ 192.168...	select round((select sum(used) from syslogs ...	sysmaster	2	
4/26/06 10:18:09 AM	#6433078: informix @ 192.168...	select round((sum(po_usedent)/1042.0) memory...	sysmaster	8	
4/26/06 10:18:09 AM	#6433078: informix @ 192.16...	select name, value from sysmaster/infor...	sysmas...	8	
4/26/06 10:18:09 AM	#6433081: informix @ 192.16...	select t2.cbl_sessionid session_id, cbl_st...	sysmas...	8	

select round((select sum(used) from syslogs where number <=(select number from syslogs where is_current = 1)/sum(size)),2)*100 perc_lgol_log_used from syslogs

Session: #6433078: informix @ 192.168.49.52
 Estimated Cost: 2
 Estimated Rows: 1
 Sequential Scans: 0
 Auto Index: 0
 Number of Temp Files: 0

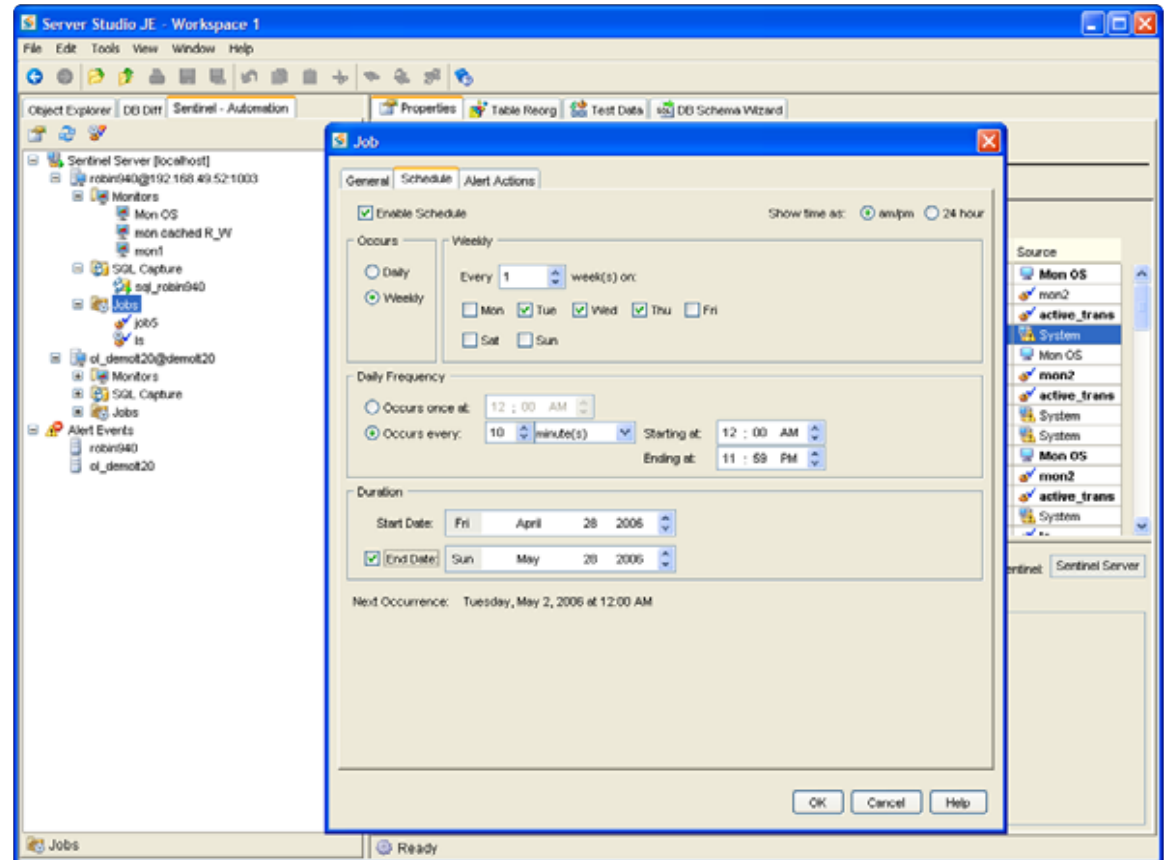
Details | Execution Plan



Sentinel™

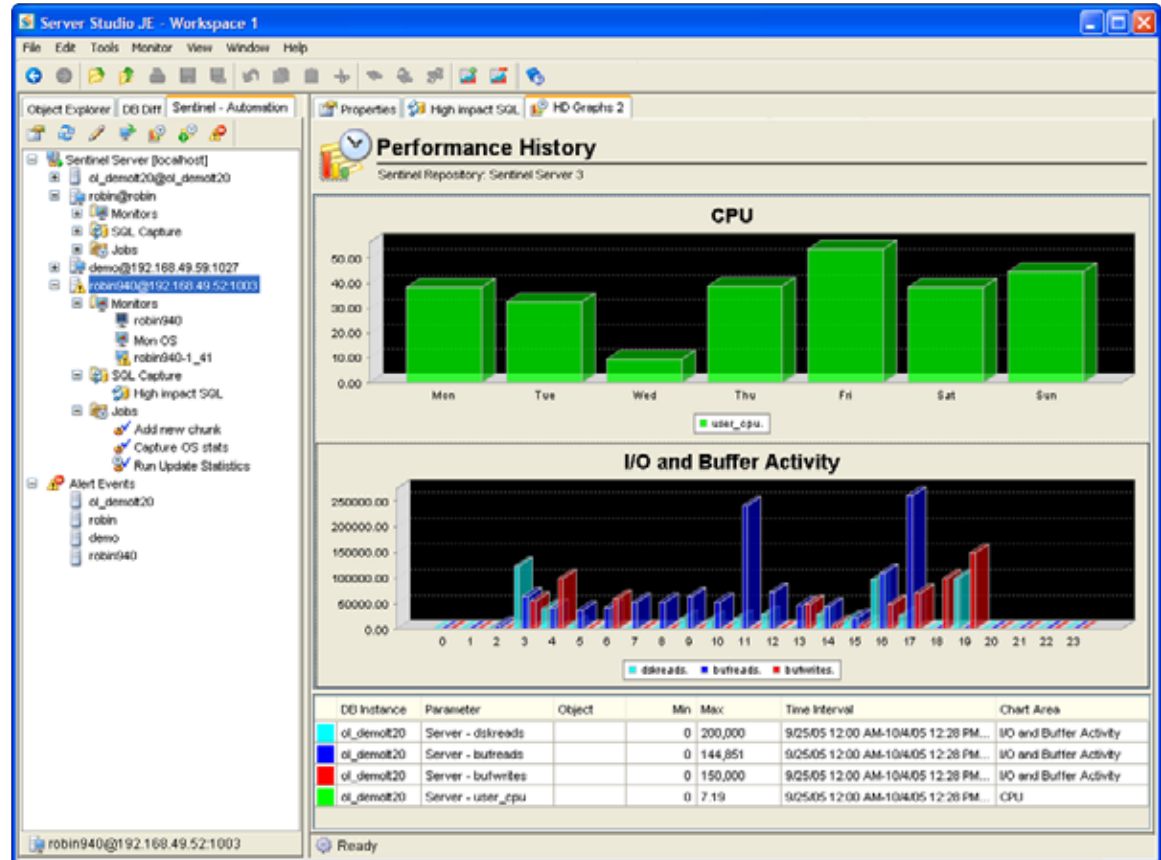
Task Automation

- 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 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.



Performance Data Time-Series Analysis

- For all IDS 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 IDS 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™ - Compliance Edition

(coming soon)



Sentinel™ - *Compliance Edition*



- Sentinel – Compliance Edition, a powerful solution for simplifying and automating change management and compliance auditing across multiple IDS servers from a central point of control.
- Sentinel's Version Control Subsystem streamlines database change management procedures by capturing periodic database schema snapshots, detecting changes from a baseline, and enabling easy roll-back, roll-out and recovery of lost or damaged database objects.
- Sentinel's Audit Subsystem offers comprehensive, low-impact auditing and reporting with flexible rules-based alerting to help ensure that compliance is continuously enforced.





- Manage and track schema changes
- Roll out databases from development to production
- Implement changes across multiple production systems
- Compare & synchronize schemas – enterprise wide
- Roll-back schema changes
- Recover lost or damaged database objects
- Track database changes for compliance reporting
- Leverage powerful functionality of Server Studio™
DB Difference Analyzer and Schema Manager

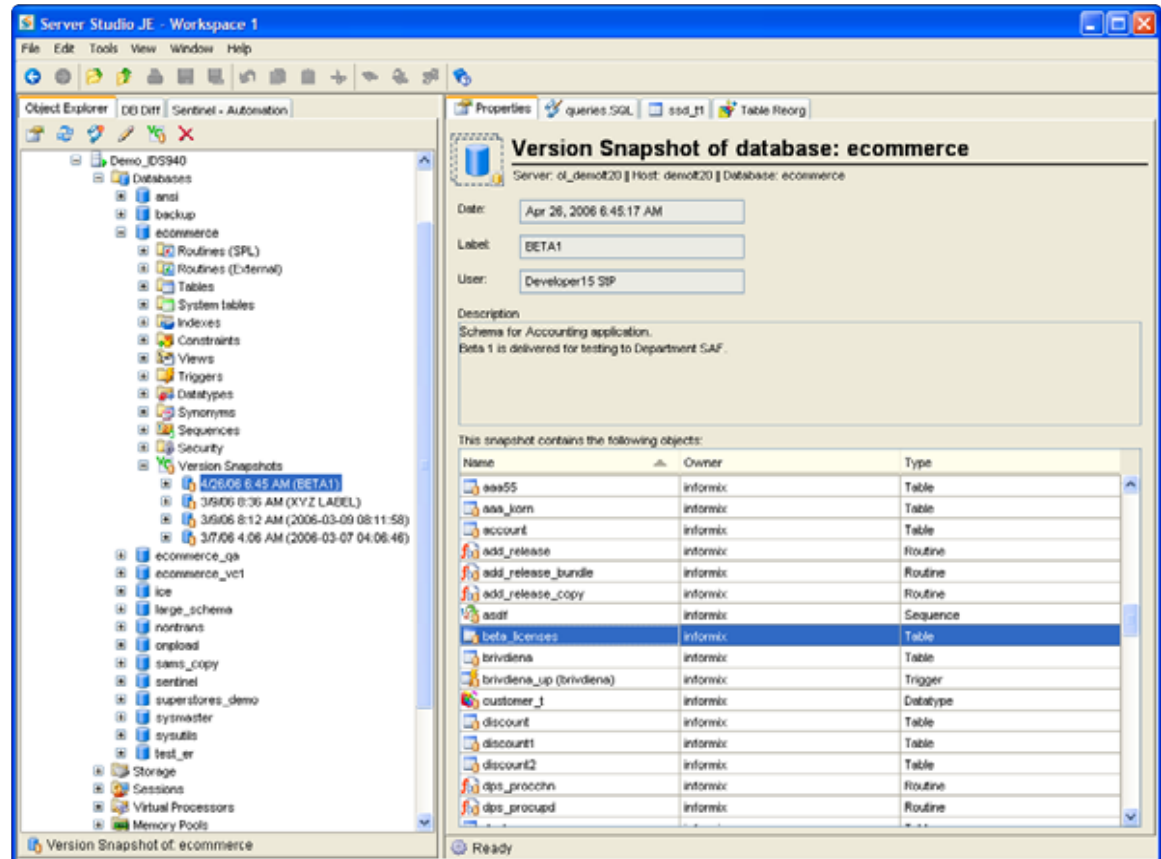


Sentinel™

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





- Powerful auditing of virtually all Informix® server and individual databases configuration parameters
- Automatically traps server configuration, database objects and security changes for compliance reporting
- Flexible user-defined filters to gather only the data needed
- Customizable alerts to notify of suspicious activity
- Self-auditing features assure an immutable source of audit data
- Satisfies audit requirements with comprehensive reporting
- Leverages powerful functionality of Server Studio™
DB Difference Analyzer and Schema Manager





■ Continuous Compliance

- The Audit Subsystem goes beyond traditional auditing approaches by providing real-time monitoring and auditing of all server configuration and data structure modifications, as well as changes to security permissions. The audit data captured is stored in a central repository for reporting, querying and forensic analysis.

■ Low-impact data collection

- Sentinel's agent-less architecture employs a very efficient, low-impact real time data collection mechanism. The type and detail of data collected by the audit process is highly configurable and may be defined at the server, database and object level. No changes to applications or production databases are required.

■ Powerful reporting and analytics

- The user-friendly schema of the audit data repository enables rapid development of ad-hoc queries and reports for forensic analysis.





■ Self-auditing

- The Audit Subsystem has been engineered to provide a trusted, immutable source of audit data. Its powerful self-auditing features ensure data collection settings integrity and tracks all attempts to tamper with the audit data repository.

■ Enterprise scalability and manageability

- Sentinel's Audit Subsystem has been specifically designed to support large IBM Informix® data server installations. It scales from auditing a single server instance to thousands; from databases with only a few tables to databases with tens of thousands of tables and large volumes of data.

■ Rapid deployment

- Sentinel's agent-less technology enables the Audit Subsystem to be configured and deployed in minutes. There is nothing to install on each target server. Moreover, Sentinel eliminates risk and increases performance by running outside the Informix® data server process space.



Sentinel™ - *Compliance Edition*



- Designed to meet the needs of enterprise-scale Informix Dynamic Server implementations, Sentinel – Compliance Edition easily scales to monitor and automate configuration change management and compliance auditing in environments of any size.
- If you need proof that your systems are in compliance with external regulations such as Sarbanes-Oxley, GLBA, HIPAA, Basel II, need to meet the requirements of internal auditors, manage database schema changes, or simply need to track “what was done when”, then Sentinel – Compliance Edition should be an essential component of your IDS management plan.



Conclusion



Server Studio™ with Sentinel™ Release 7



The most feature-rich, productive and capable release ever!

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:

■ IBM

- www.ibm.com/software/data/informix/serverstudio/
- www.ibm.com/software/data/informix/sentinel/

■ AGS

- www.serverstudio.com/products/serverstudio/
- www.serverstudio.com/products/sentinel/



Questions



Thank
You

