Using Sentinel to Monitor and Manage your IDS Server Performance

Lester Knutsen

Advanced DataTools Corporation

IDUG/IIUG North American Conference 2007

- May 6-10, 2007 *San Jose California*
- 6 half day Educational Seminars – Sunday May 6, 2007
- 52 Informix sessions – Monday May 6 thru Thursday May 10
- First public appearance of IDS – Cheetah!
- Informix only technical sessions given by Users, IBM Developers/Advanced support and Business Partners:
  - Information on the upcoming Cheetah release
  - Performance tuning and monitoring IDS
  - Application Development (Java, XML, PHP….)
  - Utilities that work with IDS
  - Much More!!

Speaker Developer Reception – At IBM at Silicon Valley Labs Meet many of the Informix developers!
Welcome Reception
Exhibition Hall
Special Interest Groups (SIGS)
- Informix Best Practices
- BI/Data Warehousing with Informix
- Informix on Linux

Informix Spotlight Session with Kevin Brown Chief Architect of IDS from IBM
IIUG "Ask the Experts" Panel
Informix User Feedback Opportunities
Informix Certification Exams are Free!
To Register visit the IIUG web site or the conference page at www.iiug.org/conf
Email Cindy Lichtenauer – IIUG Board of Directors with questions. Cindy@iiug.org

International Informix Users Group

www.iiug.org

Using Sentinel to Monitor and Manage your IDS Server Performance

- What is Server Studio – Sentinel?
- Quick Start Guide to Setting up Sentinel
- What Parameters Should I Monitor?
- More Information on Server Studio and Sentinel

Lester Knutsen

Lester Knutsen has been developing database applications with Informix databases since 1983. He is president of Advanced DataTools, an IBM-Informix Consulting, Training, and Tools Partner specializing in data warehouse development, database design, performance tuning, and Informix training and support.

Currently, Lester specializes in developing web-enabled data warehouse systems. He provides training and consulting in database design and performance tuning, and is widely known in the Informix community for his extensive experience and teaching skill.

Lester is also president of the Washington D.C. Area Informix Users Group, one of the largest and most active Informix user groups, and is one of the founding members of the International Informix Users Group. Lester is also a member of the IBM Gold Consultant program.

What is Server Studio – Sentinel?

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® DBMS 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.**

Partnership: IBM + AGS = Server Studio™

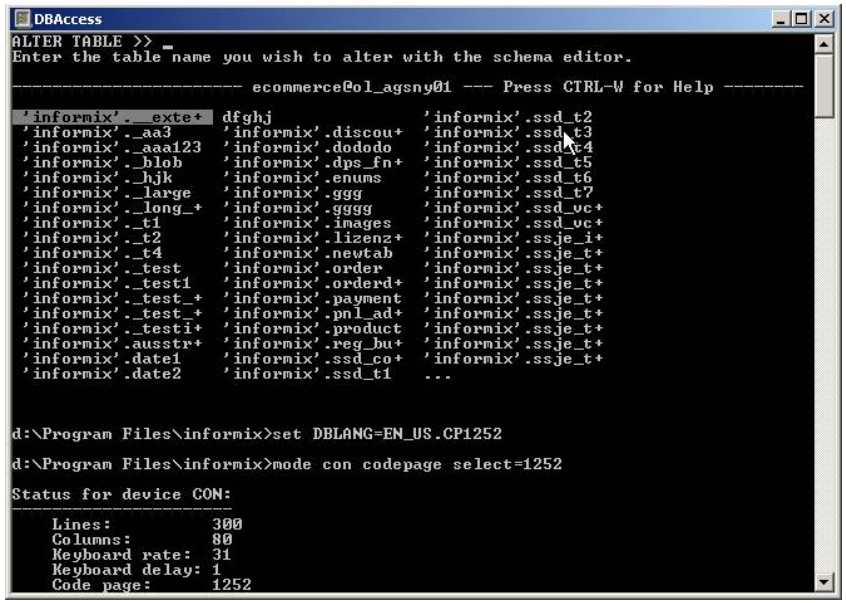
- IBM and AGS have been cooperating on DBMS tools since 1999.
- IBM ships Server Studio™ with all Informix Dynamic Servers.
- Server Studio™ had 6 major releases since September 2000.

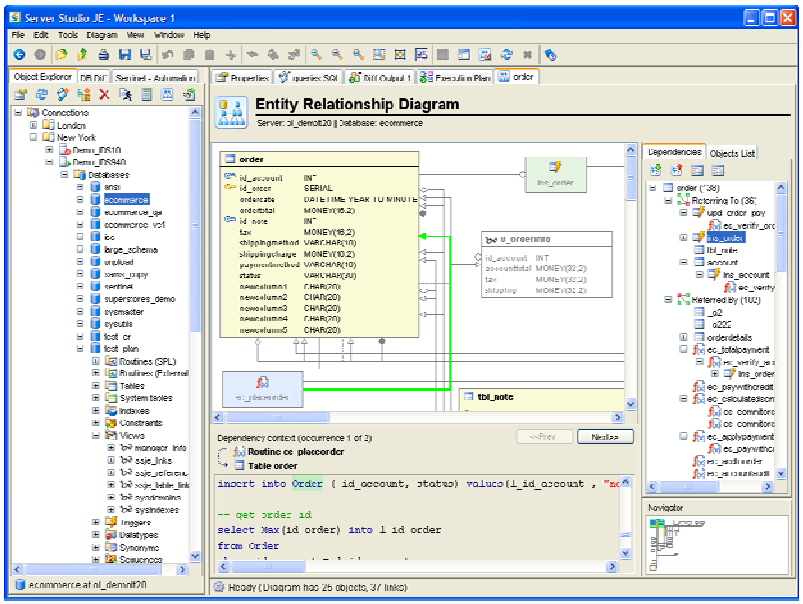
IBM is Committed to Informix Customers

"*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 substantial investments IBM customers have made in Informix database products."*

Bruce Weed
Program Director – Informix Business Leader
IBM Software Group

The Choice Facing IBM Informix® DBMS Users



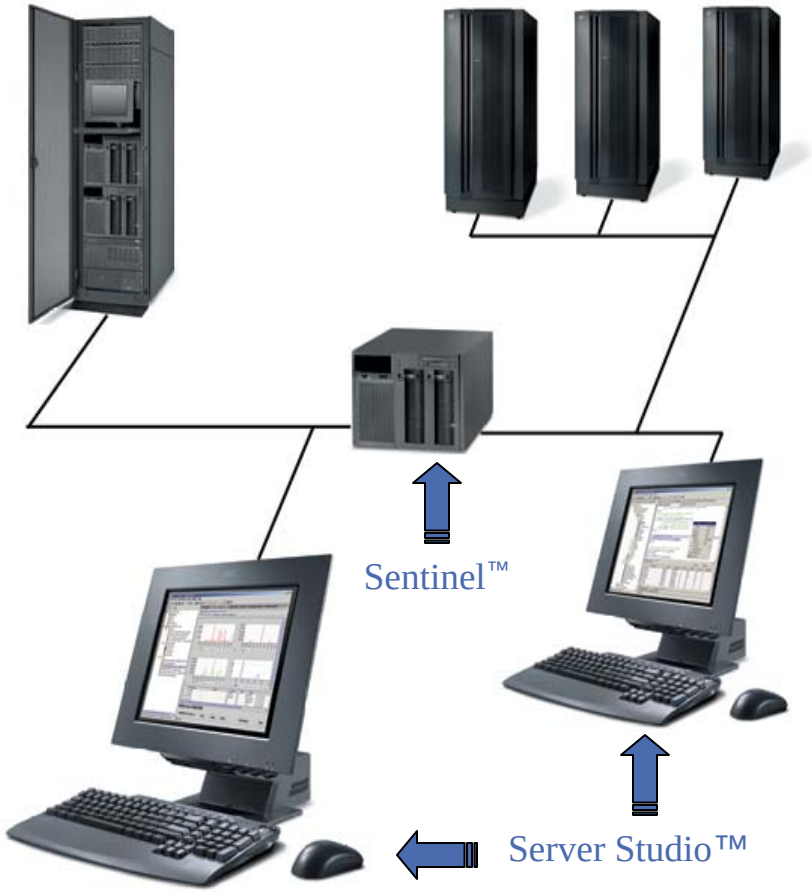


- A sparse collection of command-line, difficult to use, unintuitive, error-prone native tools - circa 1999.
- IT management is concerned with the lack of available qualified personnel capable of operating in such complicated environment.
- Valuable DBA skills acquired on other DBMS platforms are not 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 IBM Informix® DBMS

- Manage your entire infrastructure of IBM Informix® DBMS servers 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.
- Agentless 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.



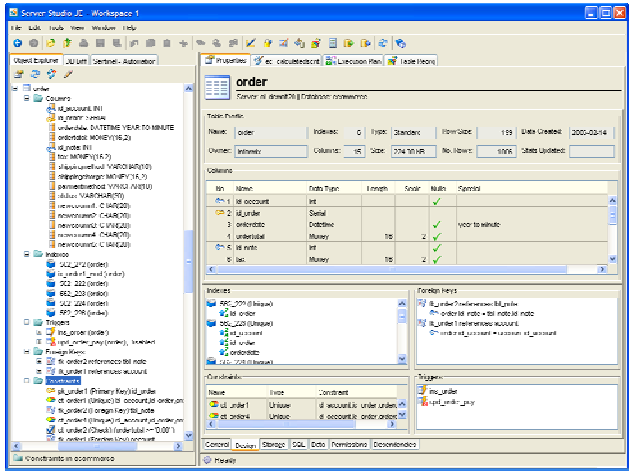
Server Studio™ *with* Sentinel™ Release 6

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

- Full E/R Diagramming and Object Dependencies Analysis
- Graphical Explain Plan Analyzer to help tune SQL performance
- 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

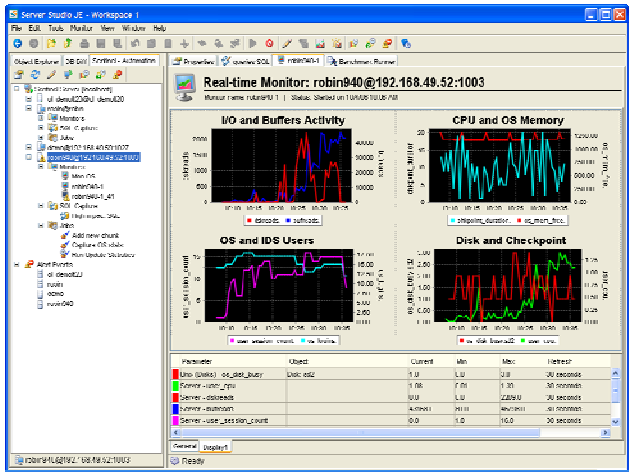
Avant-garde Management Tools for IBM Informix® DBMS

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 and assure 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® DBMS environments by providing:

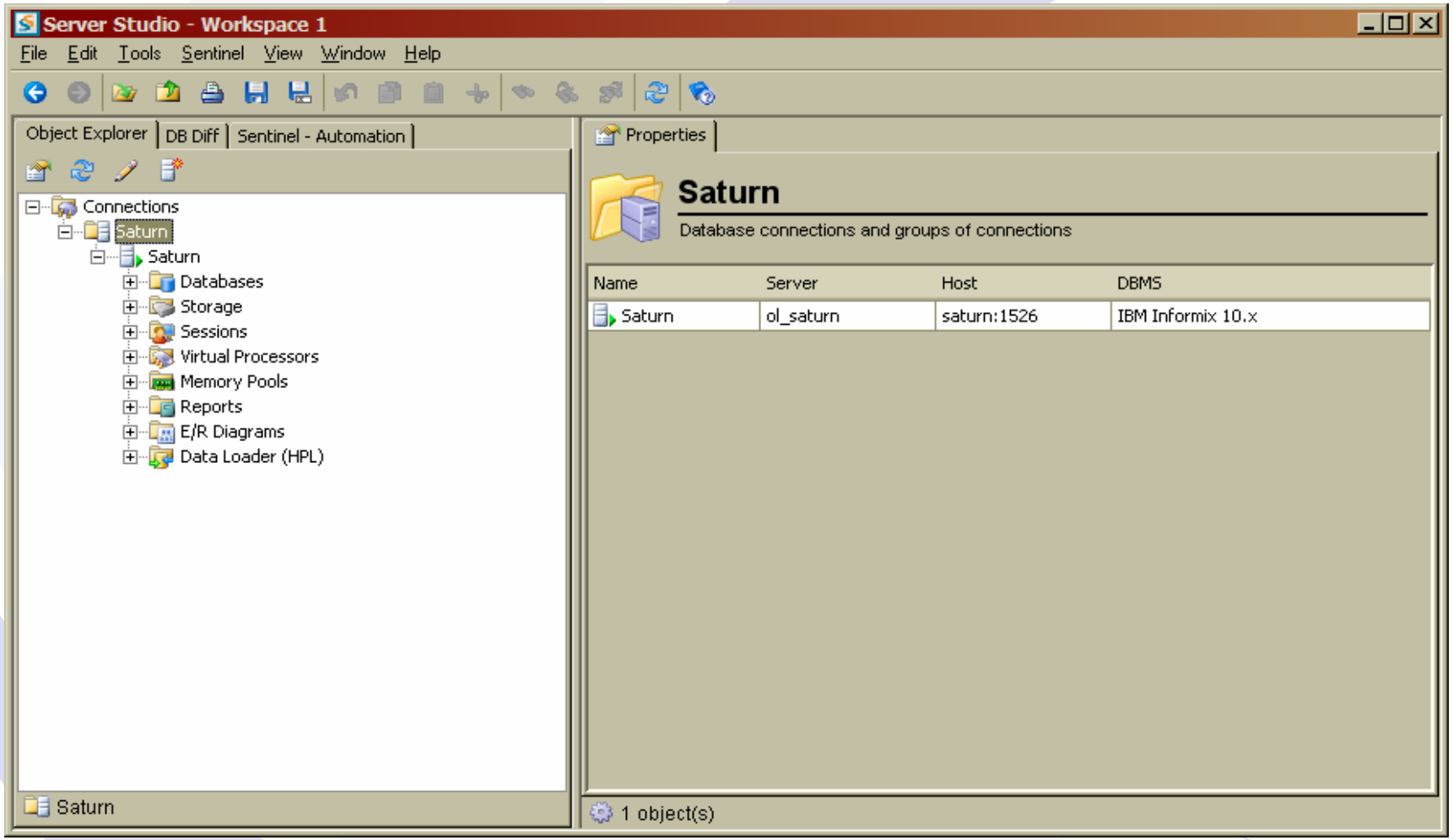
- 24 × 7 operational monitoring of IBM Informix® DBMS servers
- 24 × 7 operational monitoring of the IDS' host platform
- Continuous time-series measurement data of servers' performance
- Execution of regularly scheduled maintenance tasks
- Highly flexible multi-level performance degradation alerts
-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

Quick Start Guide to Setting up Sentinel

Instead of a live demo – here are some screen shots to setting up Sentinel

Advanced DataTools

Server Studio - Workspace



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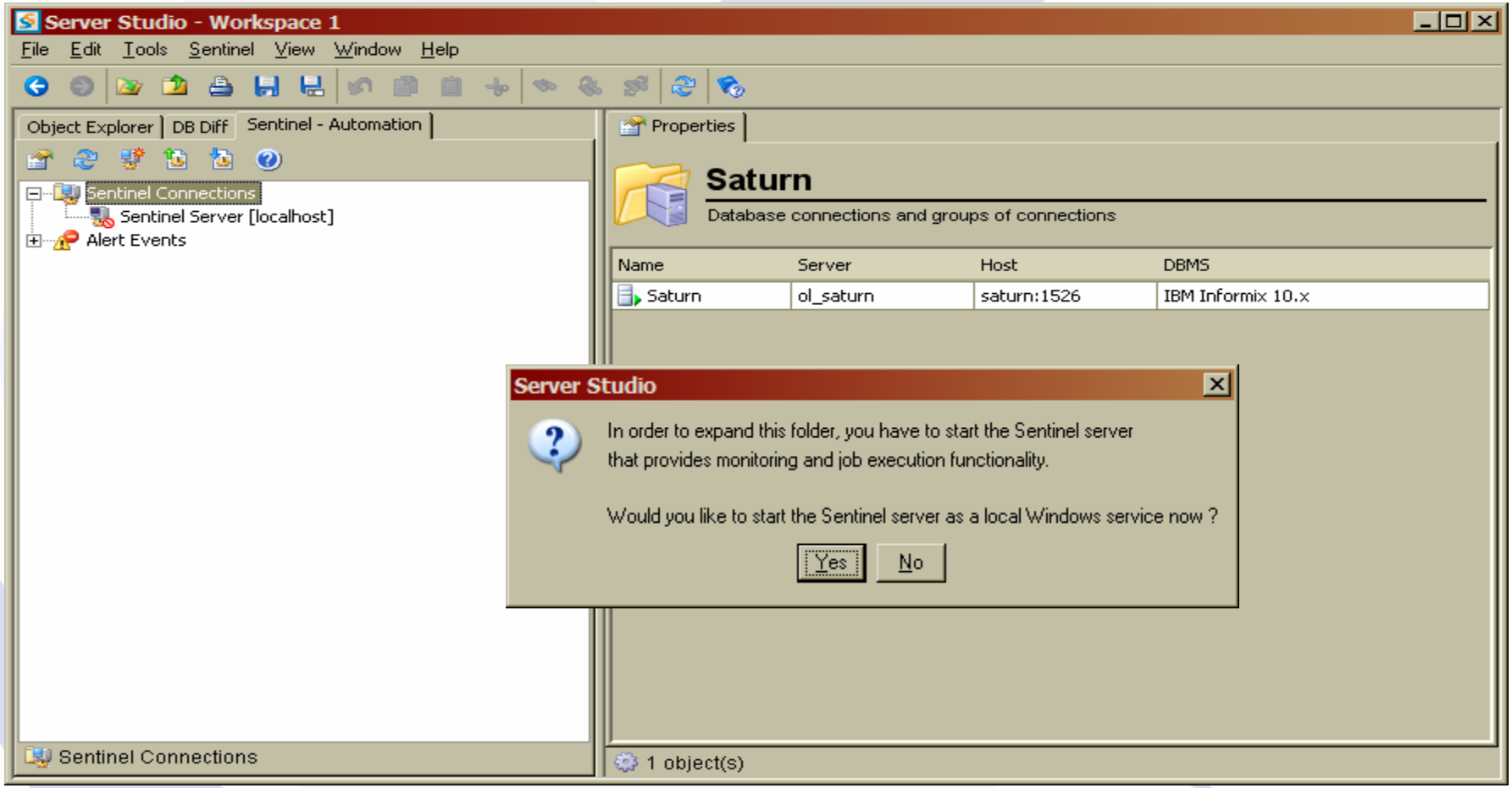
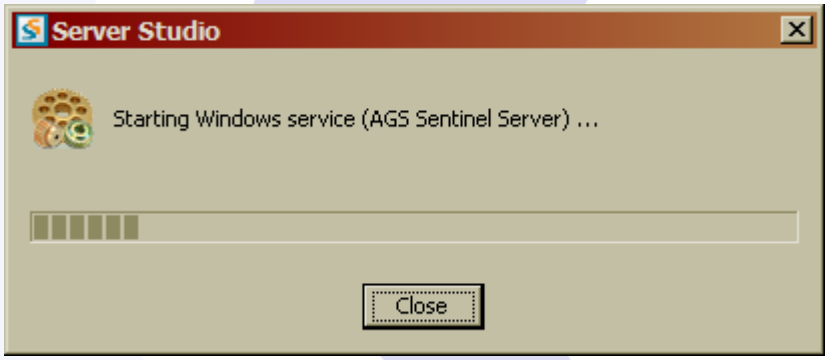
Start Sentinel Server

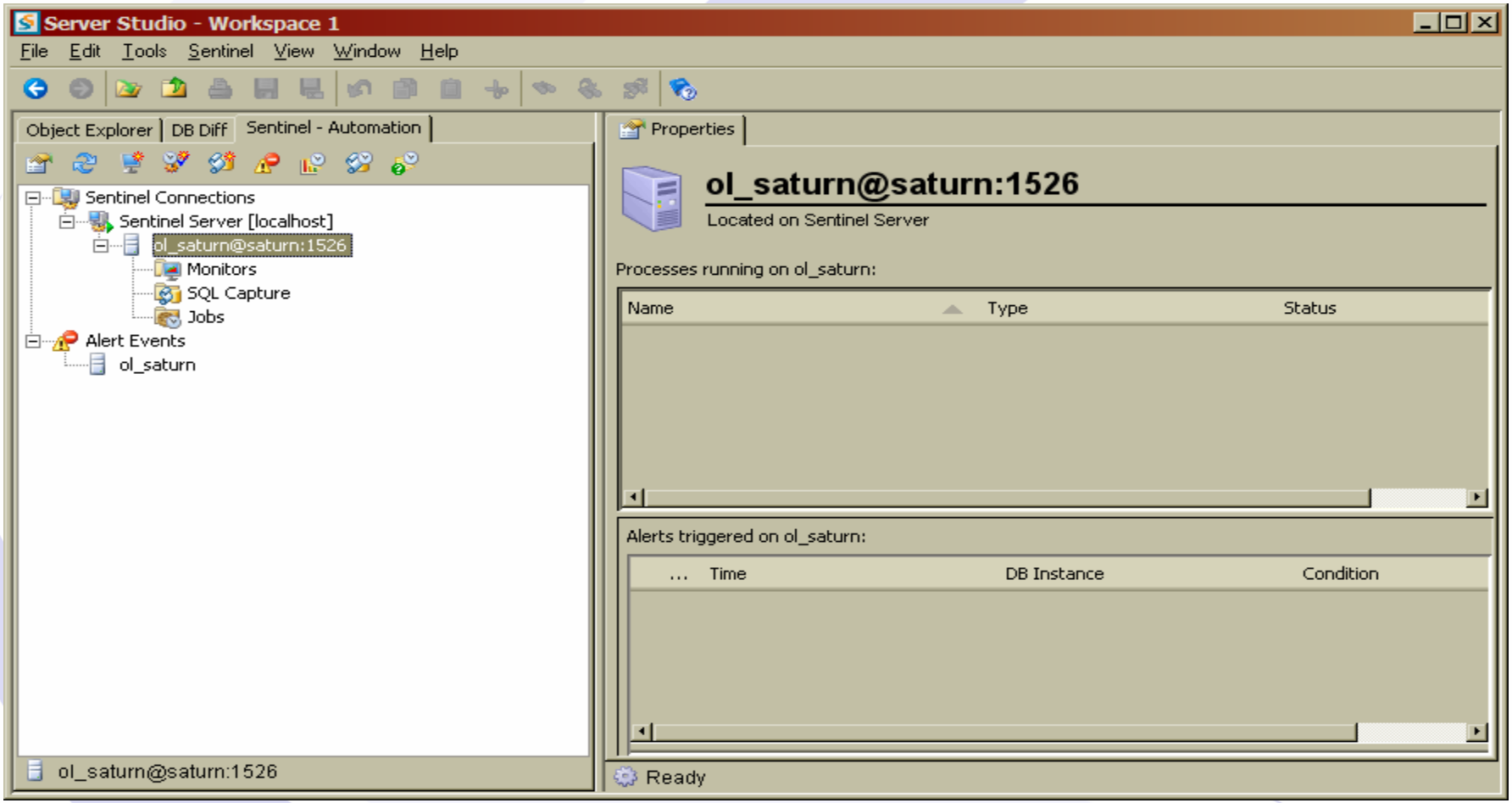


Advanced DataTools

Starting the AGS Sentinel Server

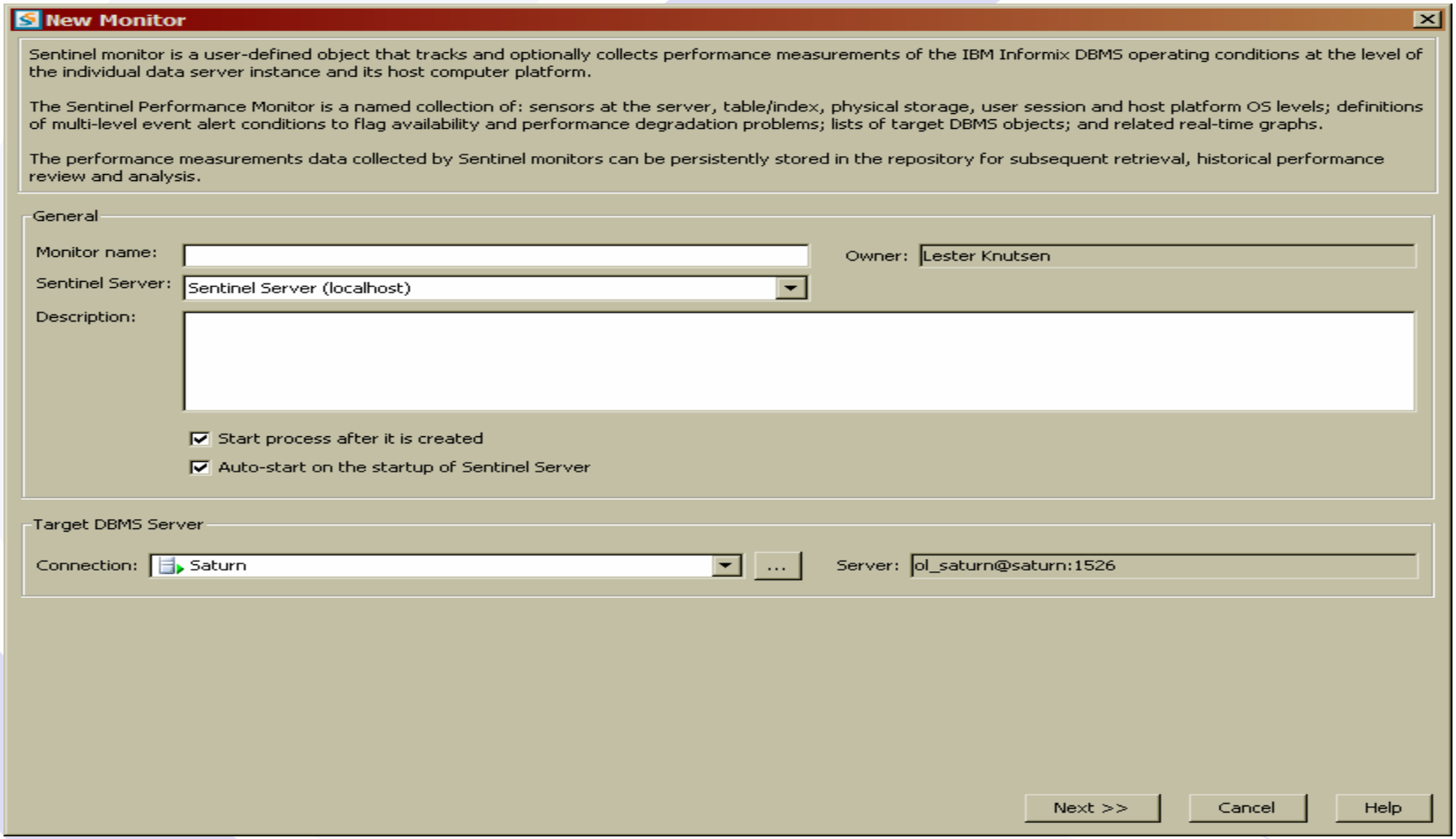


Sentinel Workspace

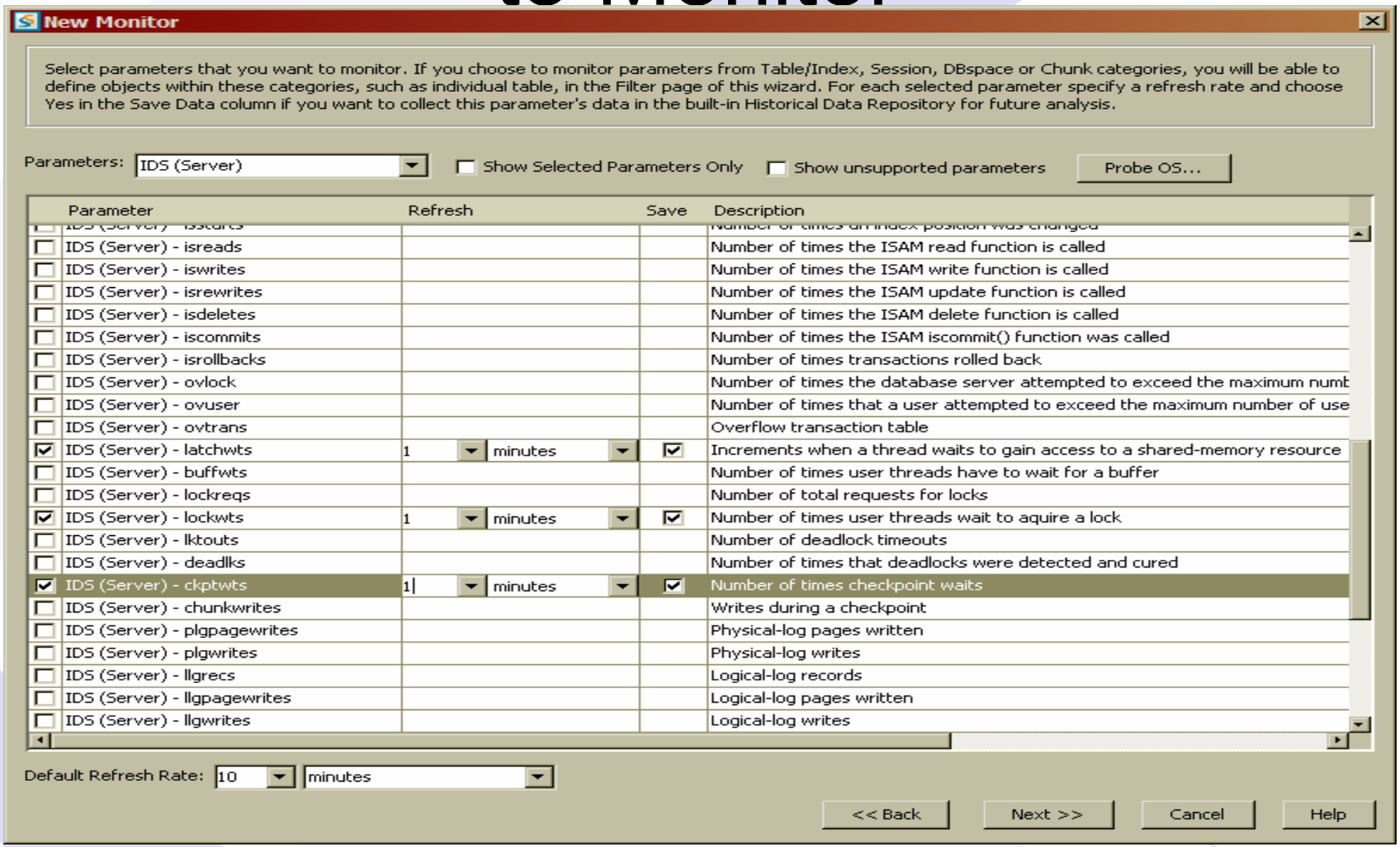


Advanced DataTools

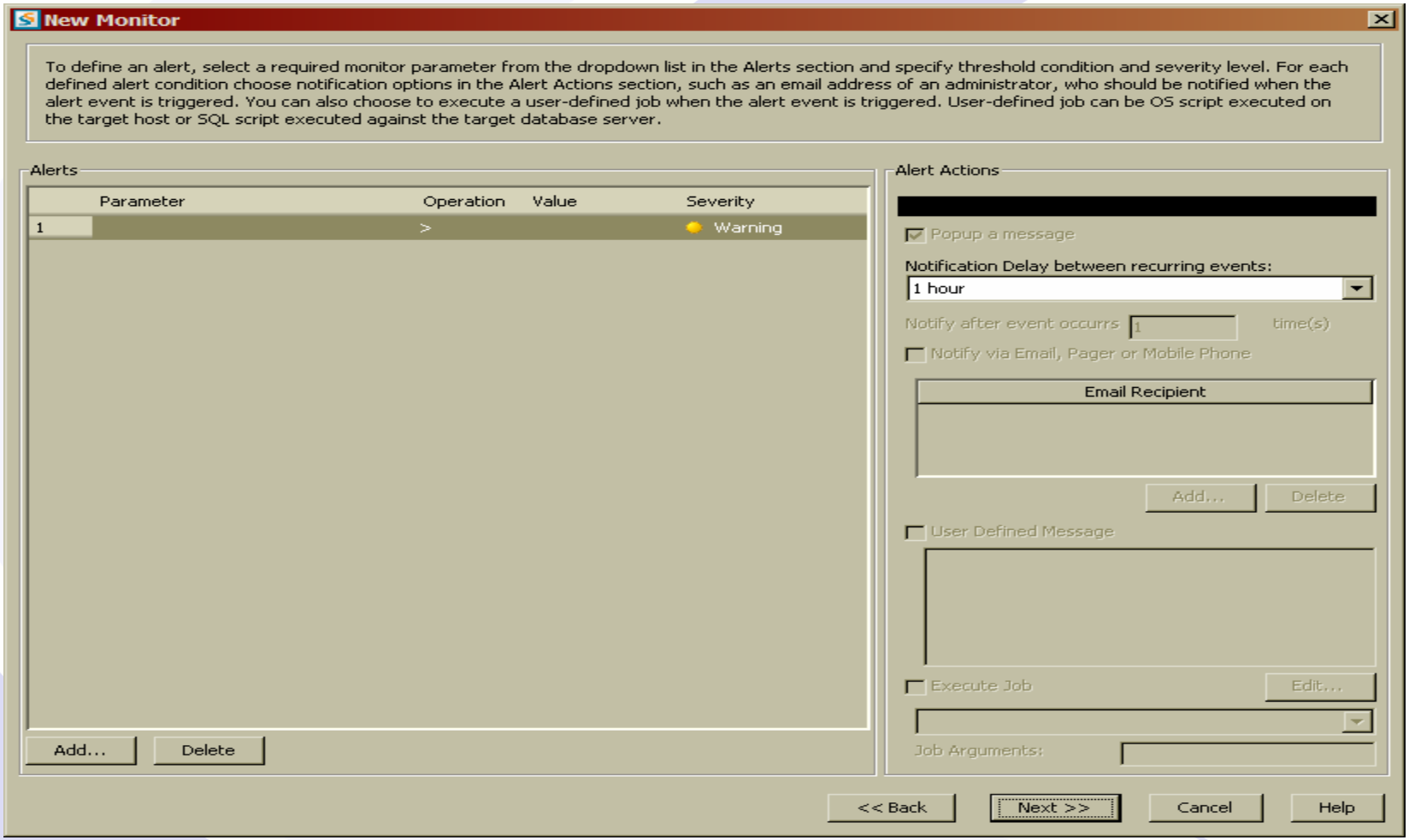
Step 1 - Create a New Monitor



Step 2 – Select the Parameters to Monitor

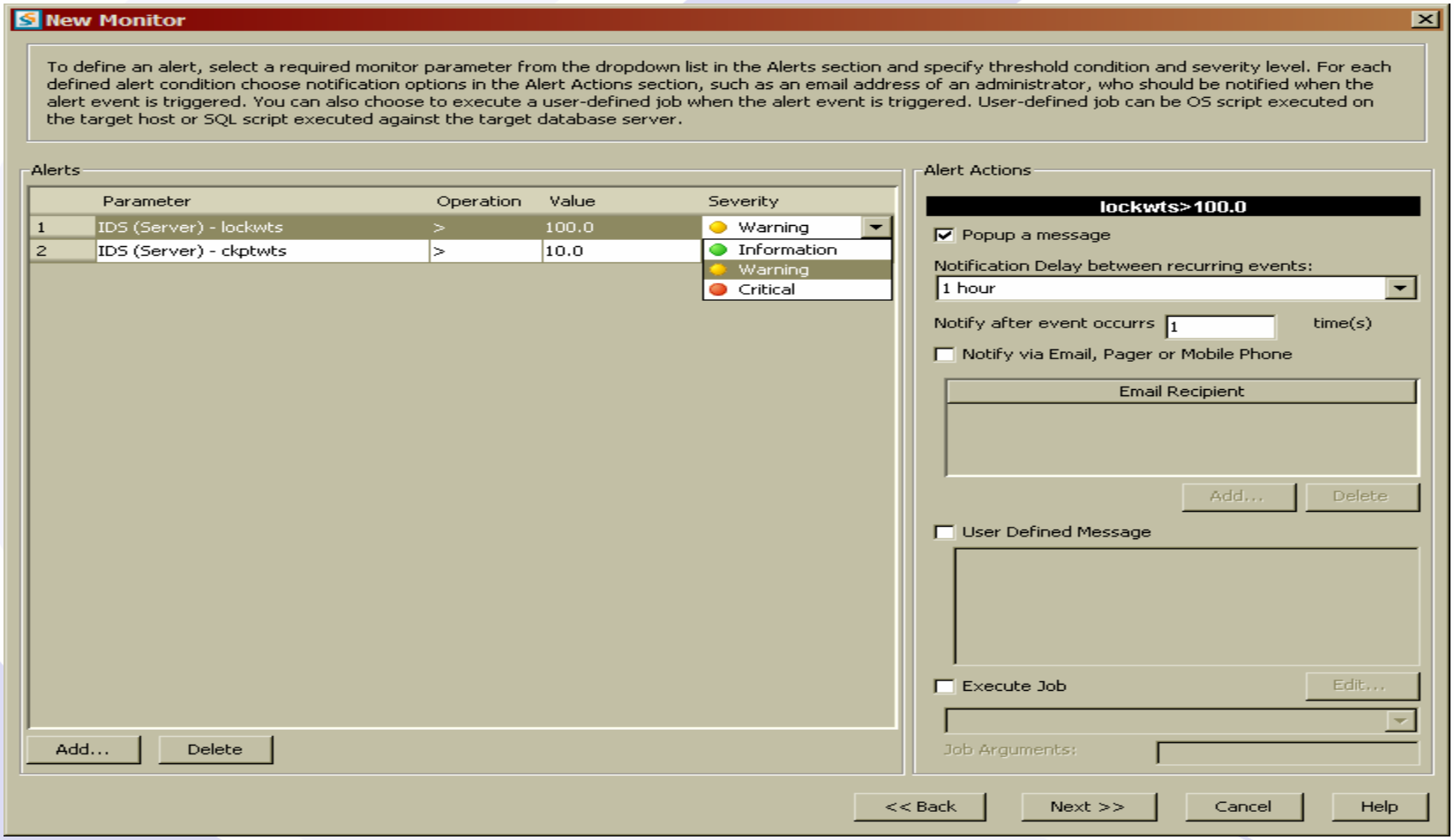


Step 3 – Define Alerts



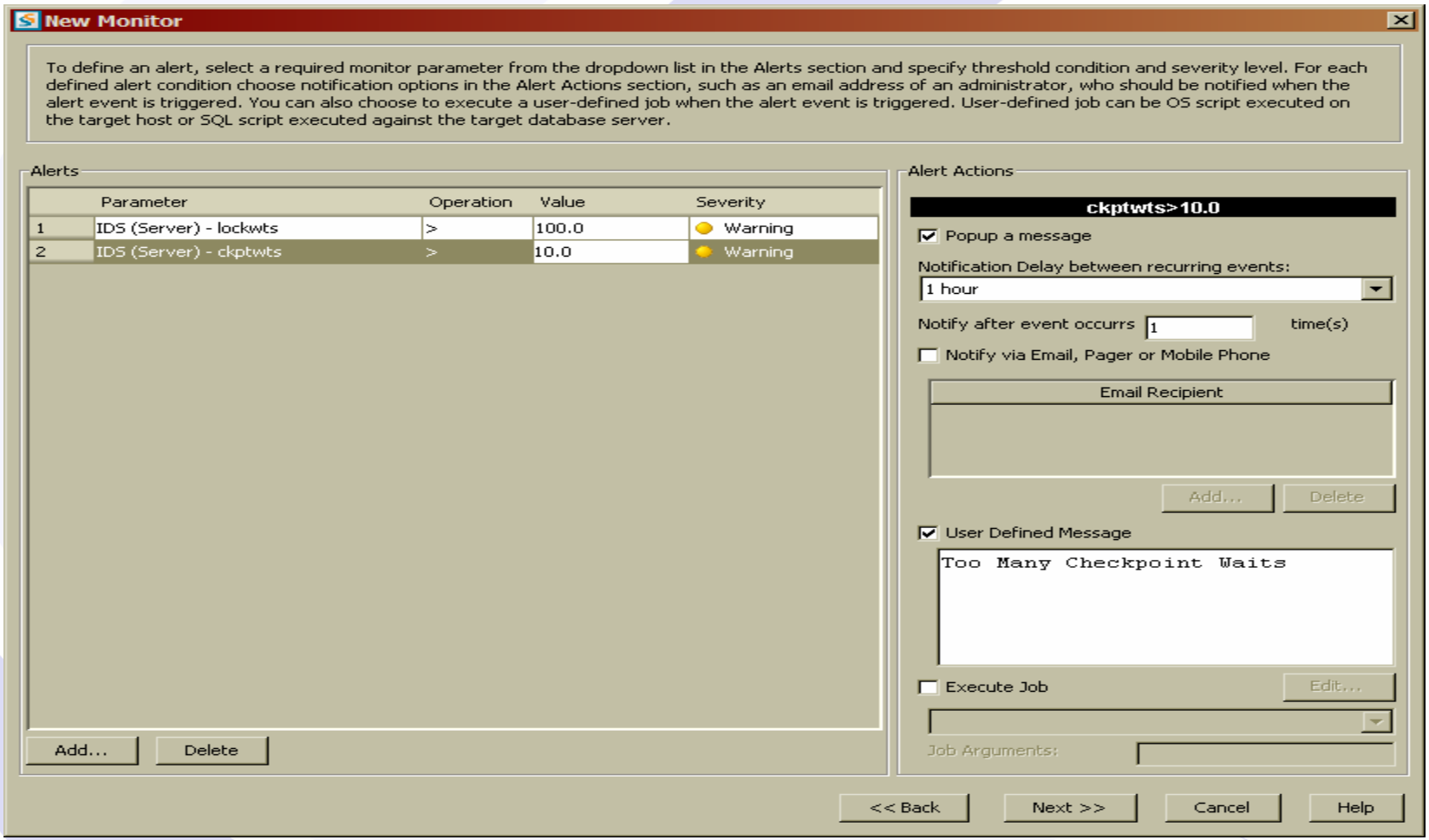
Advanced DataTools

Step 3 – Define Alerts

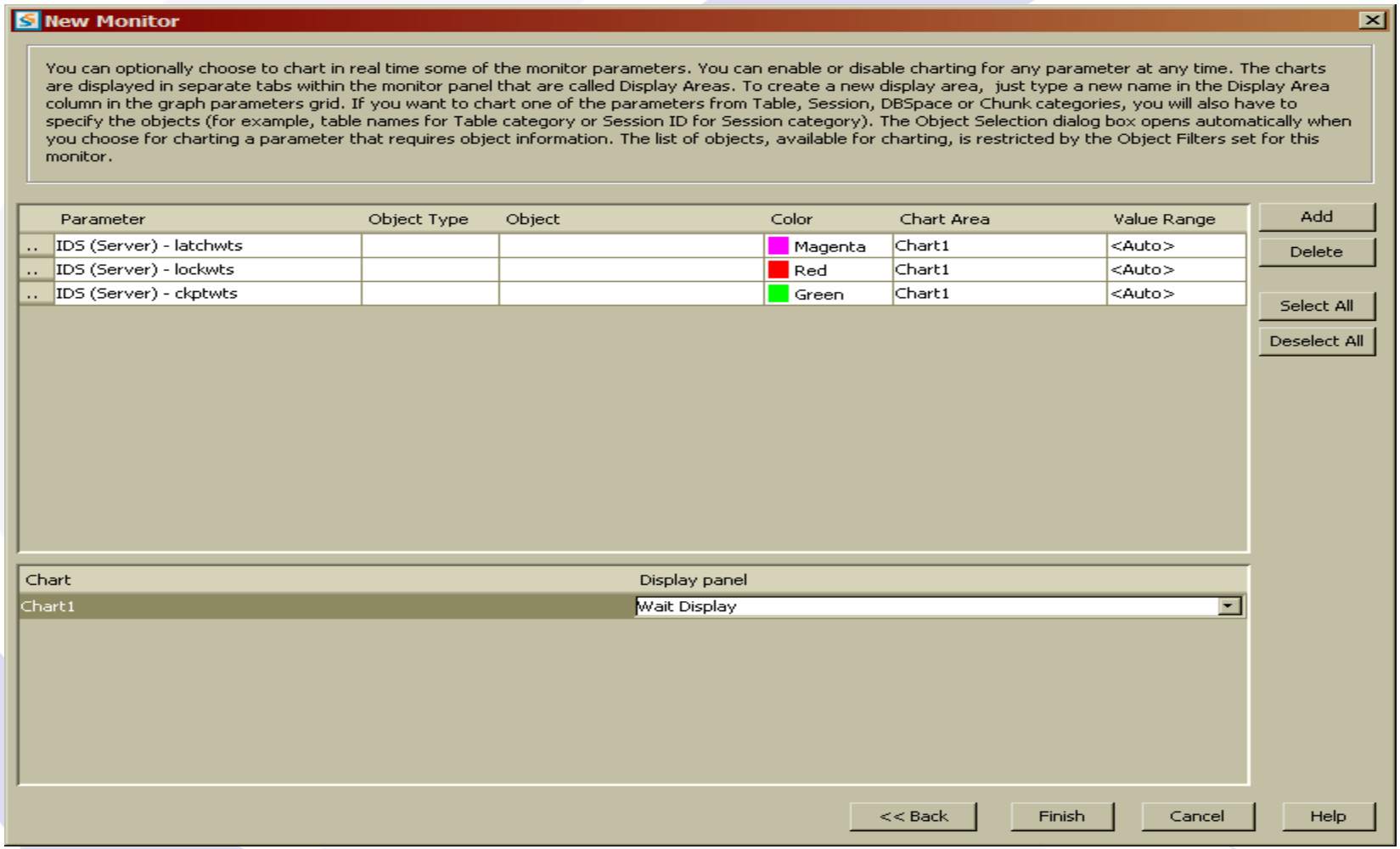


Advanced DataTools

Step 3 – Define Alerts

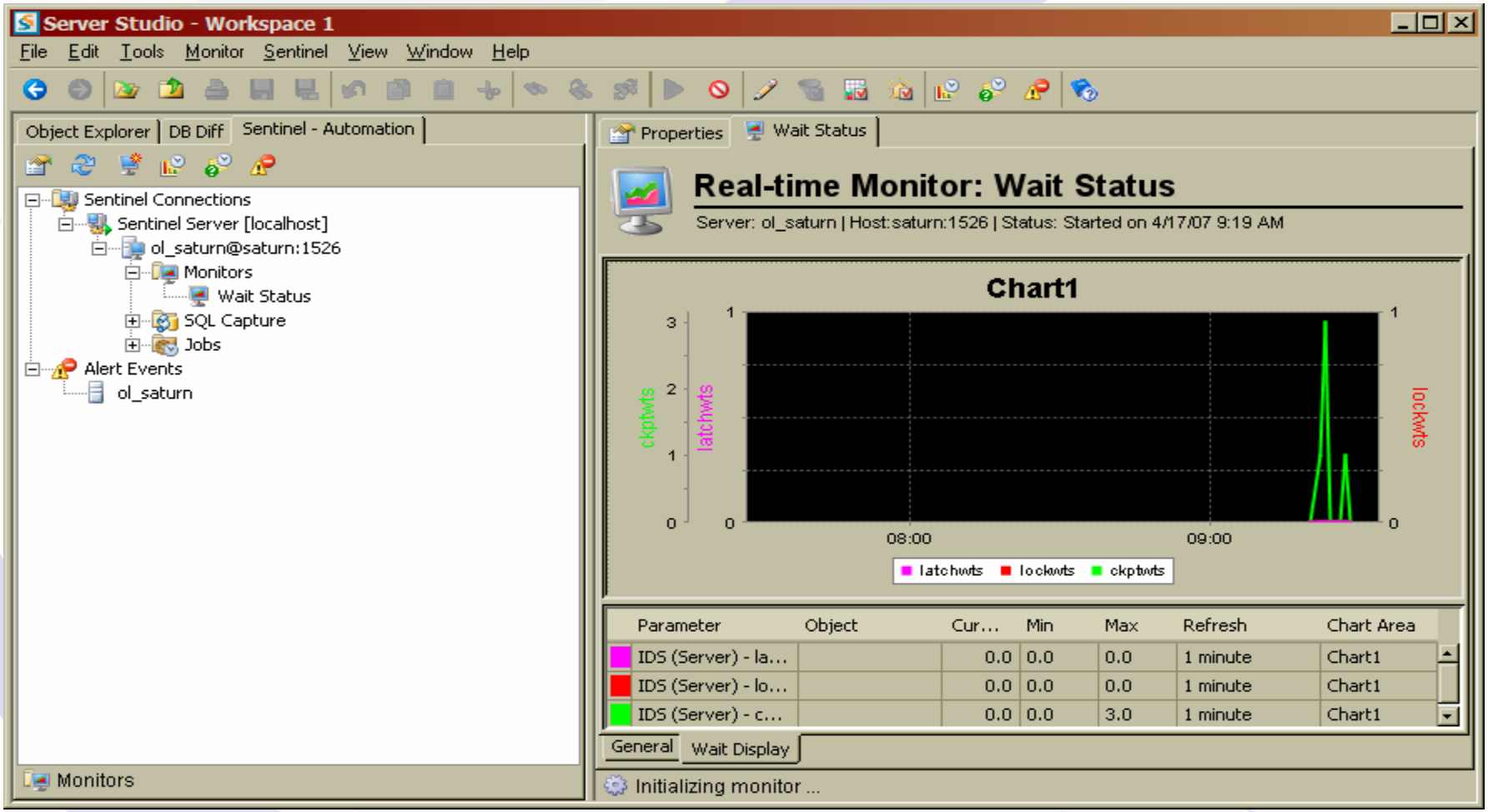


Step 4 – Define the Chart Layout



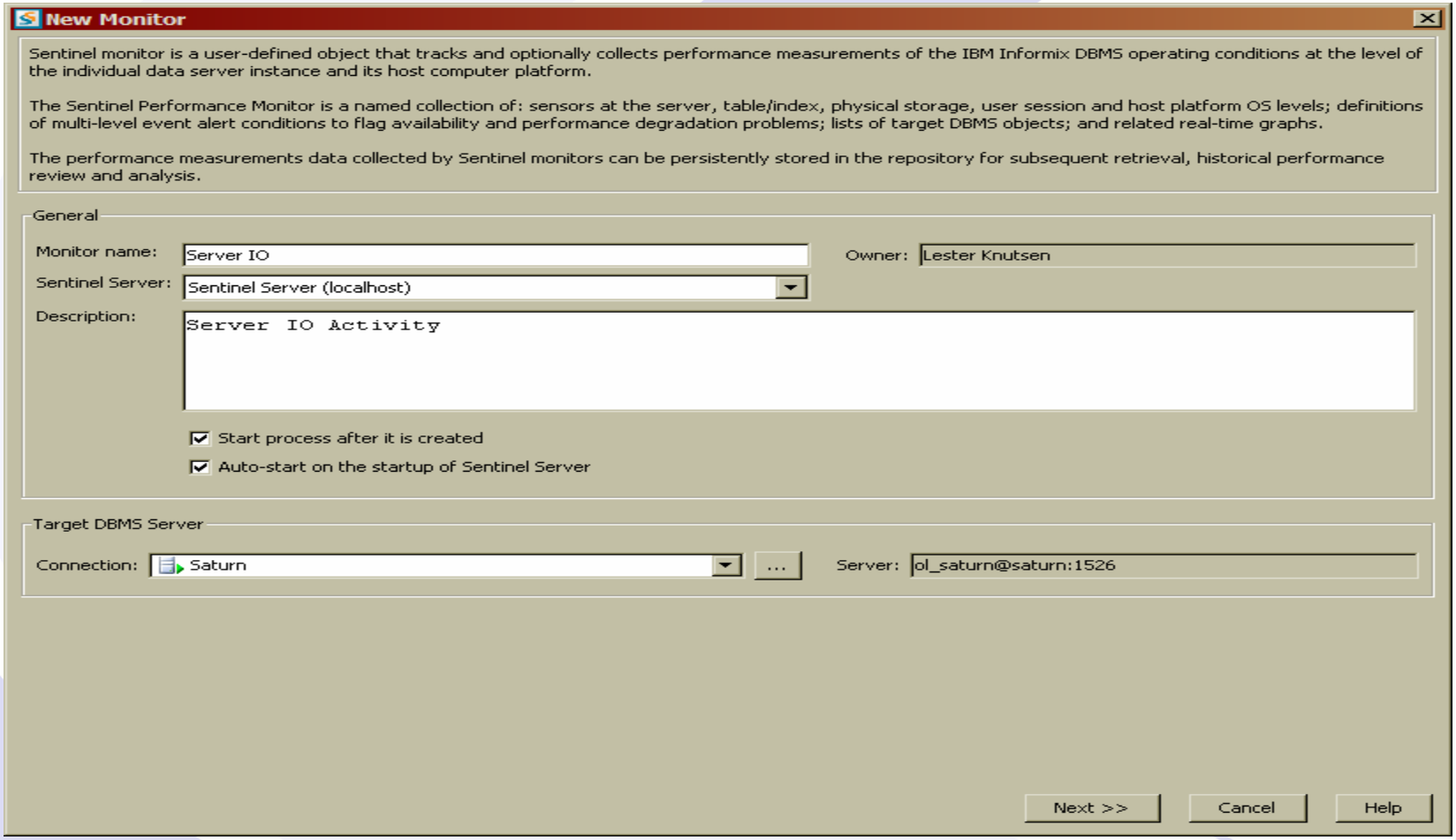
Advanced DataTools

Watch the Display

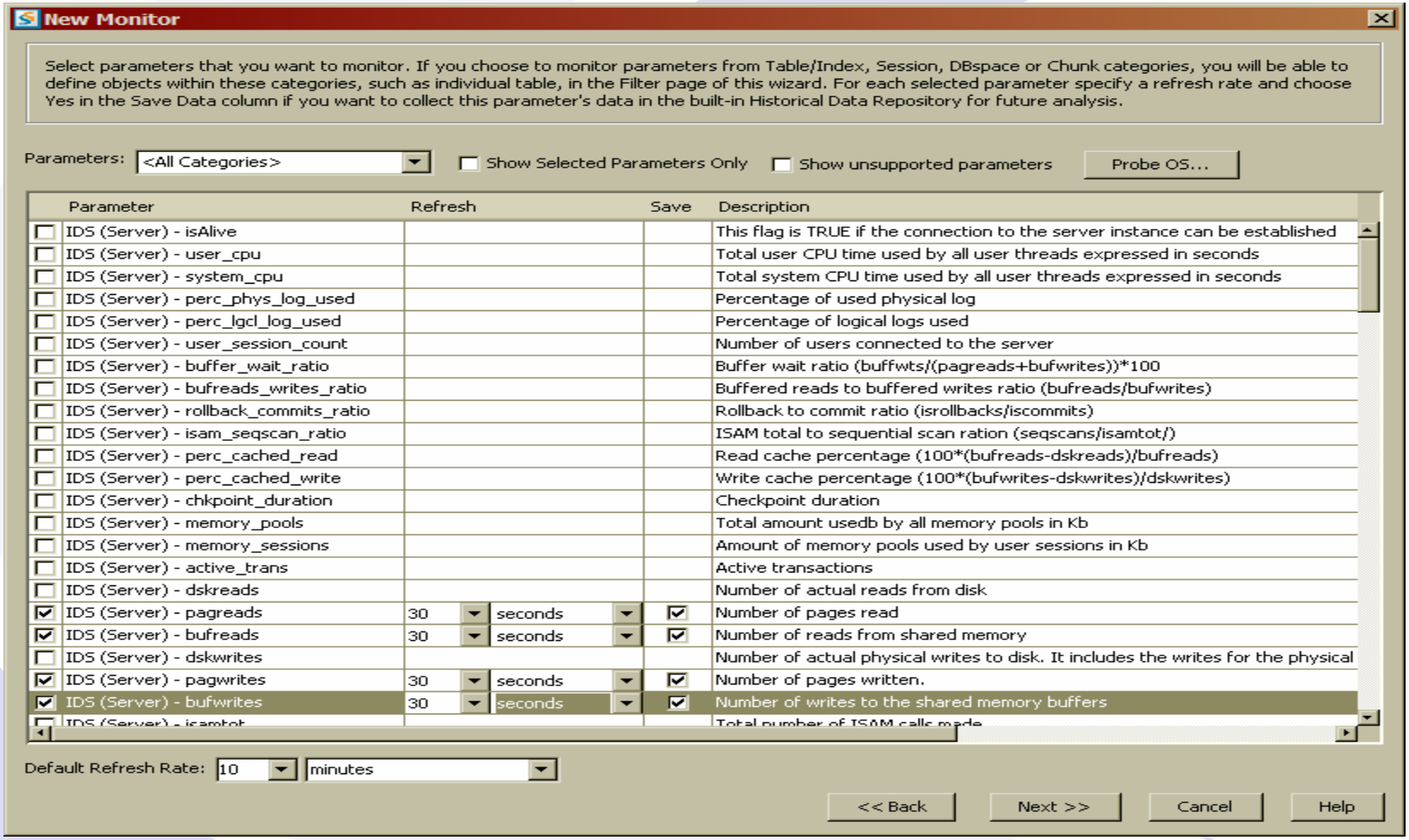


Advanced DataTools

Step 1 – Create a New Monitor for Server IO

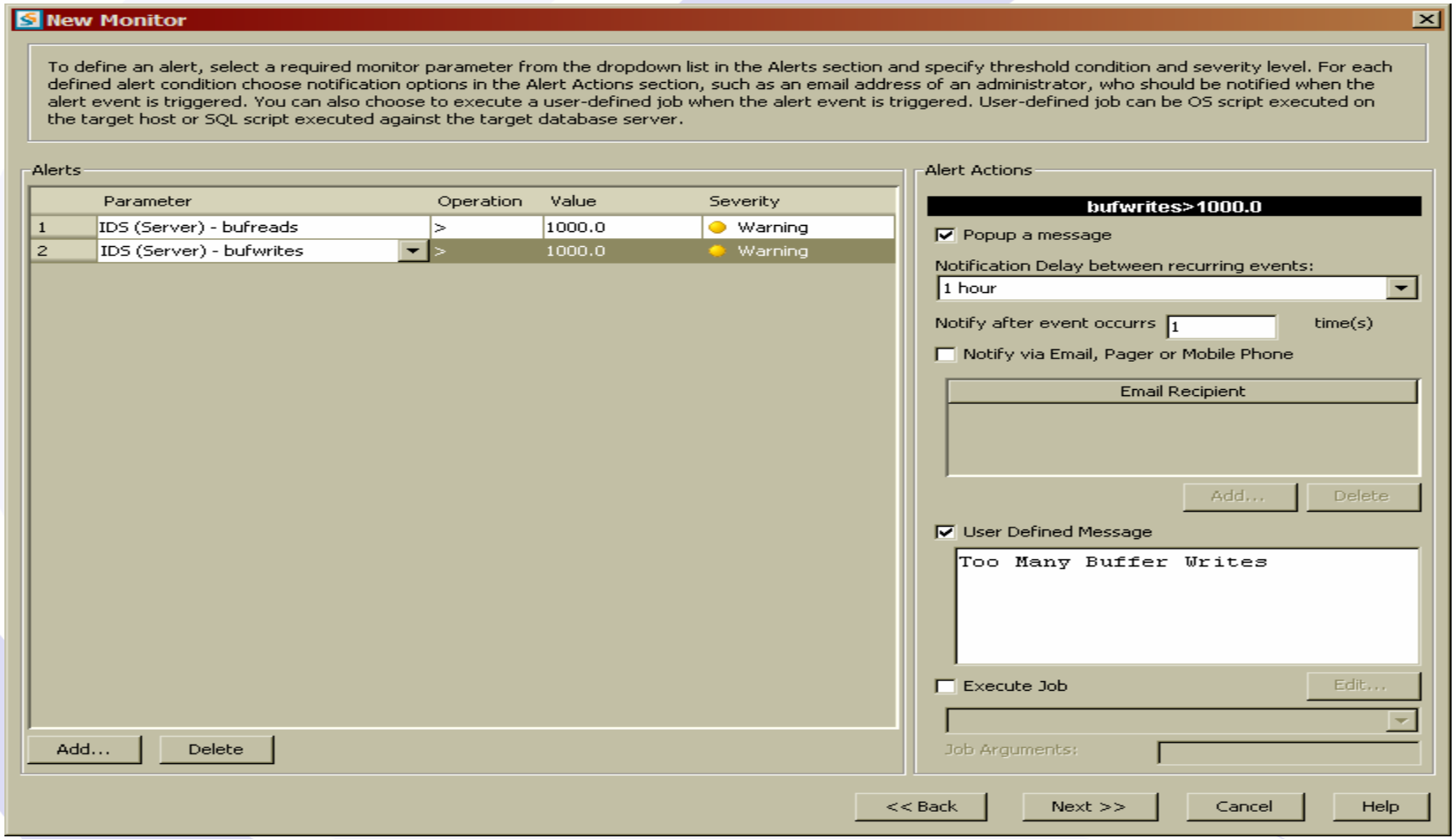


Step 2 – Select the Parameters

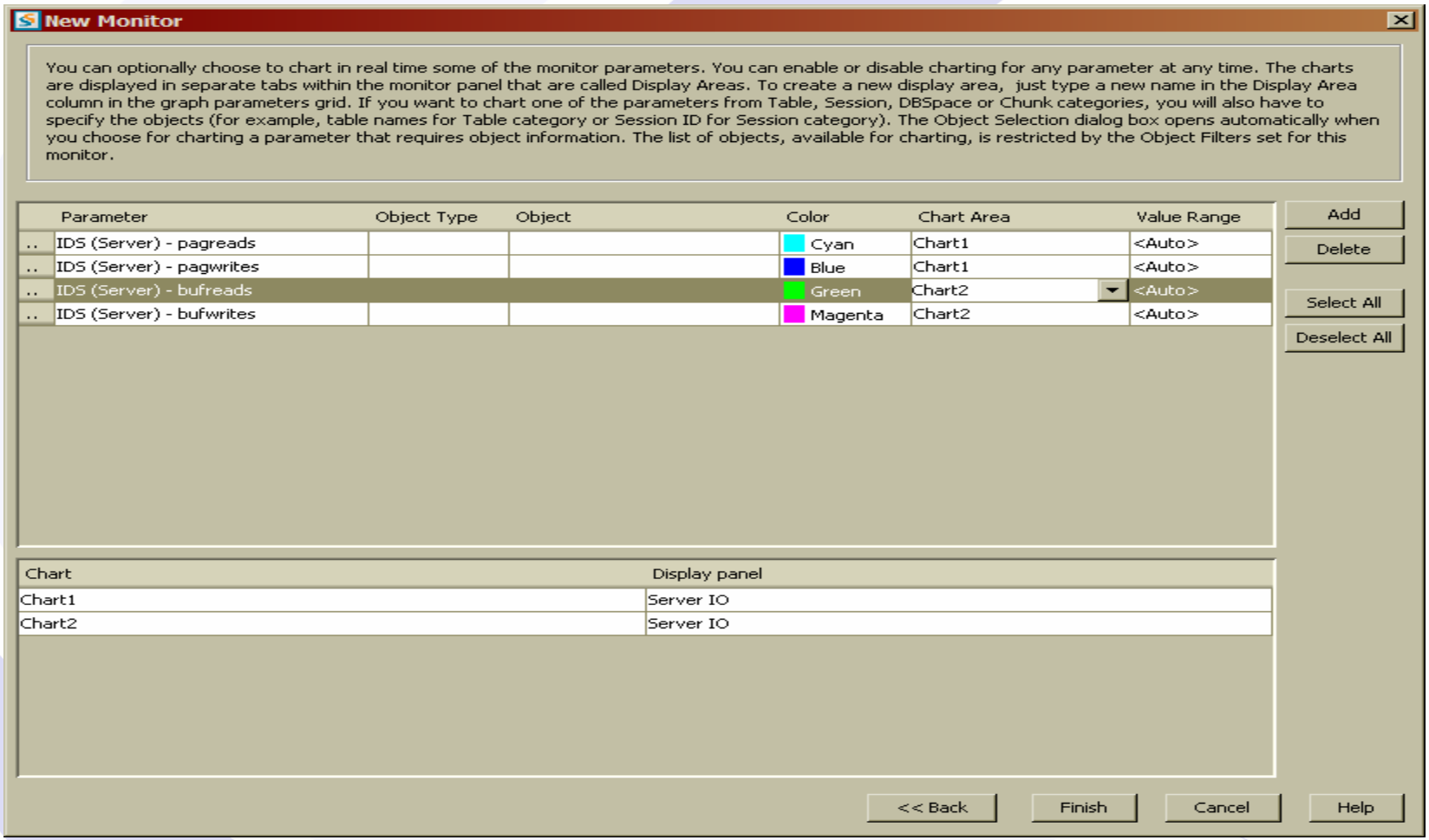


Advanced DataTools

Step 3 – Define the Alerts



Step 4 – Layout the Charts



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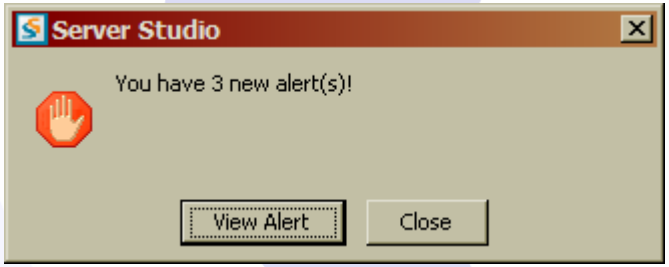
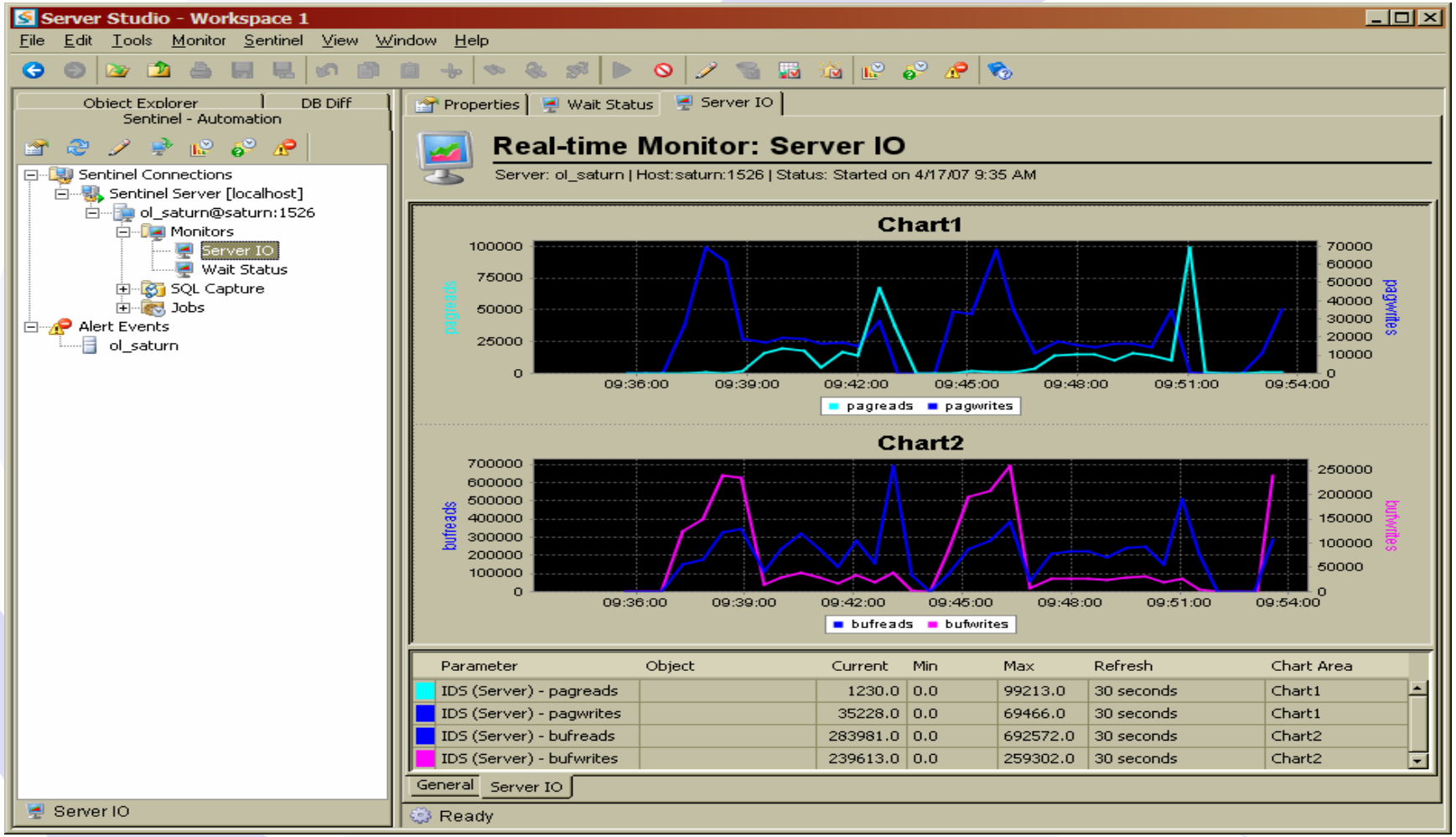
Alert Pop-Up



Watch the Display



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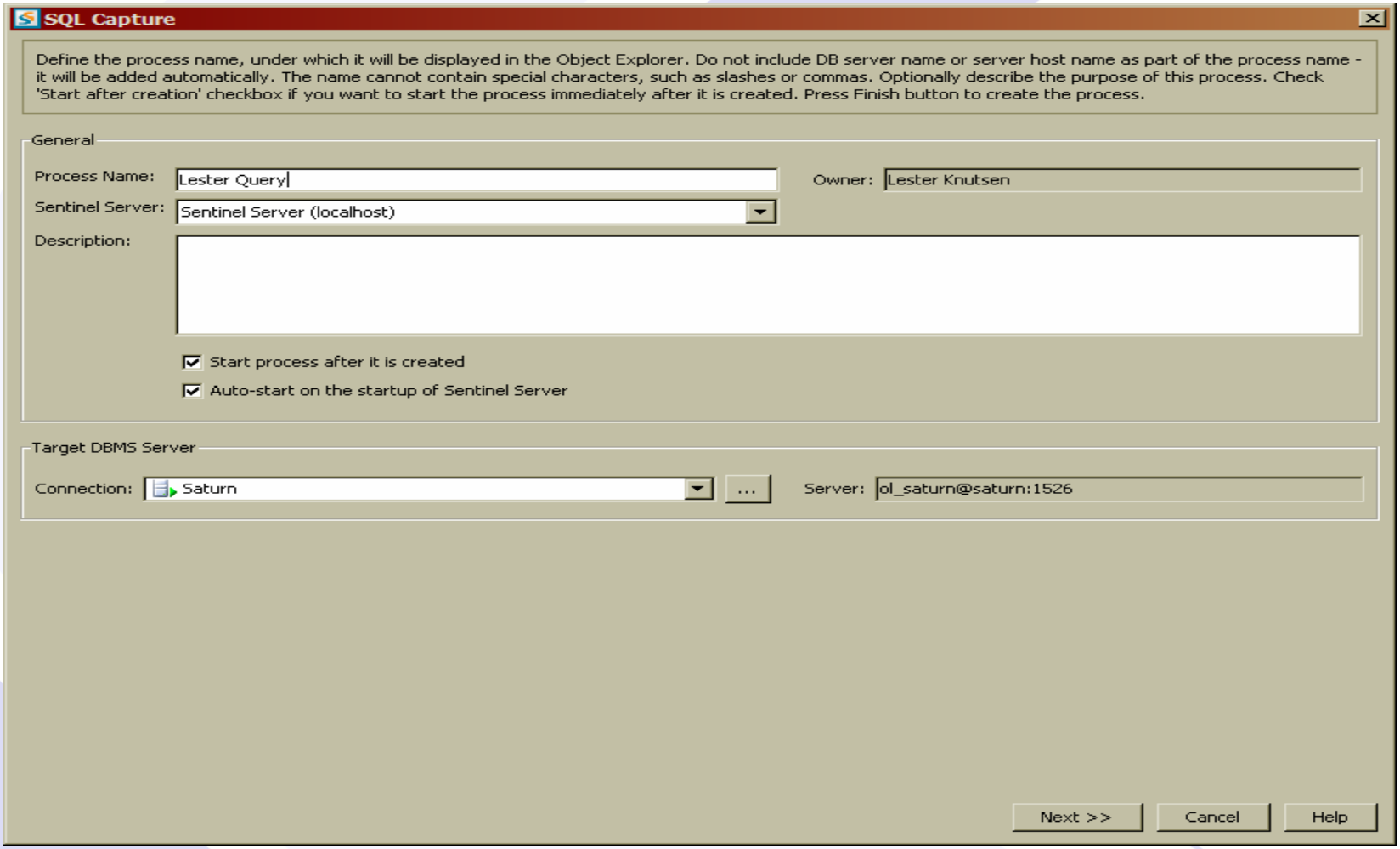
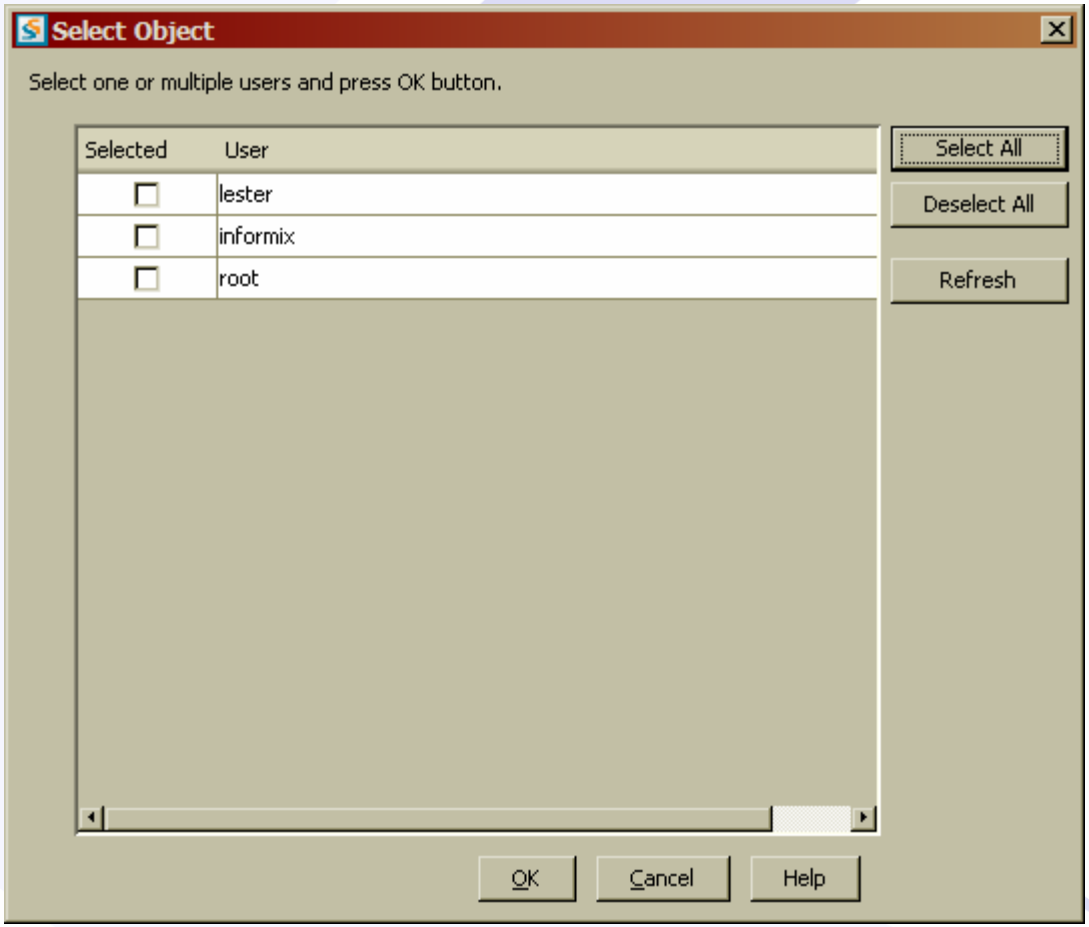
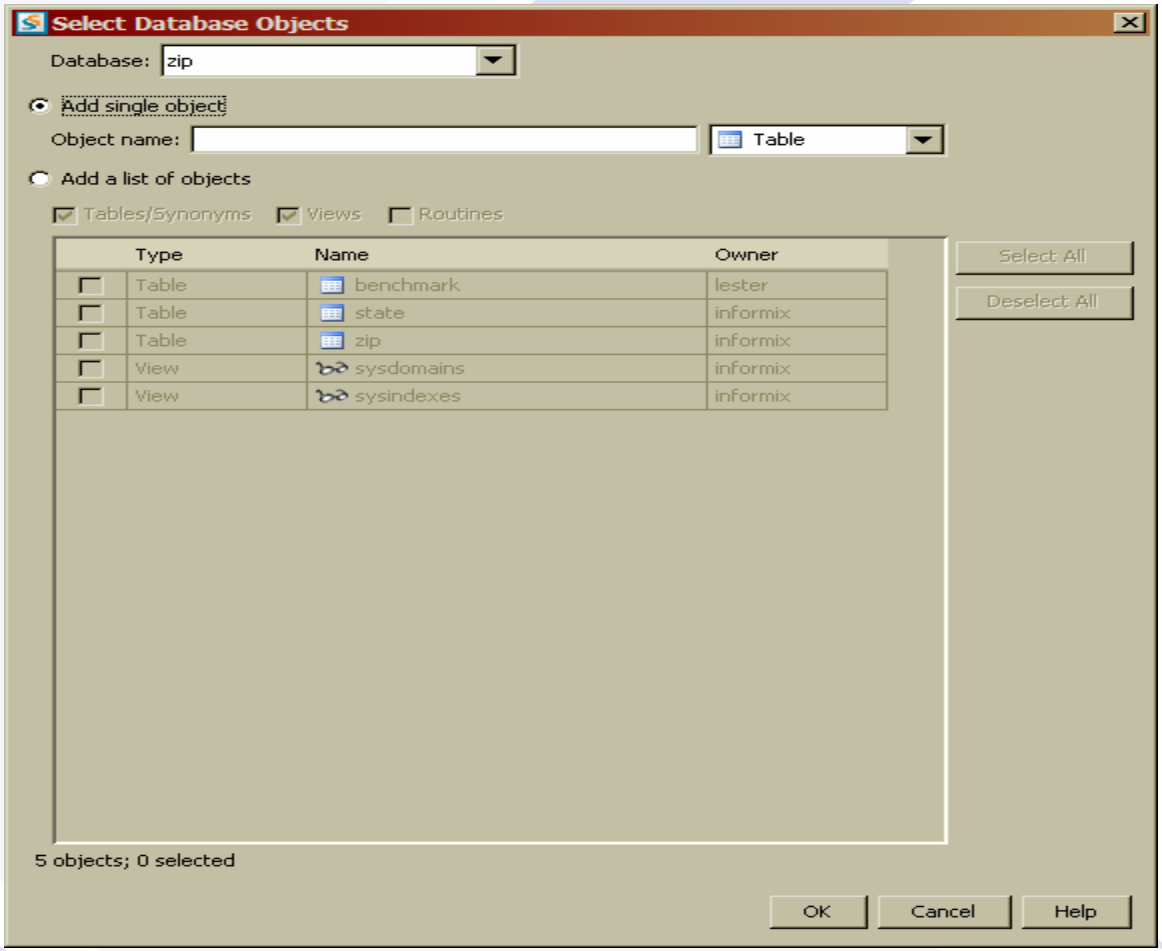
Step 1- Define SQL Capture



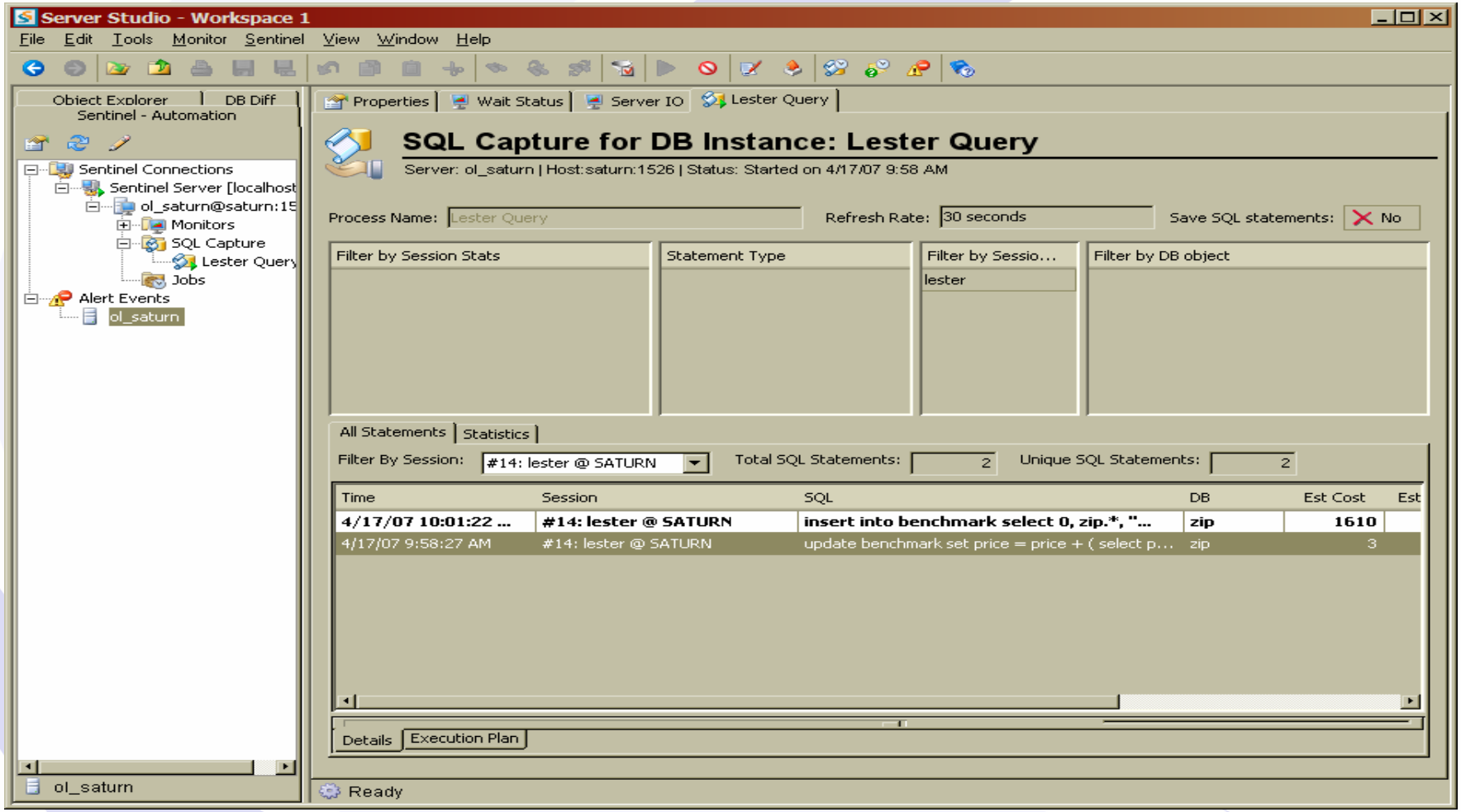
Step 1 - Select the User



Or Select the Database Object



Watch the SQL



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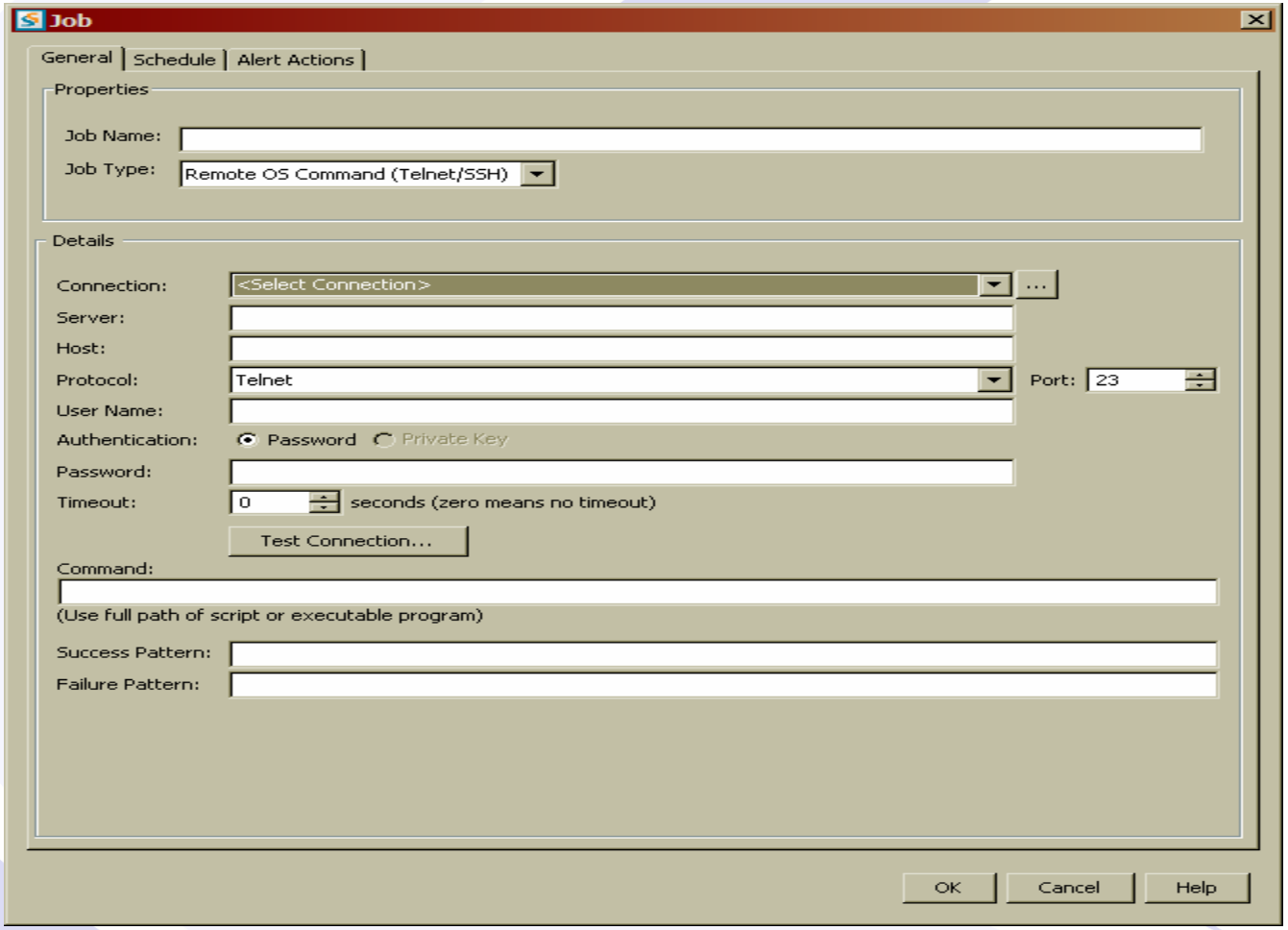
Create Jobs in Sentinal



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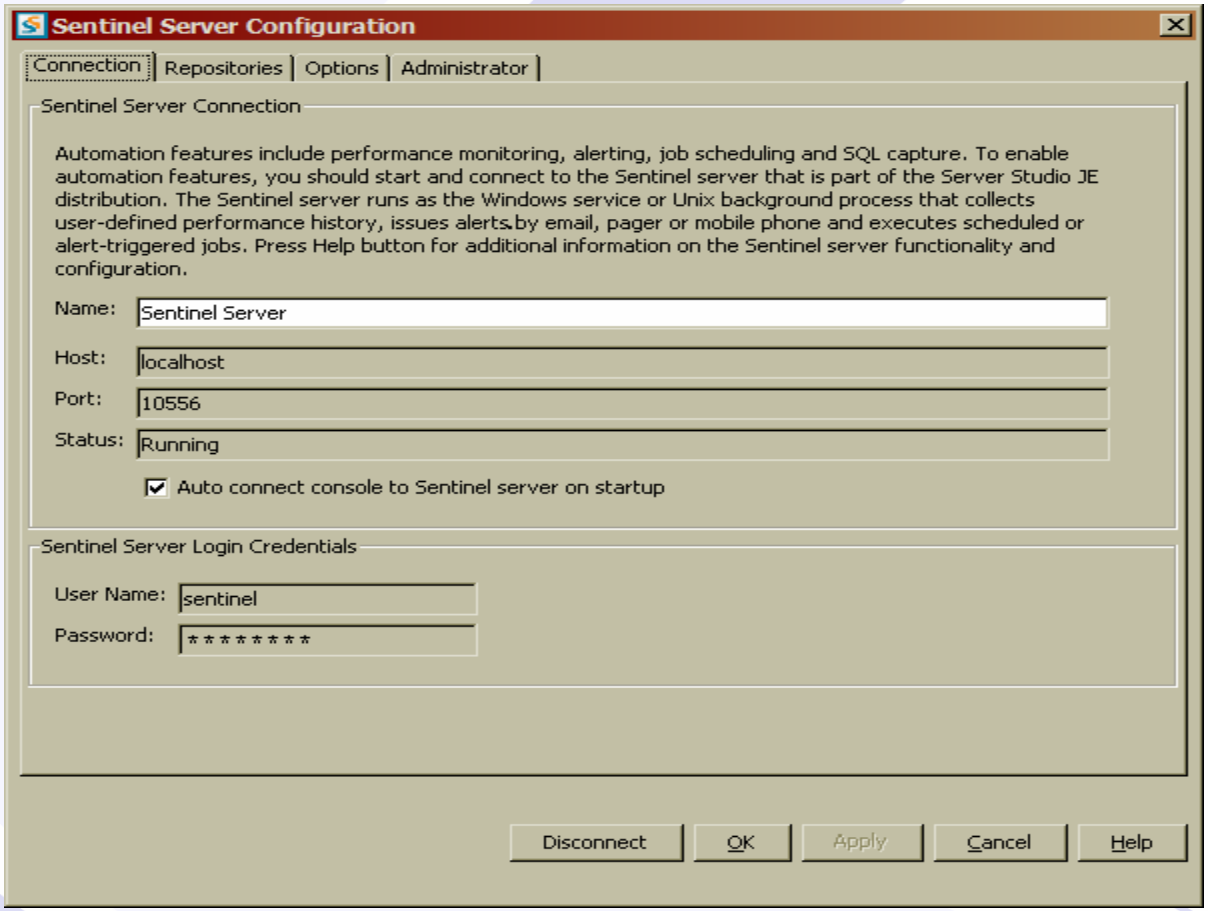
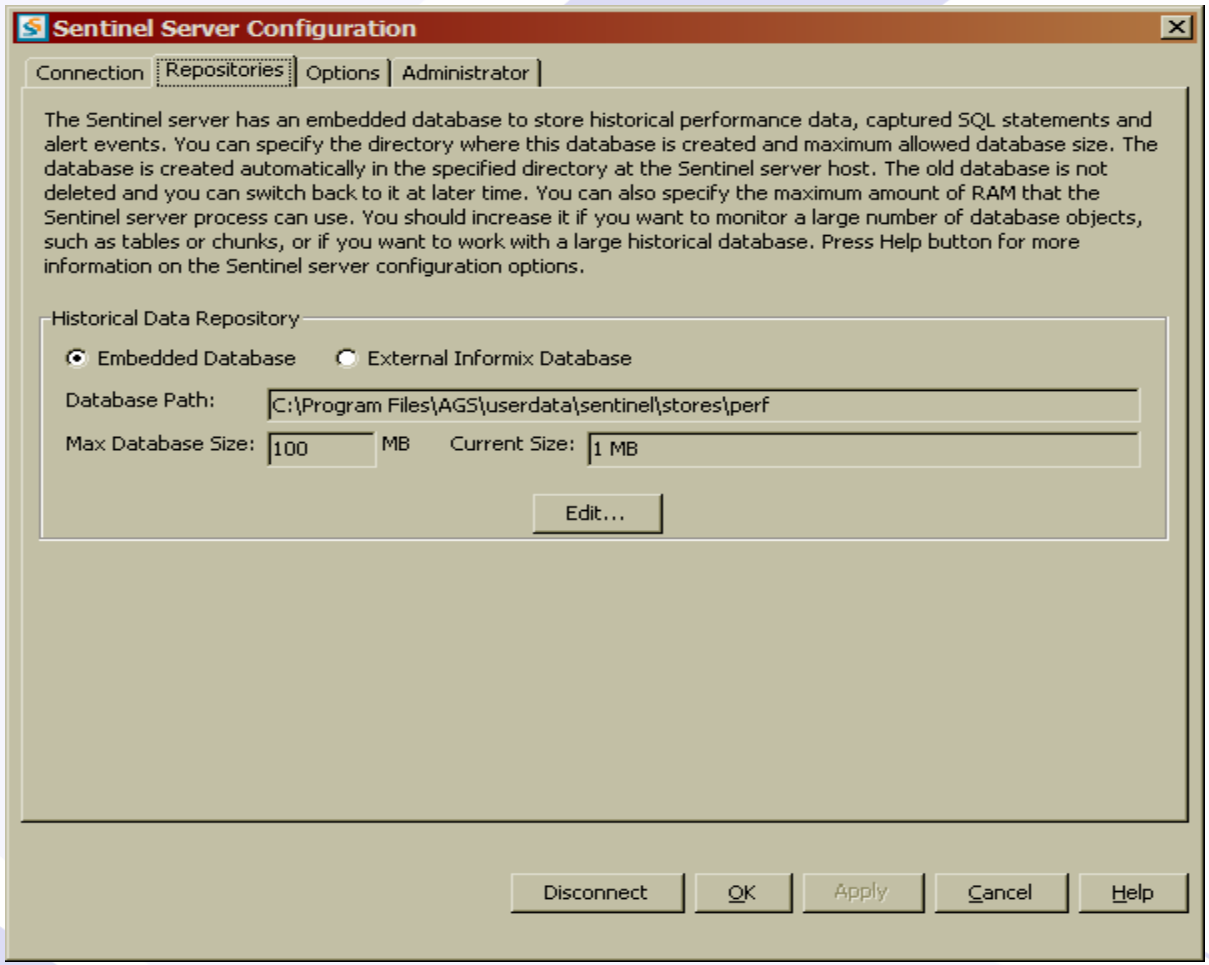
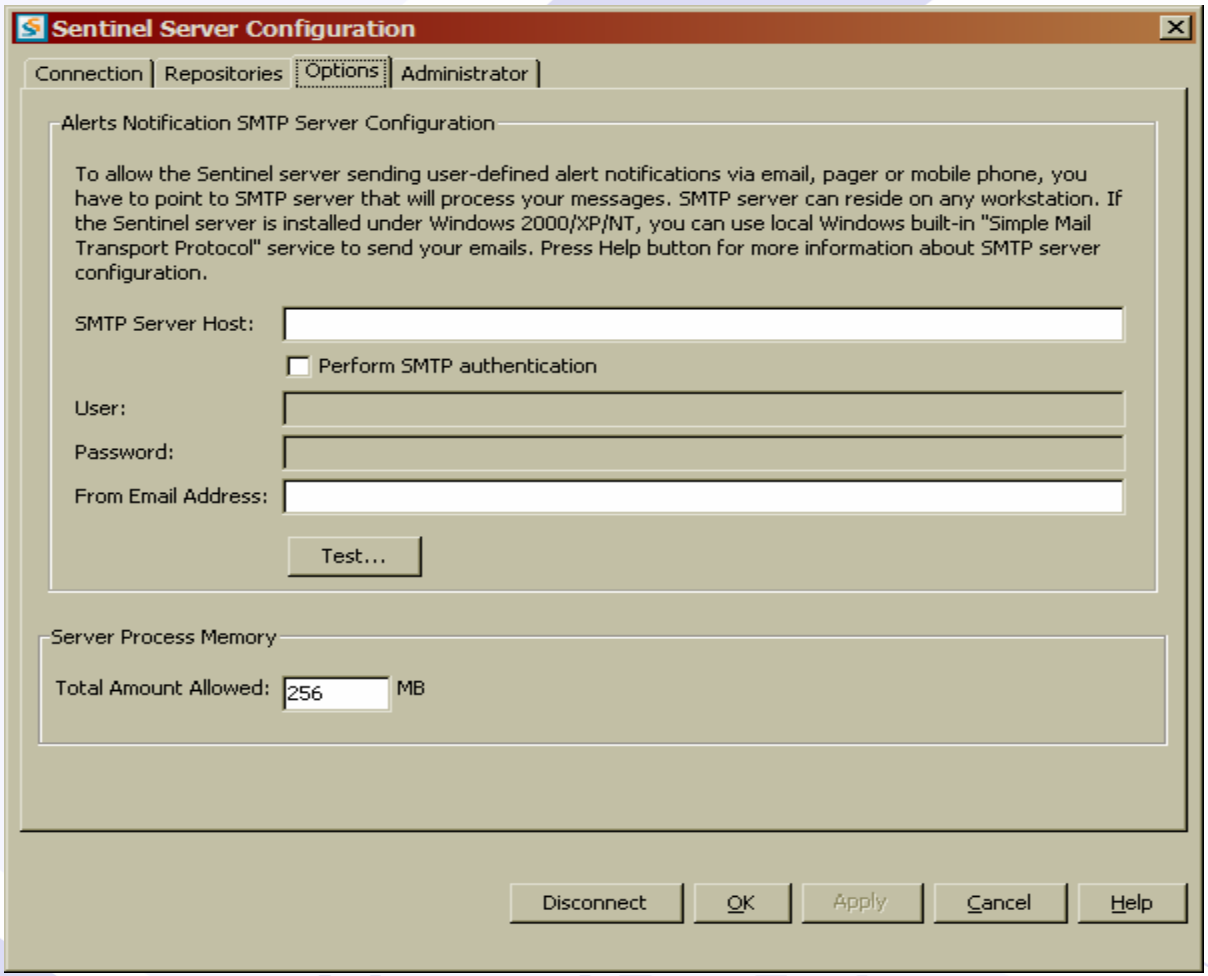
Configure Sentinel - Connection



Configure Sentinel - Repository



Configure Sentinel - Options



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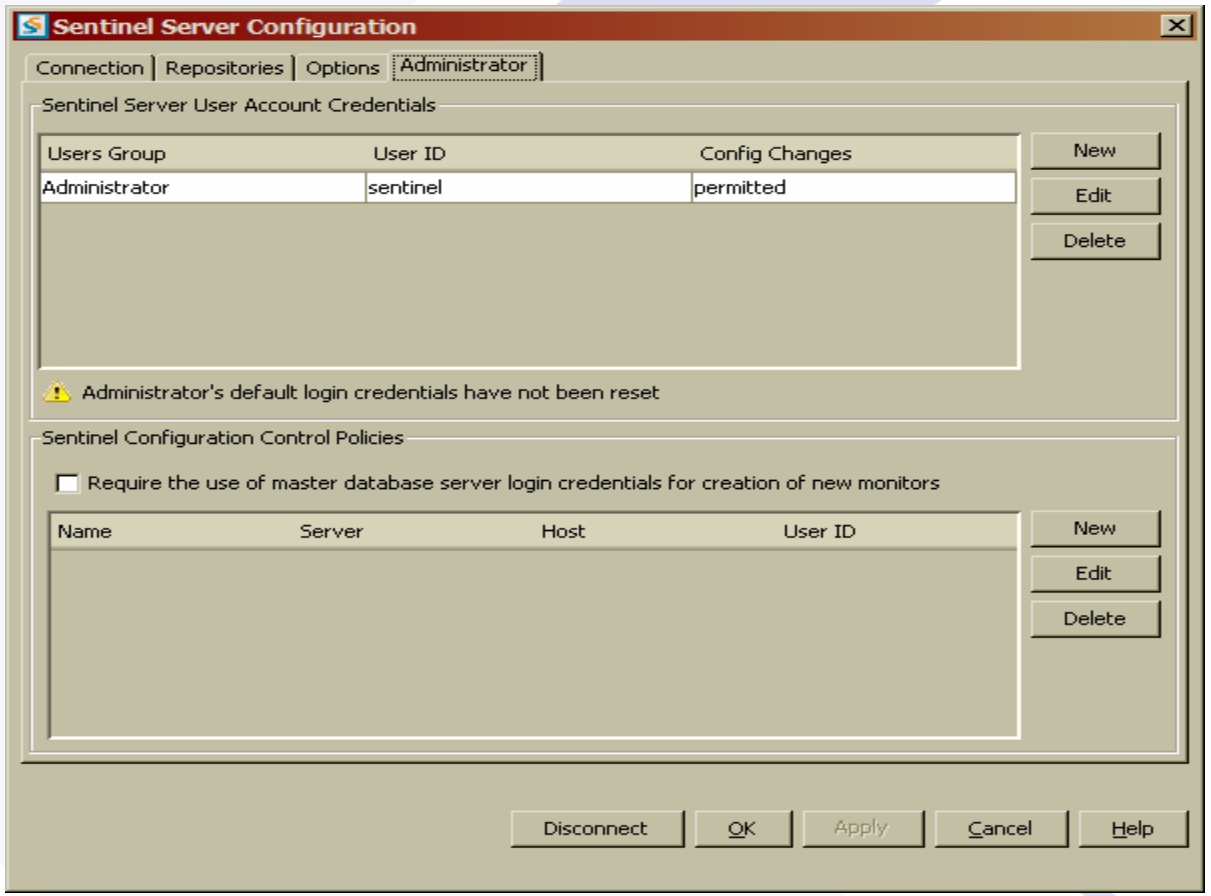
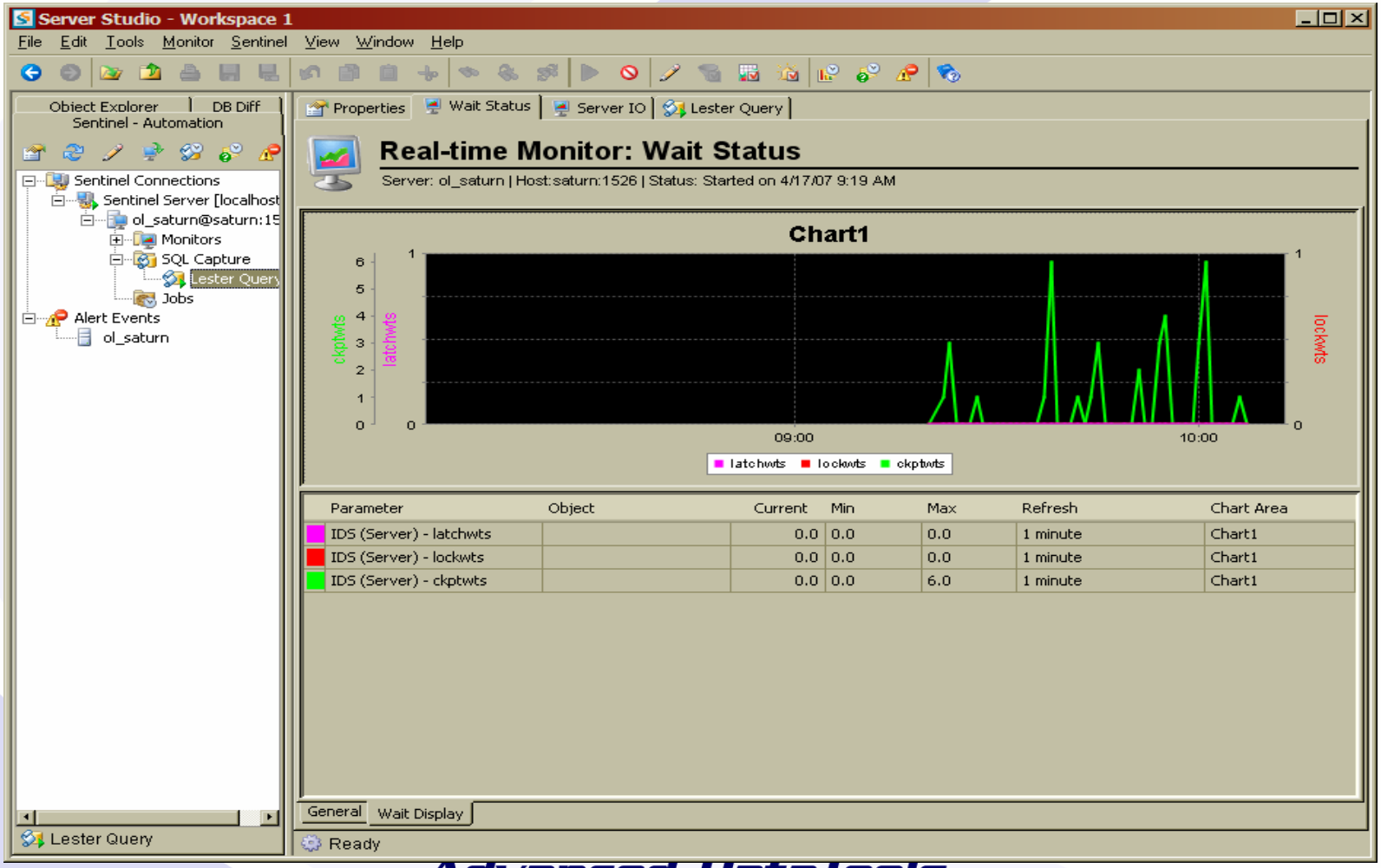
Configure Sentinel - Administration



Advanced DataTools

Watch the Monitor



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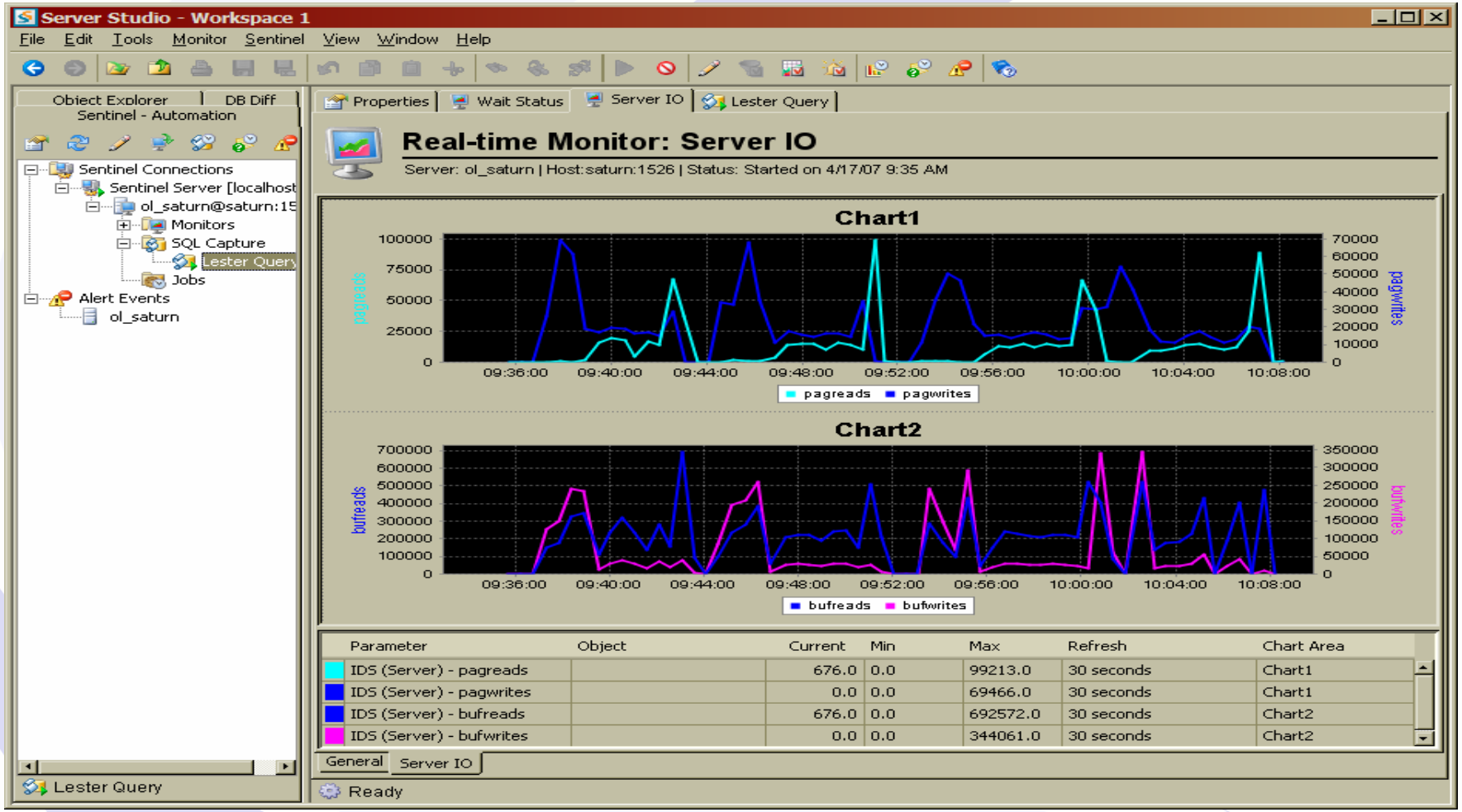
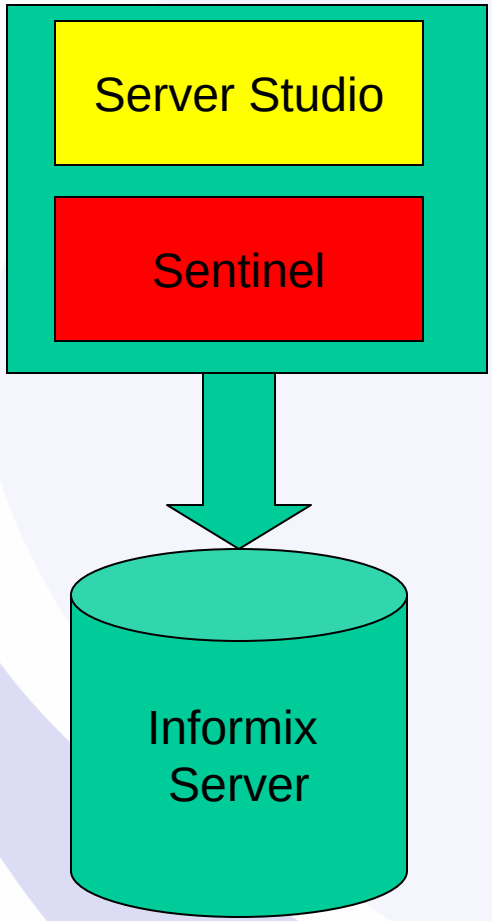
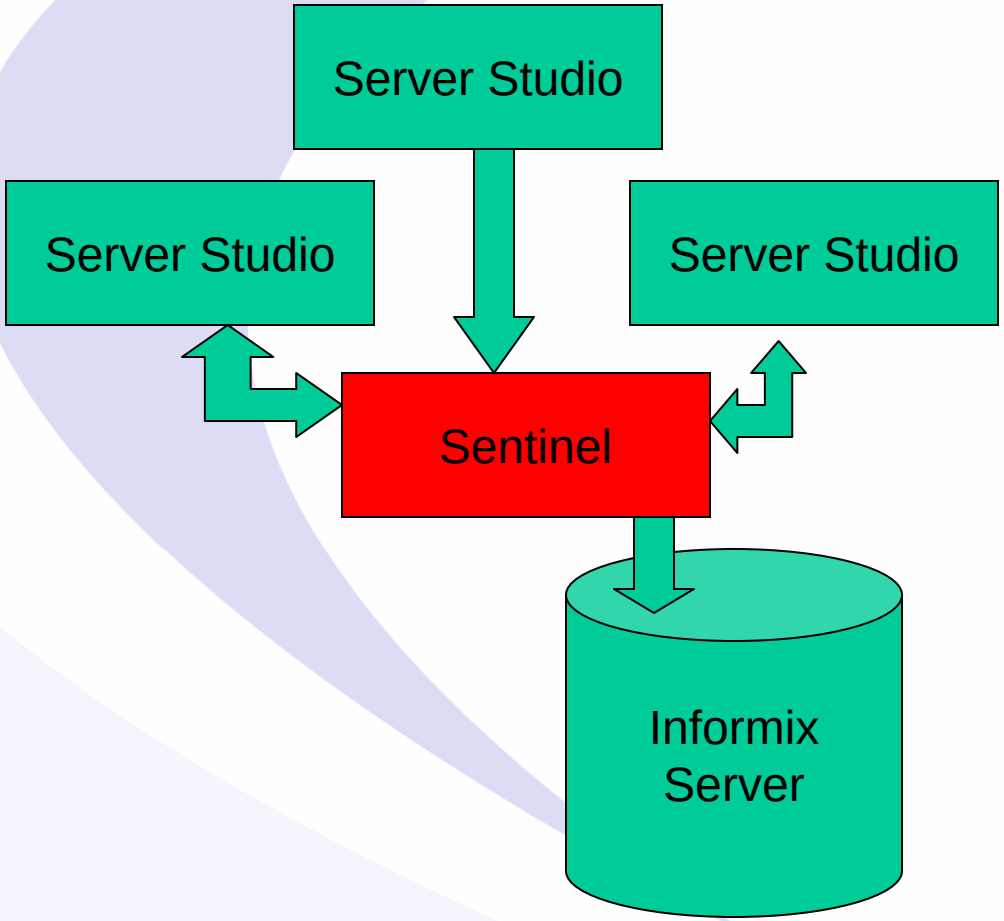


Advanced DataTools

Sentinel Configuration Option





What Parameters Should I Monitor?

Parameters - IDS Server

IDS (Server) - isAlive	This flag is TRUE if the connection to the server instance can be established
IDS (Server) - user_cpu	Total user CPU time used by all user threads expressed in seconds
IDS (Server) - system_cpu	Total system CPU time used by all user threads expressed in seconds
IDS (Server) - perc_phys_log_used	Percentage of used physical log
IDS (Server) - perc_lgcl_log_used	Percentage of logical logs used
IDS (Server) - user_session_count	Number of users connected to the server
IDS (Server) - buffer_wait_ratio	Buffer wait ratio (buffwts/(pagreads+bufwrites))*100
IDS (Server) - bufreads_writes_ratio	Buffered reads to buffered writes ratio (bufreads/bufwrites)
IDS (Server) - rollback_commits_ratio	Rollback to commit ratio (isrollbacks/iscommits)
IDS (Server) - isam_seqscan_ratio	ISAM total to sequential scan ration (seqscans/isamtot/)
IDS (Server) - perc_cached_read	Read cache percentage (100*(bufreads-dskreads)/bufreads)
IDS (Server) - perc_cached_write	Write cache percentage (100*(bufwrites-dskwrites)/dskwrites)
IDS (Server) - chkpoint_duration	Checkpoint duration
IDS (Server) - memory_pools	Total amount usedb by all memory pools in Kb
IDS (Server) - memory_sessions	Amount of memory pools used by user sessions in Kb
IDS (Server) - active_trans	Active transactions
IDS (Server) - dskreads	Number of actual reads from disk
IDS (Server) - pagreads	Number of pages read
IDS (Server) - bufreads	Number of reads from shared memory
IDS (Server) - dskwrites	Number of actual physical writes to disk. It includes the writes for the physical and logical logs.
IDS (Server) - pagwrites	Number of pages written.
IDS (Server) - bufwrites	Number of writes to the shared memory buffers
IDS (Server) - isamtot	Total number of ISAM calls made
IDS (Server) - isopens	Number of times a tablespace is opened
IDS (Server) - isstarts	Number of times an index position was changed
IDS (Server) - isreads	Number of times the ISAM read function is called
IDS (Server) - iswrites	Number of times the ISAM write function is called
IDS (Server) - isrewrites	Number of times the ISAM update function is called
IDS (Server) - isdeletes	Number of times the ISAM delete function is called
IDS (Server) - iscommits	Number of times the ISAM iscommit() function was called

Parameters - IDS Server

IDS (Server) - isrollbacks	Number of times transactions rolled back
IDS (Server) - ovlock	Number of times the database server attempted to exceed the maximum number of locks (specified as LOCKS in the ONCONFIG file)
IDS (Server) - ovuser	Number of times that a user attempted to exceed the maximum number of user threads
IDS (Server) - ovtrans	Overflow transaction table
IDS (Server) - latchwts	Increments when a thread waits to gain access to a shared-memory resource
IDS (Server) - buffwts	Number of times user threads have to wait for a buffer
IDS (Server) - lockreqs	Number of total requests for locks
IDS (Server) - lockwts	Number of times user threads wait to aquire a lock
IDS (Server) - lktouts	Number of deadlock timeouts
IDS (Server) - deadlks	Number of times that deadlocks were detected and cured
IDS (Server) - ckptwts	Number of times checkpoint waits
IDS (Server) - chunkwrites	Writes during a checkpoint
IDS (Server) - plgpagewrites	Physical-log pages written
IDS (Server) - plgwrites	Physical-log writes
IDS (Server) - llgrecs	Logical-log records
IDS (Server) - llgpagewrites	Logical-log pages written
IDS (Server) - llgwrites	Logical-log writes
IDS (Server) - flushes	Number of times that the buffer pool has been flushed to the disk
IDS (Server) - compress	Number of pages compressions
IDS (Server) - seqscans	Number of sequential scans executed
IDS (Server) - totalsorts	Total number of sorts
IDS (Server) - memsorts	Number of memory sorts (sorts that fit in memory)
IDS (Server) - disksorts	Number of disk sorts (sorts that did not fit in memory)
IDS (Server) - maxsortspace	Maximum disk space used by a sort
IDS (Server) - lruwrites	Least-recently used (LRU) writes
IDS (Server) - btradata	Data pages read ahead though leaf
IDS (Server) - btraidx	Leaf read ahead though leaf
IDS (Server) - dpra	Data-page read aheads
IDS (Server) - rapgs_used	Read-ahead pages used

Parameters – Table/Index/ Dbspace/Chunk

IDS (Table/Index) - tb_exts_count	Number of table extents
IDS (Table/Index) - tb_pg_allocated	Pages allocated
IDS (Table/Index) - tb_pg_used	Pages used
IDS (Table/Index) - tb_reads	Number of read function calls
IDS (Table/Index) - tb_writes	Number of write function calls
IDS (Table/Index) - tb_bufreads	Number of buffer reads
IDS (Table/Index) - tb_bufwrites	Number of buffer writes
IDS (Table/Index) - tb_pgwrites	Number of page writes
IDS (Table/Index) - tb_pgreads	Number of page reads
IDS (Table/Index) - tb_wtlock	Number of lock waits
IDS (Table/Index) - tb_lockrq	Number of lock requests
IDS (Table/Index) - tb_deadlocks	Number of deadlocks
IDS (Table/Index) - tb_seqscans	Number of seqeuential scans
IDS (Table/Index) - tb_deletes	Number of delete function calls
IDS (DBSpace) - sp_used_page_size	Number of used pages in the space
IDS (DBSpace) - sp_perc_used	Percent of the space used
IDS (Chunk) - ch_perc_free	Percent of the chunk free
IDS (Chunk) - ch_reads	Number of physical reads
IDS (Chunk) - ch_writes	Number of physical writes
IDS (Chunk) - ch_pageswritten	Number of page writes
IDS (Chunk) - ch_pagesread	Number of page reads
IDS (Chunk) - ch_free_pages	Number of free pages in the chunk

Parameters – Session and VP

IDS (Session) - sqs_reads	Number of the ISAM read function calls
IDS (Session) - sqs_writes	Number of ISAM write function calls
IDS (Session) - sqs_buffwrts	Number of buffer writes
IDS (Session) - sqs_buffrds	Number of buffer reads
IDS (Session) - sqs_pagerds	Number of page reads
IDS (Session) - sqs_pgwrts	Number of page writes
IDS (Session) - sqs_rewrts	Number of rewrites
IDS (Session) - sqs_scans	Number of sequential scans
IDS (Session) - sqs_longtran	Number of long transactions for the session
IDS (Session) - sqs_rollback	Number of rollbacks
IDS (Session) - sqs_sorts	Number of total sorts
IDS (Session) - sqs_disksorts	Number of disk sorts
IDS (Session) - sqs_max_sort_space	Maximum space used by a sort
IDS (Session) - sqs_max_log_space	Maximum number of bytes of logical-log space ever used by the session
IDS (Session) - sqs_crt_log_space	Number of bytes of logical-log space used by current transaction of the session
IDS (Session) - sqs_log_recs	Number of logical-log records written by the session
IDS (Session) - sqs_lckreq	Number of locks requested by the session
IDS (Session) - sqs_lock_held	Number of locks currently held by the session
IDS (Session) - sqs_dead_locks	Number of deadlocks detected at the session
IDS (Session) - sqs_dels	Number of deletes
IDS (Session) - sqs_lock_waits	Number of times waited for a lock
IDS (Session) - sqs_ovlock	Number of times a session ran out of locks
IDS (Session) - sqs_commits	Number of commits
IDS (VP) - vp_class_syscpu	System cpu used by a processor
IDS (VP) - vp_class_usercpu	User cpu used by a processor
IDS (VP) - vp_class_rdqueue	Number of ready queues

Parameters – Operating System

Unix (General) - os_cpu_busy	Percentage of time CPU was busy
Unix (General) - os_cpu_idle	Percentage of time CPU was idle
Unix (General) - os_cpu_runq	Average length of the CPU run queue
Unix (General) - os_cpu_scalls	Number of system calls of per second
Unix (General) - os_cpu_sys	Percentage of time CPU was running in system mode
Unix (General) - os_cpu_user	Percentage of time CPU was running in user mode
Unix (General) - os_cpu_wio	Percentage of time CPU was idle waiting for I/O
Unix (General) - os_forks	Number of forks per second
Unix (General) - os_load_avg_1	Load average for the past minute
Unix (General) - os_load_avg_5	Load average for the past 5 minutes
Unix (General) - os_load_avg_15	Load average for the past 15 minutes
Unix (General) - os_logins	Number of interactive logins
Unix (General) - os_mem_phys_free	Free physical memory in MB
Unix (General) - os_mem_phys_used	Used physical memory in MB
Unix (General) - os_mem_swap_free	Free swap space in MB
Unix (General) - os_mem_swap_used	Used swap space in MB
Unix (General) - os_mem_pgin	Paging activity (in per second)
Unix (General) - os_mem_pgout	Paging activity (out per second)
Unix (CPU) - os_mp_busy	Percentage of time CPU is busy (per-CPU)
Unix (CPU) - os_mp_idle	Percentage of time CPU is idle (per-CPU)
Unix (Disk) - os_disk_busy	Percentage of time disk was busy servicing a request
Unix (Disk) - os_disk_avque	Average number of requests outstanding for the disk
Unix (Disk) - os_disk_avserv	Average disk service time, milliseconds
Unix (Disk) - os_disk_wr_sec	Number of writes per second
Unix (Disk) - os_disk_rd_sec	Number of reads per second
Unix (Disk) - os_disk_rdwr_sec	Number of read and write operations per second
Unix (Volume) - os_vol_free	Free space on disk volume, megabytes
Unix (Volume) - os_vol_used	Used space on disk volume, megabytes
Unix (Volume) - os_vol_free_pct	Free space on disk volume, percent of volume size
Unix (Volume) - os_vol_used_pct	Used space on disk volume, percent of volume size
Unix (Network) - os_net_err_in	Number of bad network packets received per second
Unix (Network) - os_net_err_out	Number of bad network packets sent per second
Unix (Network) - os_net_conns	Number of concurrent established TCP connections
Unix (Network) - os_net_pks_in	Number of network packets received (per second)
Unix (Network) - os_net_pks_out	Number of network packets sent (per second)

What Points of Time Should You Monitor?

- Near Real Time – 15 seconds
- Regular points of time in a day – 15 minutes to 1 x per hour
- Daily Summary Totals
- Weekly or Monthly – when things change

Near Real Time – 15 seconds

- Number of Transactions
- What are things waiting on?

Regular points of time in a day – 15 minutes to 1 x per hour

- Server Performance
- Session Performance

Daily Summary Totals

- Table performance
- Chunk performance

Weekly or Monthly – when things change

- Schema
- Server Configuration

More Information on Server Studio and Sentinel

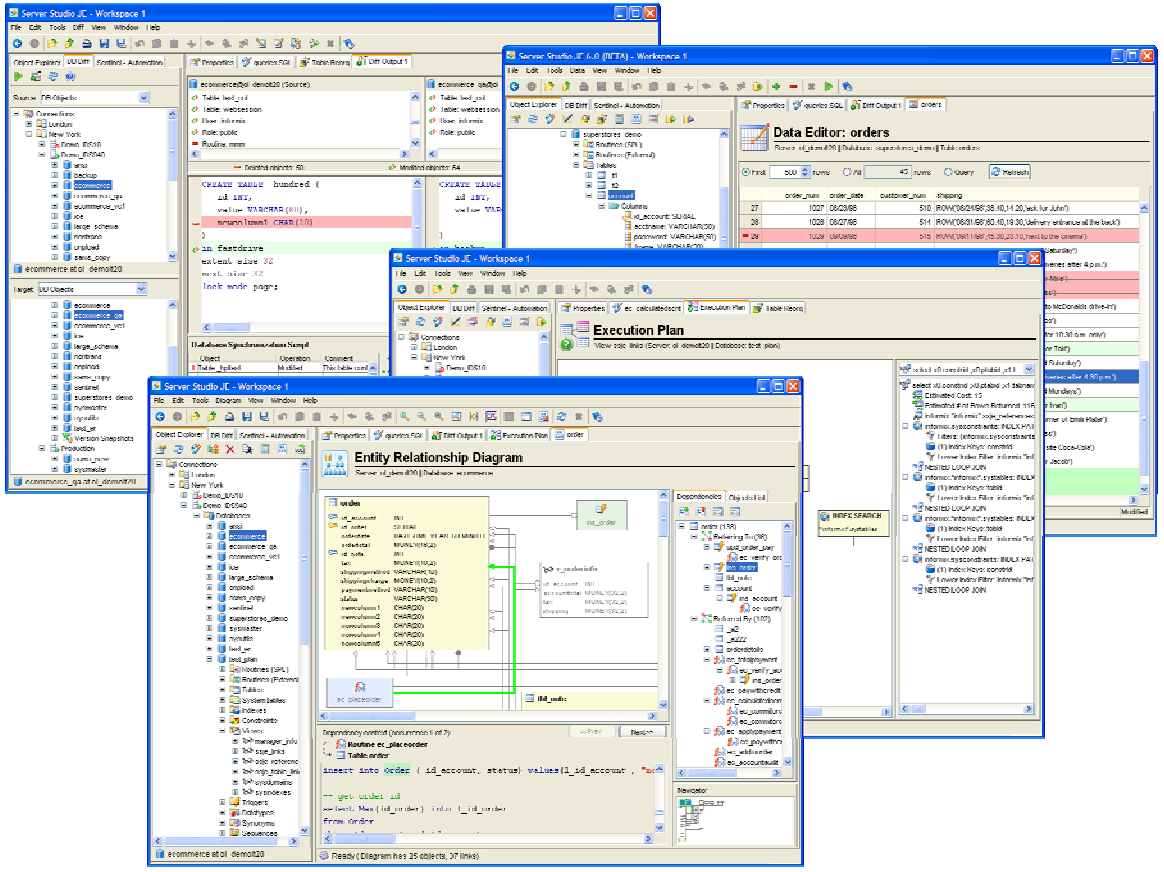
Server Studio™

AGS TAKE BACK CONTROL

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.

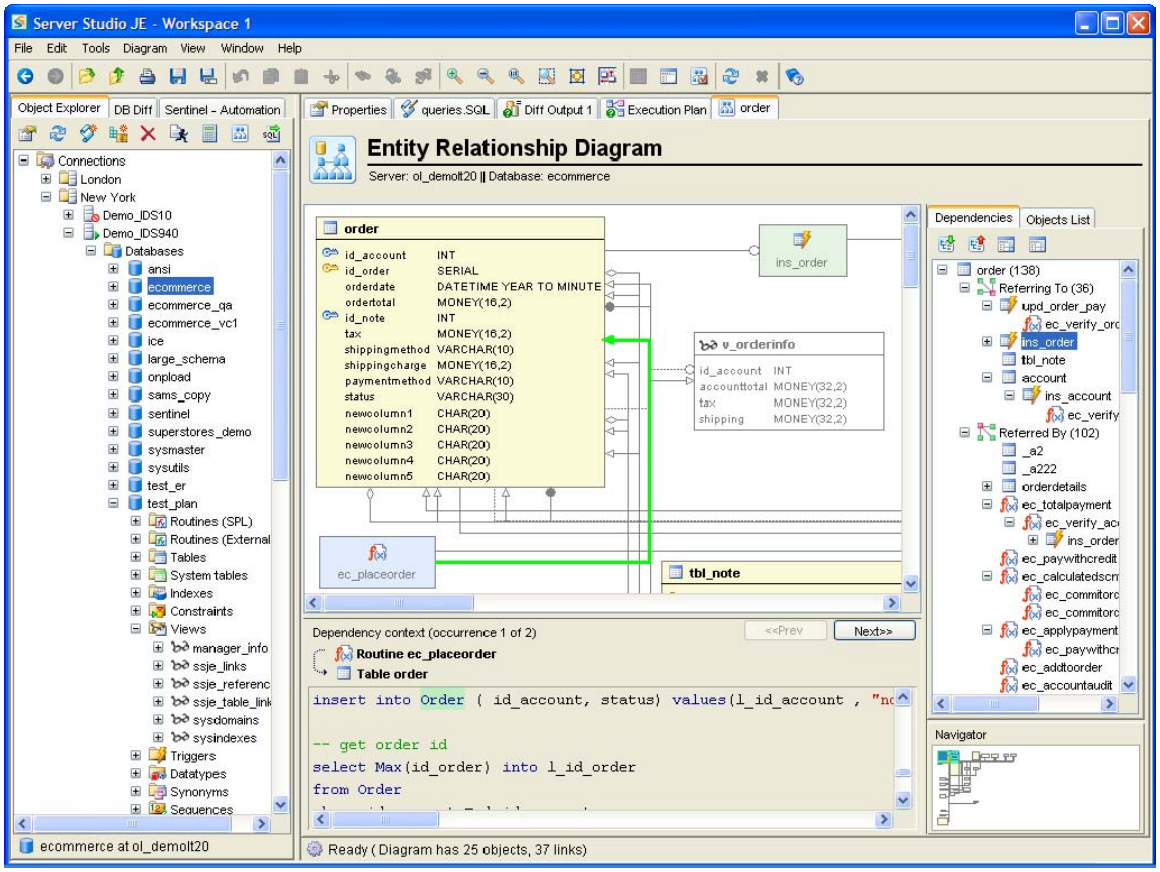


Server Studio™

Database Development & Administration – Entity Relationship Diagrams

New

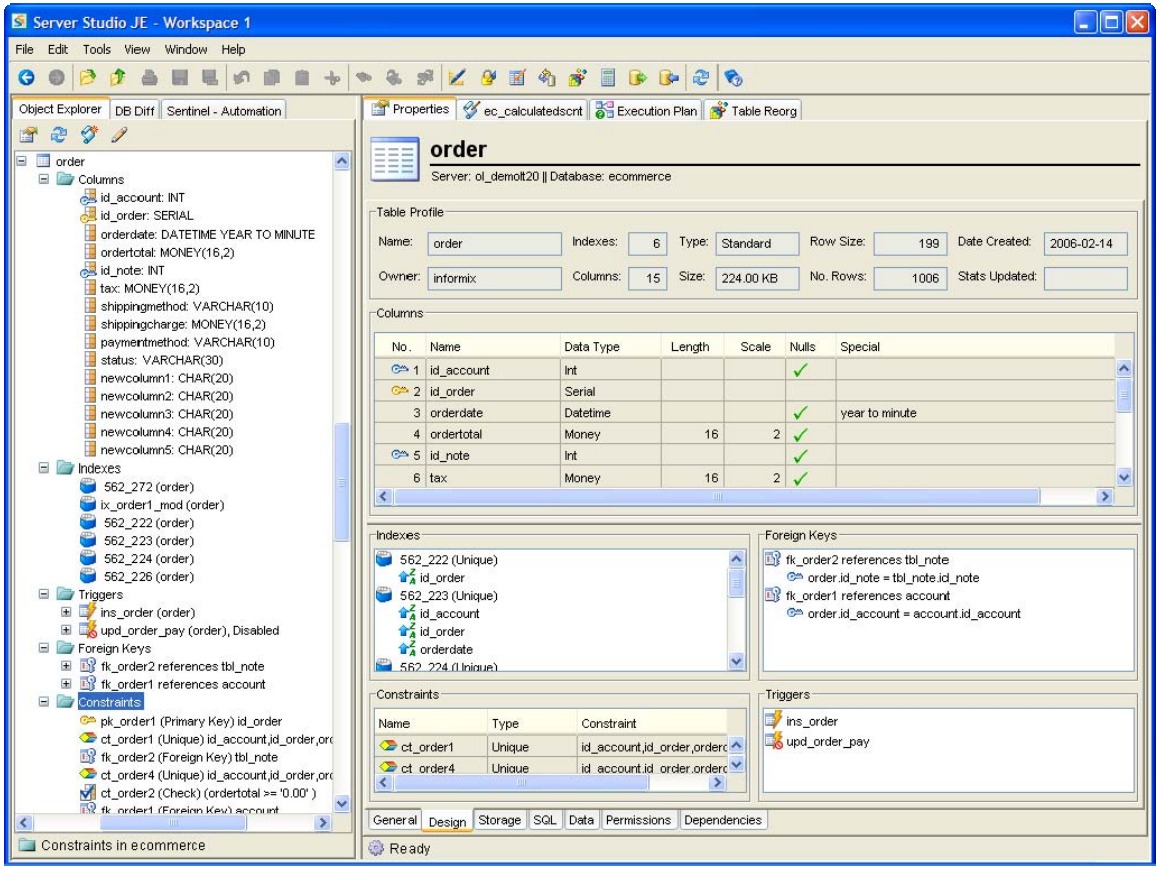
- Entity Relationship Diagrams enable immediate graphical analysis of complex relationships and dependencies between database objects, such as: Tables, Views, Indexes, Stored Procedures and Triggers.
- E/R Diagrams provide vital help in visualizing and documenting databases' logical design and constraints.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

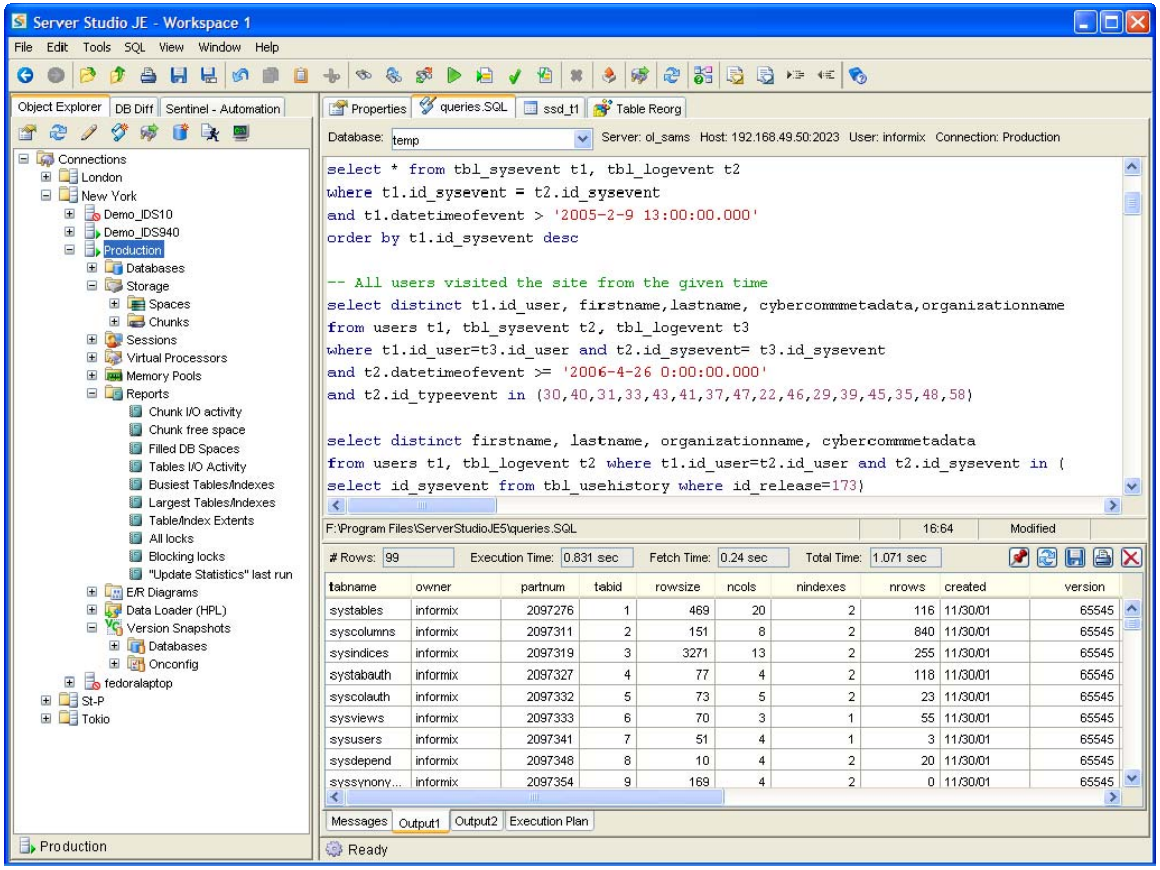
- Interactively create new, or edit existing tables and views.
- Highly granular access to all attributes including:
  - columns
  - datatypes
  - table and index fragmentation definitions
  - referential integrity constraints
  - Primary keys
  - Foreign keys
- Dynamically generate SQL CREATE and ALTER 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.

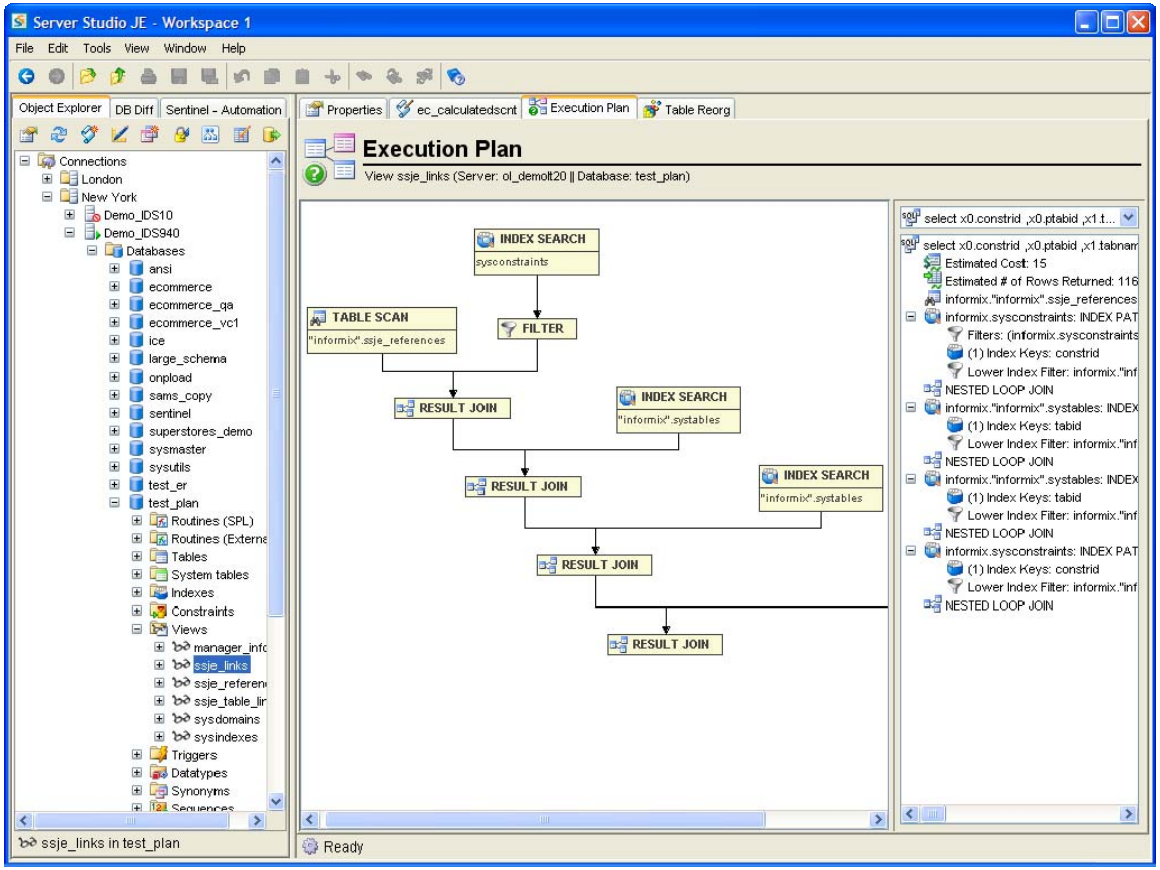


Server Studio™

Database Development & Administration – Execution Plan Analyzer

New

- 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.

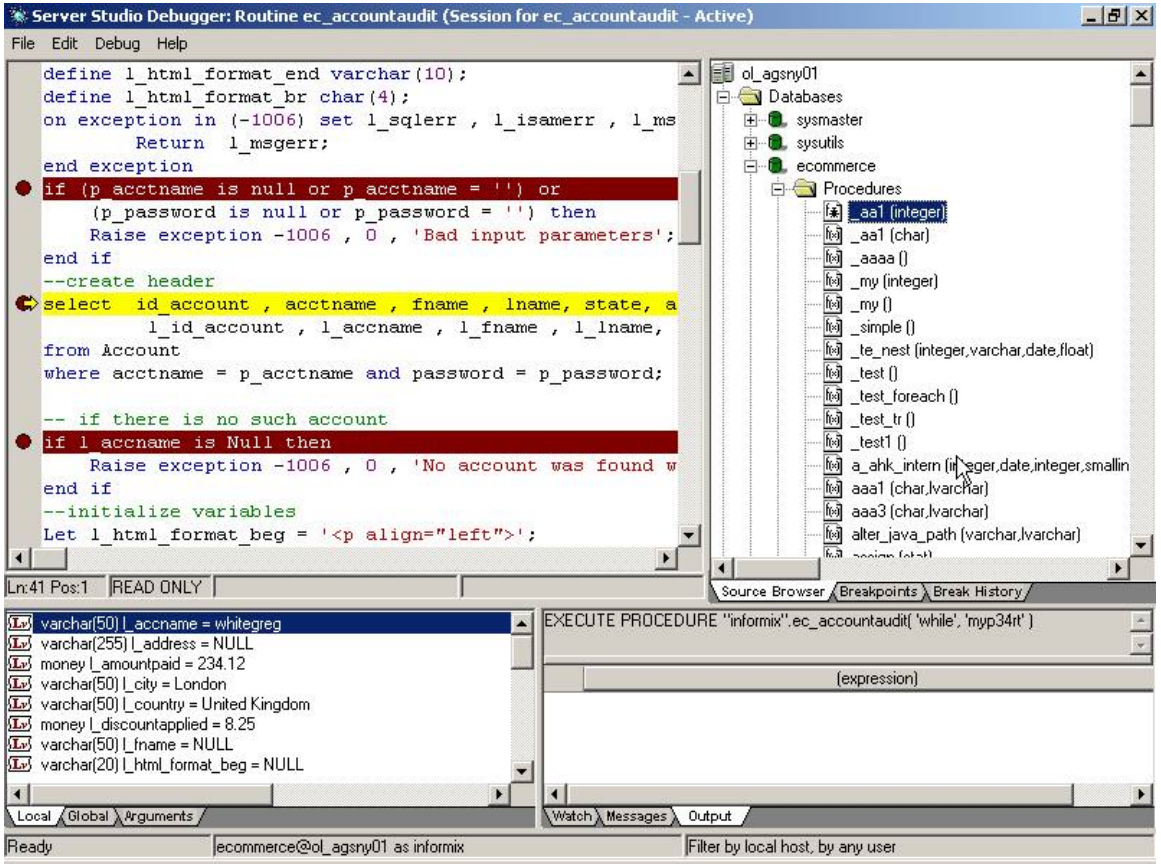


Server Studio™

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:

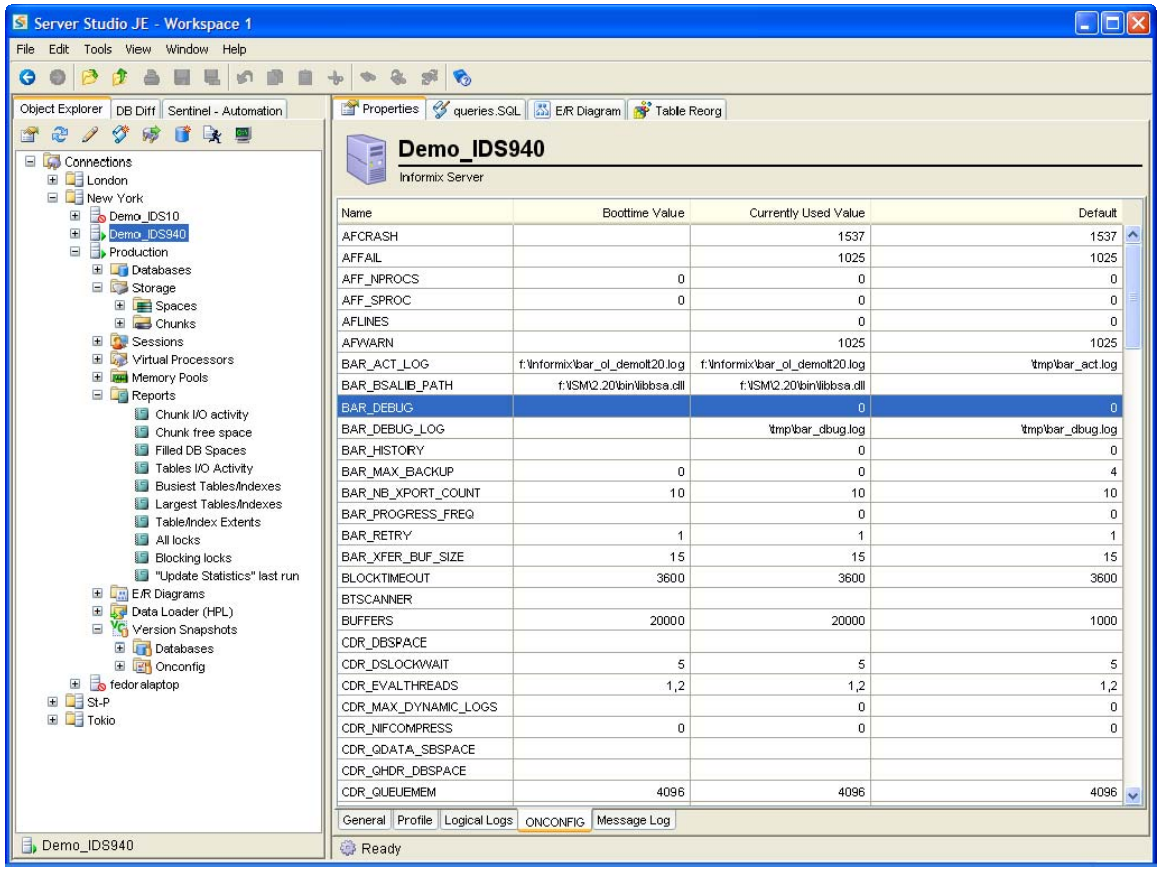
- Execute stored procedures and triggers line-by-line.
- Step into nested procedures or fired triggers.
- Set execution breakpoints.
- Watch and to modify values of procedures' variables and calling arguments.
- Break infinite loops.
- “Hook" into a stored procedure or trigger already executing on the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



Server Studio™

Database Development & Administration - Server Administrator

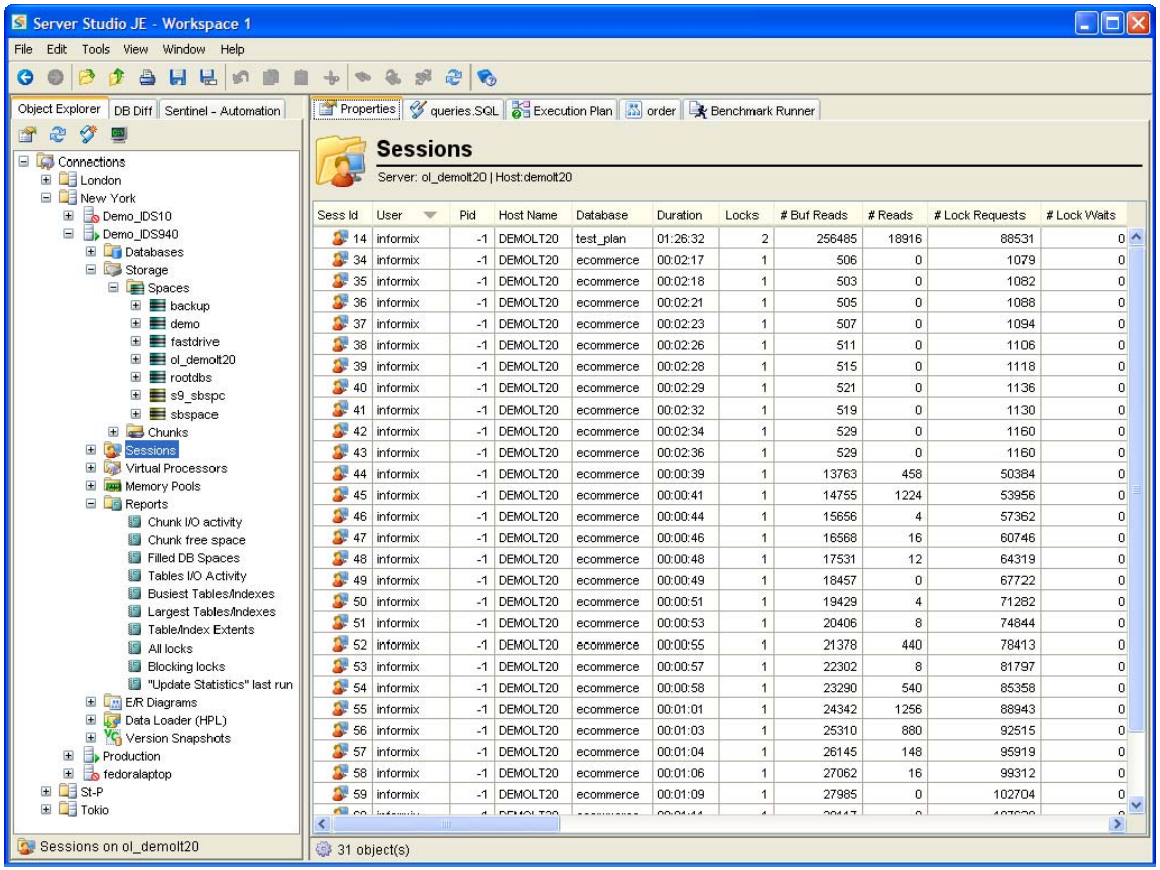
- Server Administrator provides powerful views and many pre-configured performance information reports across multiple databases instances.
- It helps handle everyday tasks such as:
  - Server's operational modes management
  - Examination of server's profile, ONCONFIG parameters, I/O statistics and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



Server Studio™

Database Development & Administration – Sessions Manager

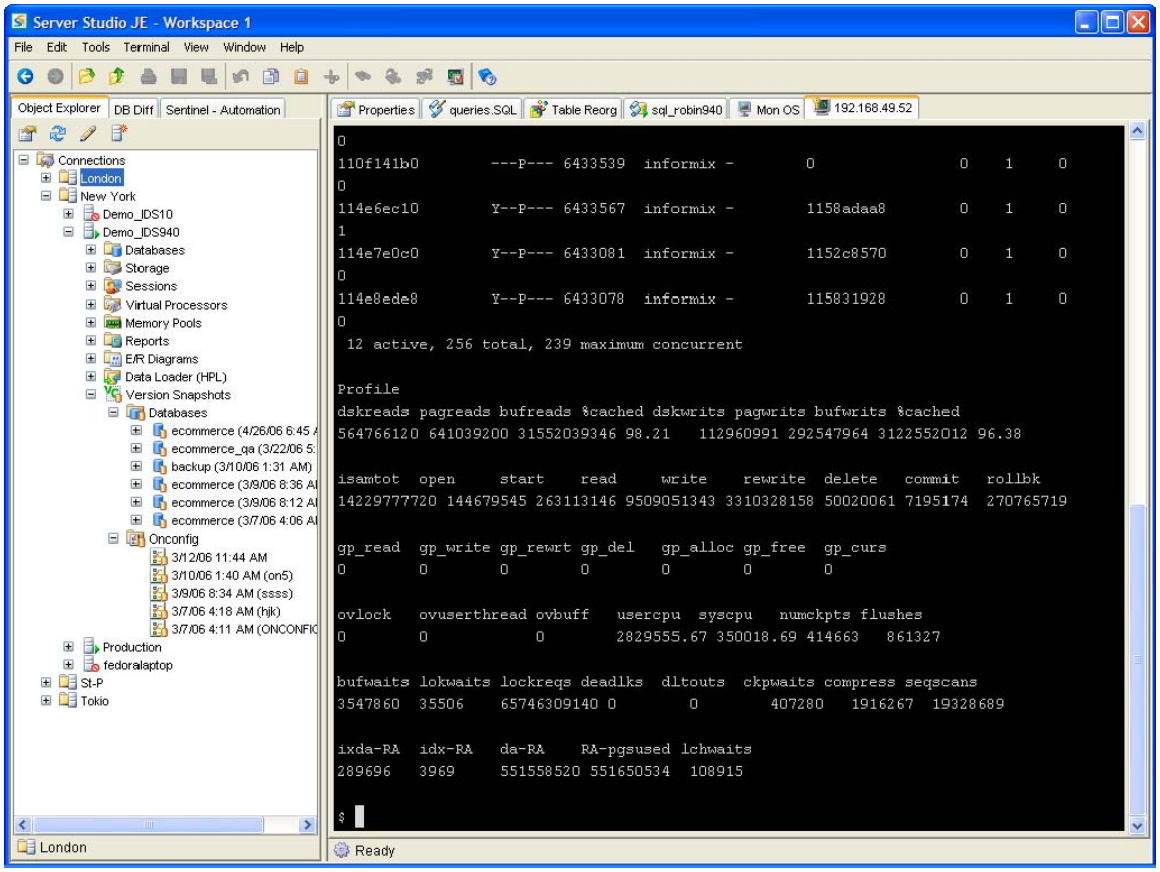
- Sessions Manager facilities of the Server Administrator provide ability to analyze database sessions' activity by:
  - Host
  - Database
  - Duration
  - Locks Statistics
  - I/O activity
- Problematic sessions that create server bottlenecks can be easily terminated.
- SQL statements last executed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



Server Studio™

Database Development & Administration - Server Administrator

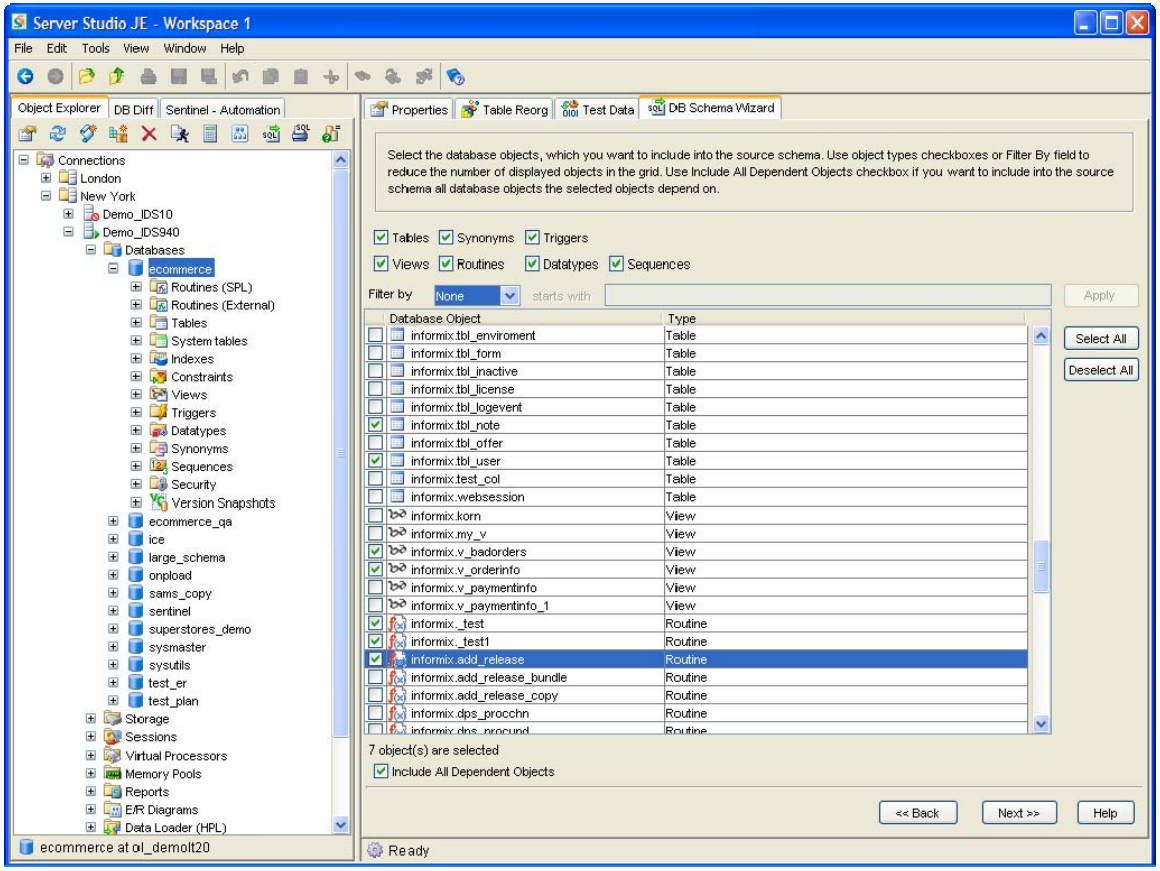
- The Server Administrator's built-in secure terminal automatically connects to the desired server host and sets all required environment variables, enabling you to execute transparently any server-side script or shell command, as well as your favorite IBM Informix® native utilities, such as:
  - ONSTAT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



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.

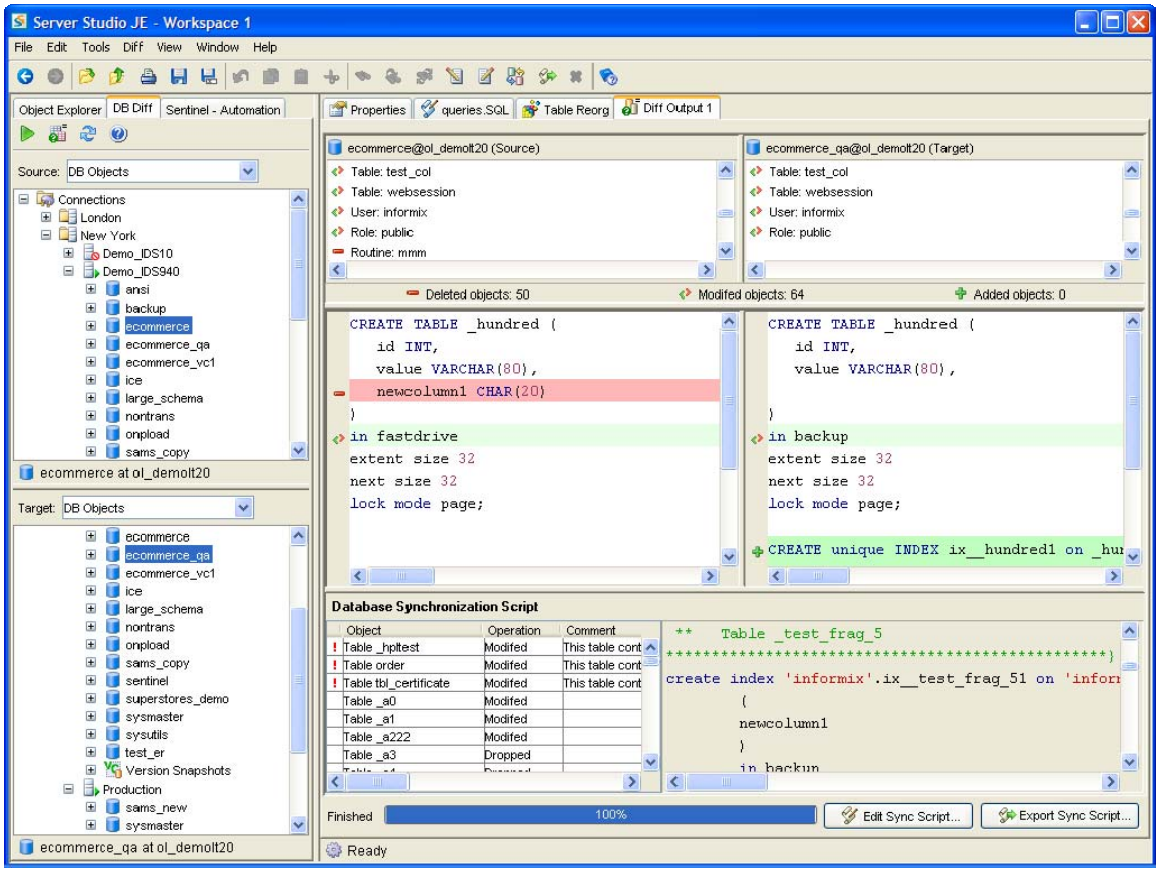


Server Studio™

Configuration & Change Management – DB Difference Analyzer

New

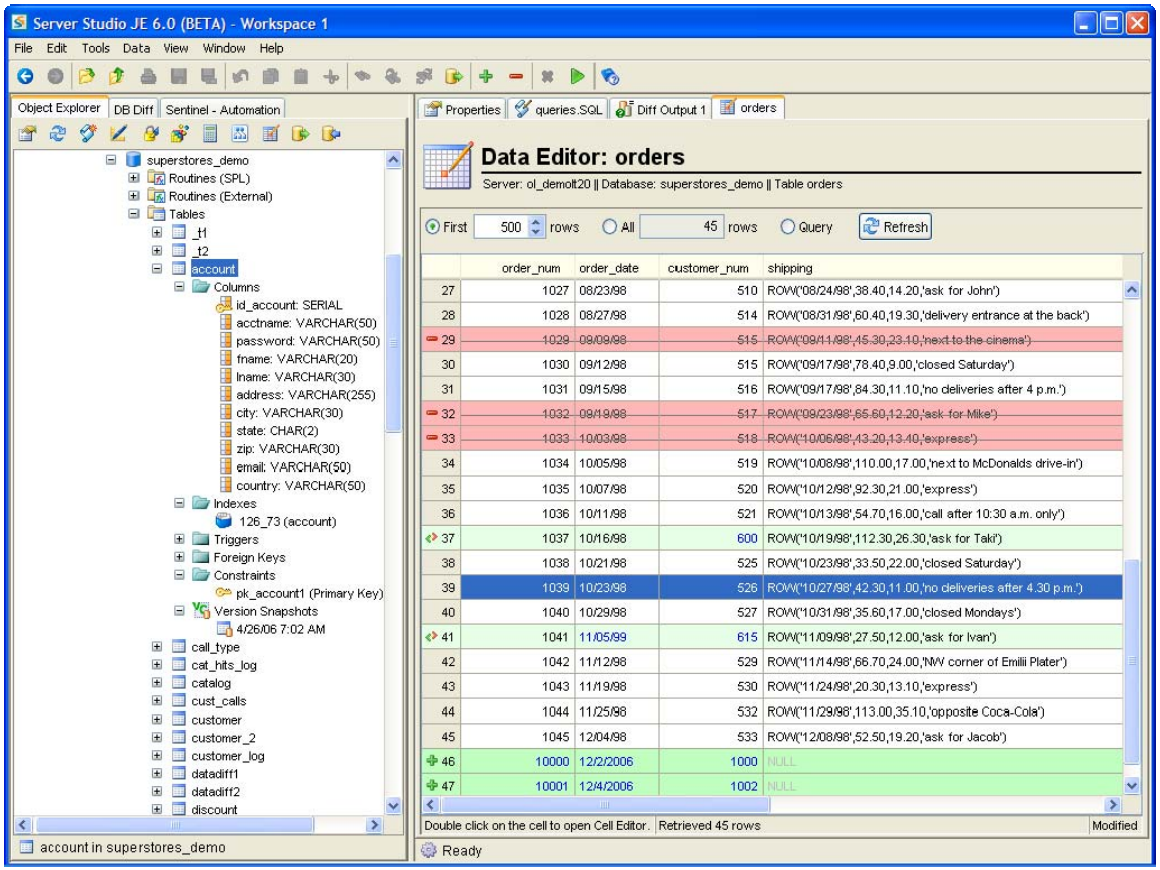
- A powerful change management tool that compares entire databases, located on the same or on different servers.
- Perform comparative analysis of all database objects' properties including:
  - table structures
  - referential integrity
  - Fragmentation
  - syntax of stored procedures, triggers and 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.

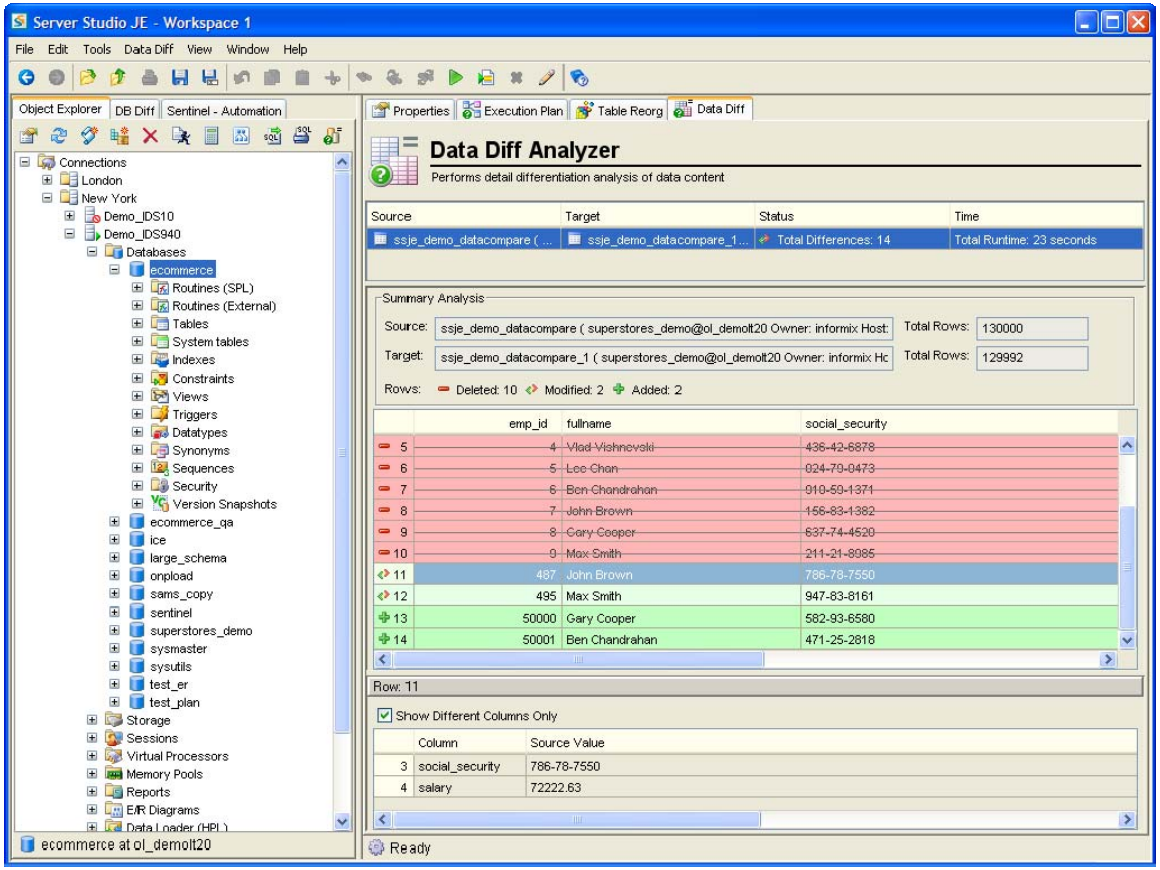


Server Studio™

Data Management – Data Difference Analyzer

New

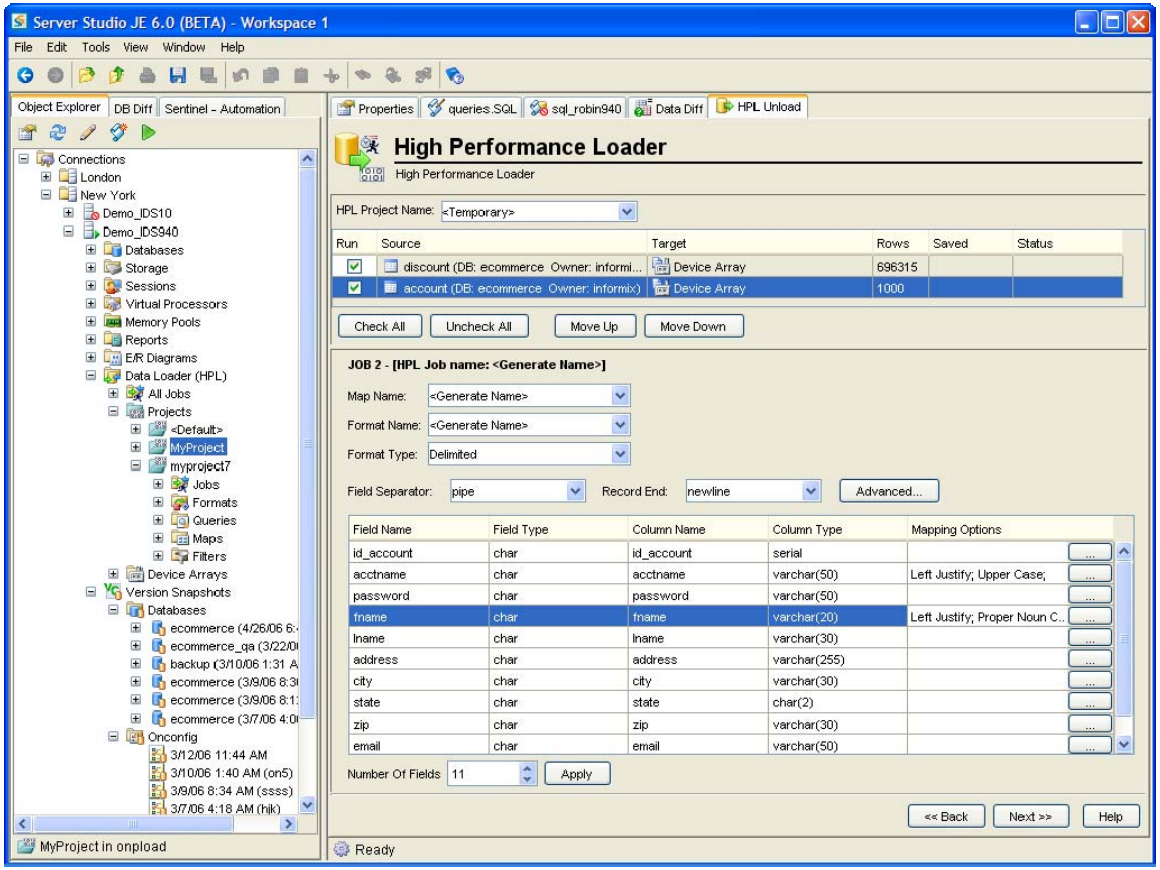
- Compare data in tables with compatible structures.
- Compared tables can be located within the same database, on the same server or on different servers.
- Highly efficient comparison algorithm - millions of records can be compared within minutes.
- Detail graphical analysis of data changes that covers 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™

Data Management – High Performance Loader

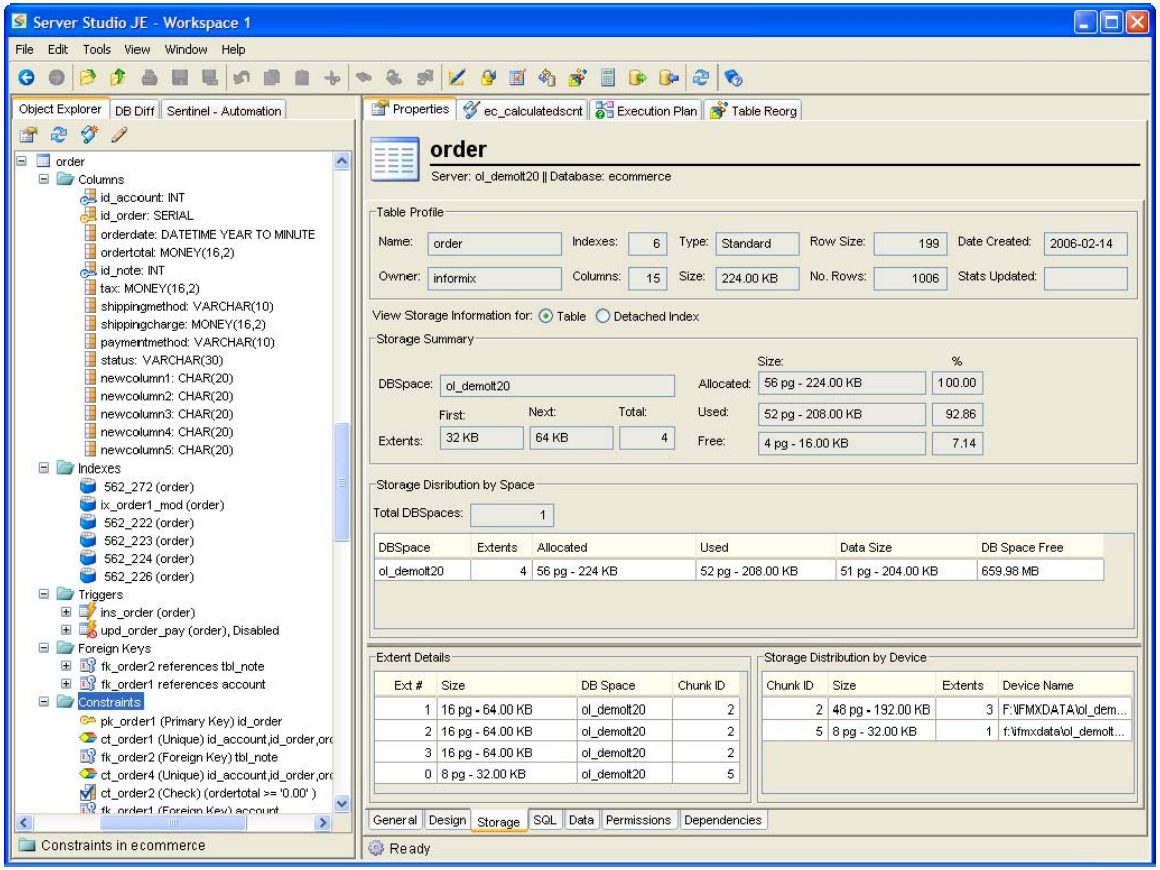
- Provides highly intuitive multi-platform user interface for IDS High Performance Loader
- Streamlines creation of new HPL data load and unload jobs
- Simplifies maintenance of existing HPL jobs
- Allows to group multiple HPL jobs into logical containers



Server Studio™

Storage Space Management – Table Fragmentation (Partitioning)

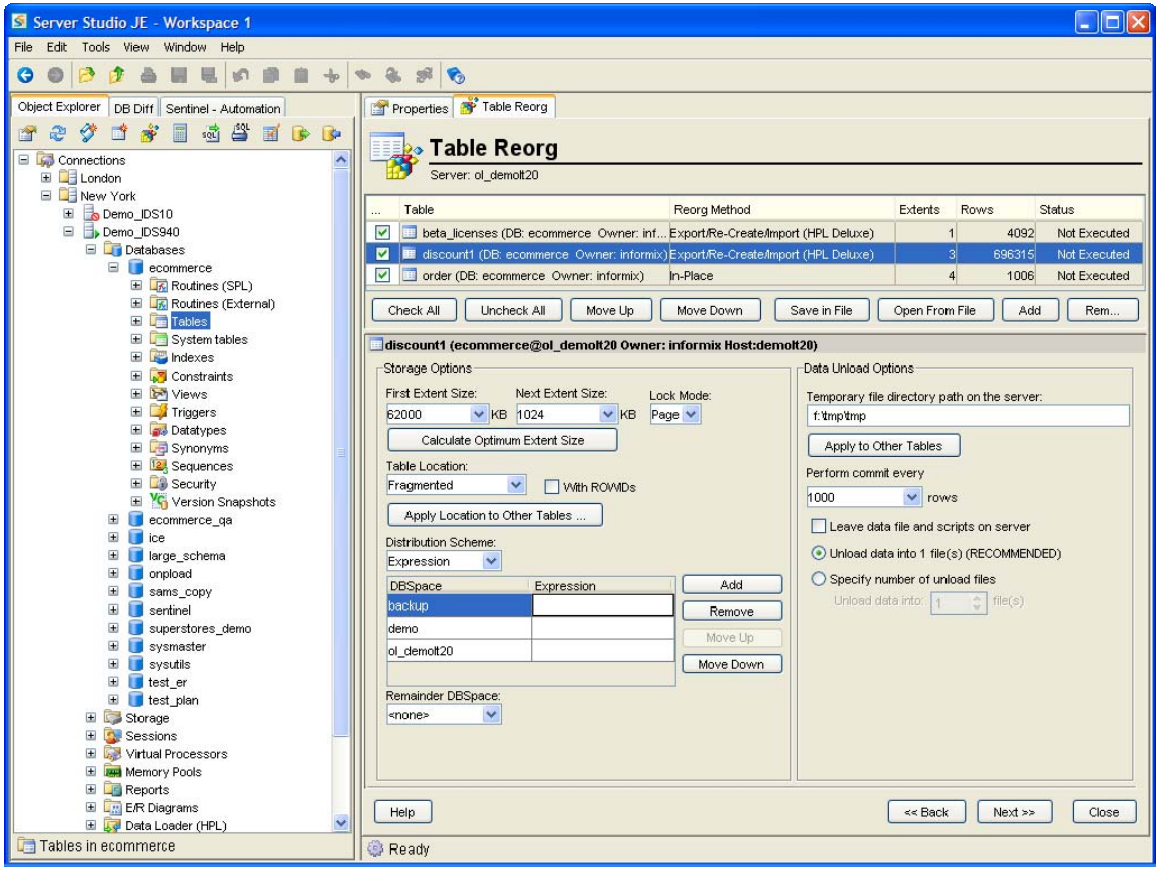
- Create, modify and manage with ease data partitioning strategies to improve:
  - Single-user response time
  - Concurrency
  - Availability
  - Backup-and-restore strategy
  - Loading of data
- Full support for:
  - Expression-based fragmentation
  - Round-robin fragmentation
  - Detached Indexes
-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



Server Studio™

Storage Space Management – Table Reorg

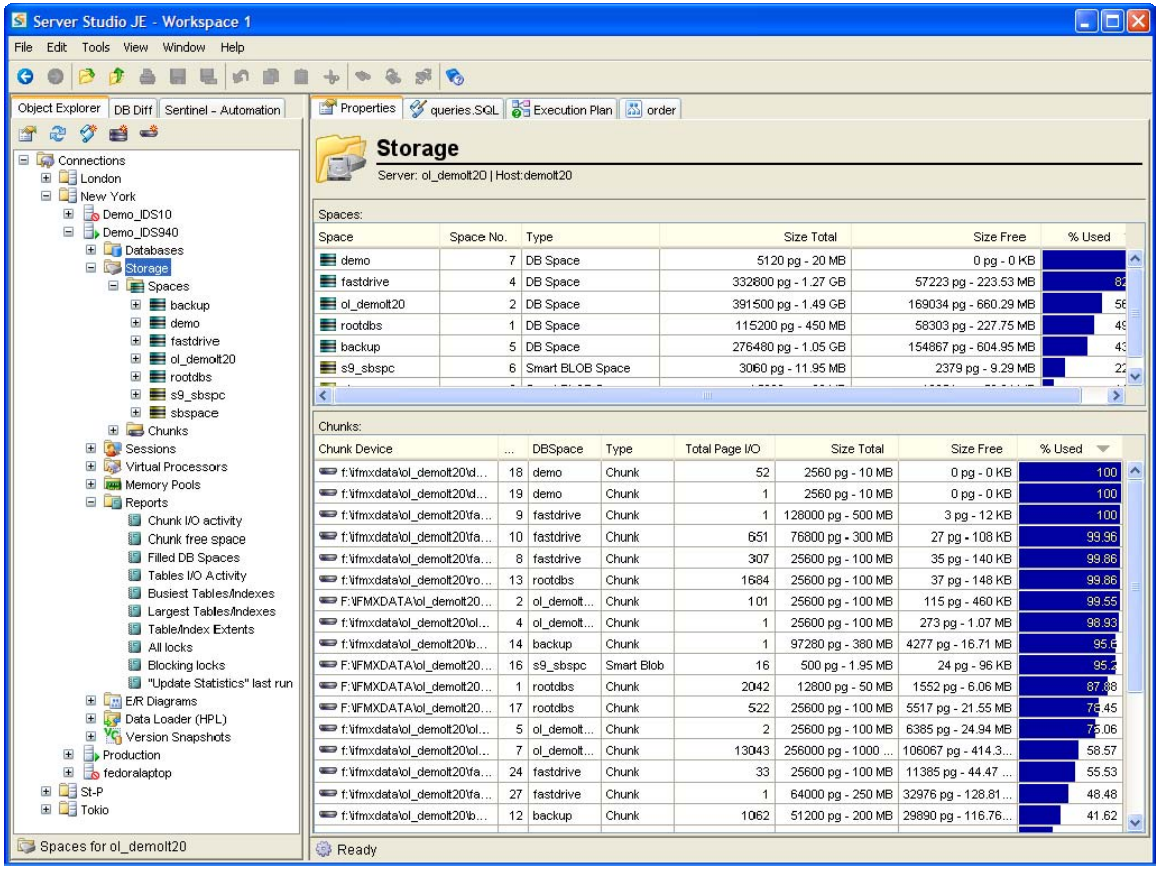
- Improve utilization efficiency of scarce data storage resources and optimize database performance by:
  - reorganizing tables' structure and data allocation to reduce the number of table extents and reclaiming wasted space
  - moving data to a different DB Spaces or fragmenting it across multiple DB 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

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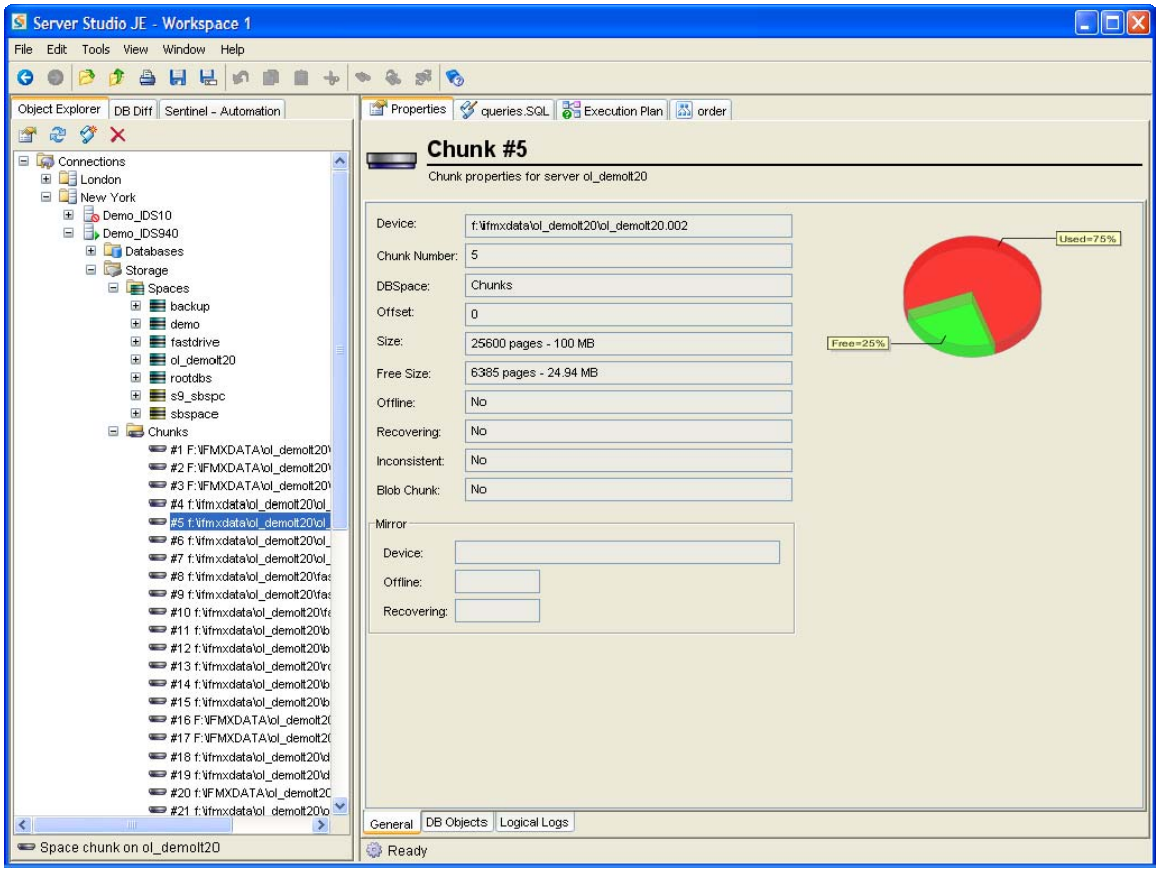


Server Studio™

Pre-Deployment Testing

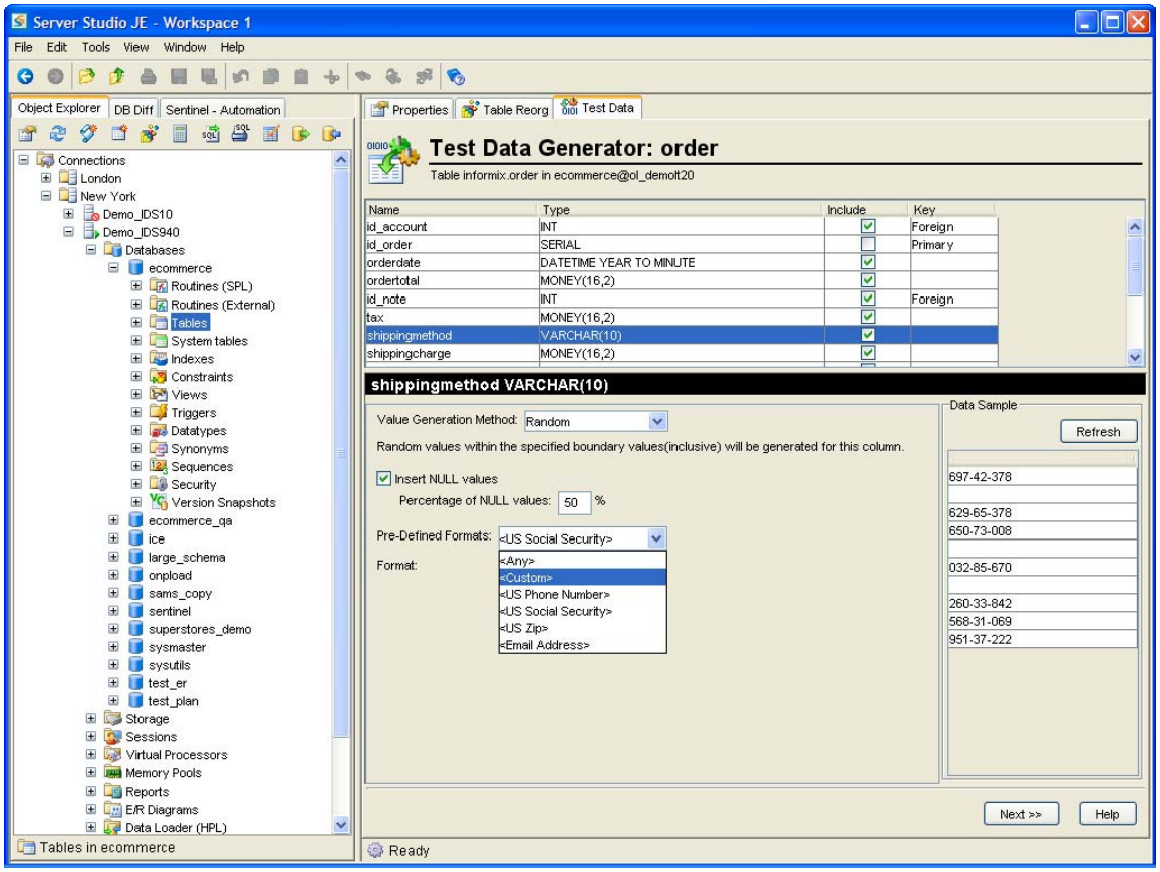
Extensive pre-deployment testing facilities of Server Studio™ help DBAs and application developers pinpoint DBMS system bottlenecks and set operational benchmarks to help achieve required levels of database performance and availability.

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

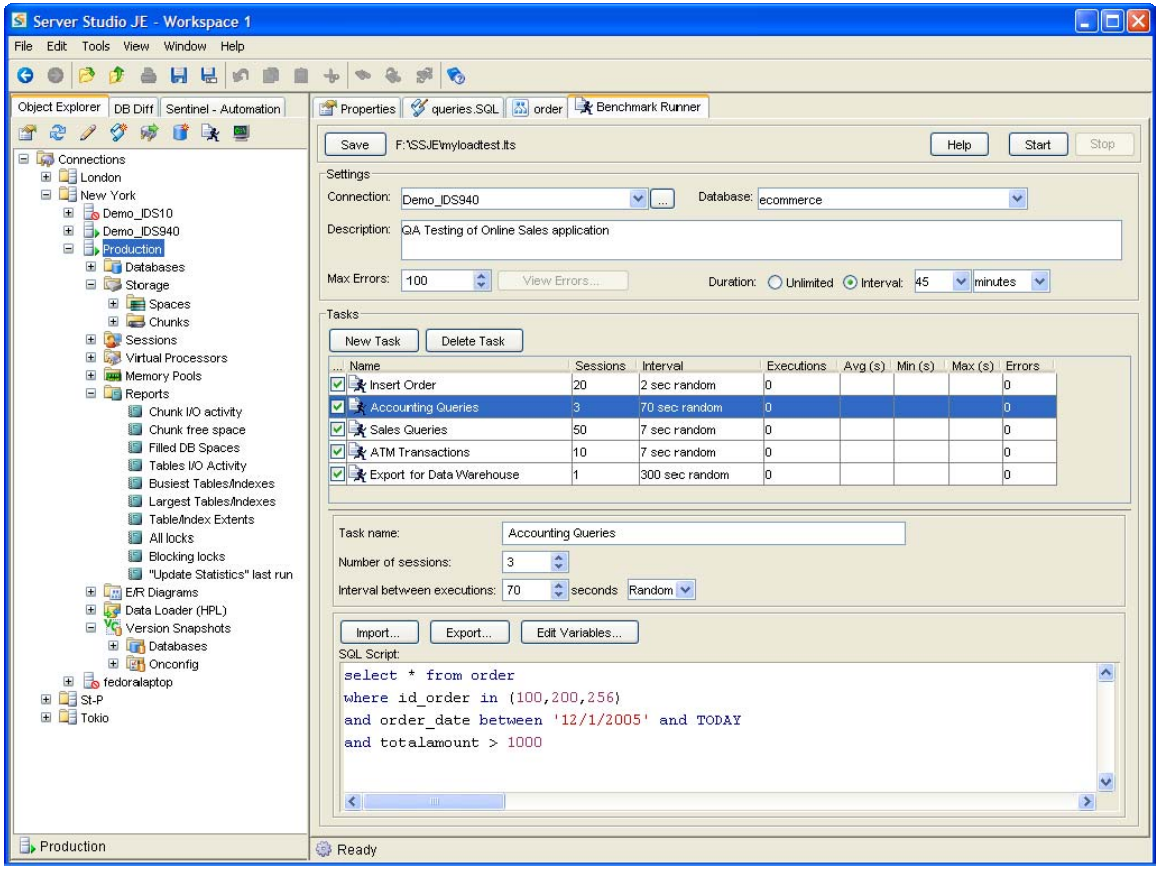
- Populate test databases with millions of rows of meaningful, syntactically correct test data, unique indexes and other dependencies, while fully maintaining referential integrity constraints.
- Supports a broad range of data value generation options:
  - text file-based
  - text data patterns
  - values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



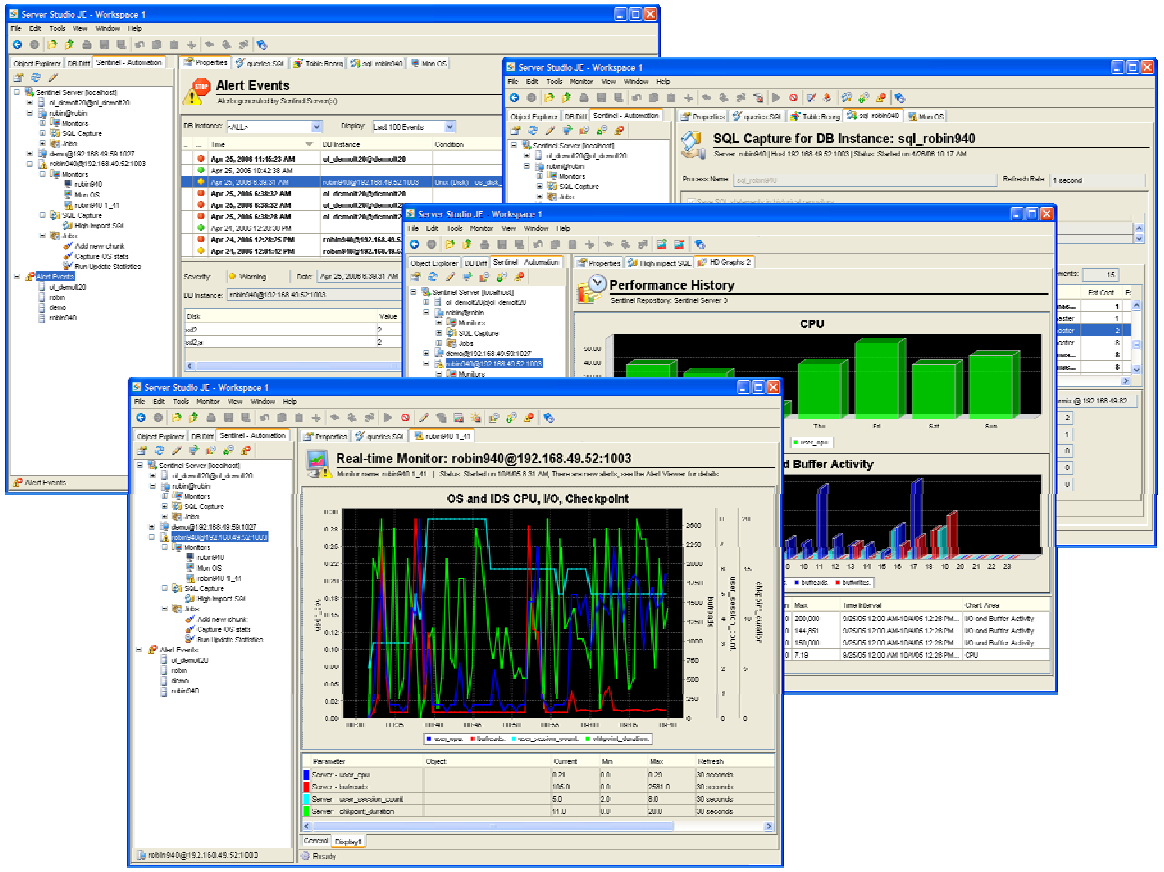
Sentinel™

AGS TAKE BACK CONTROL

Sentinel™

Performance, Availability and Regulatory Compliance Management of Informix DBMS

- 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 facilitates.
- 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.

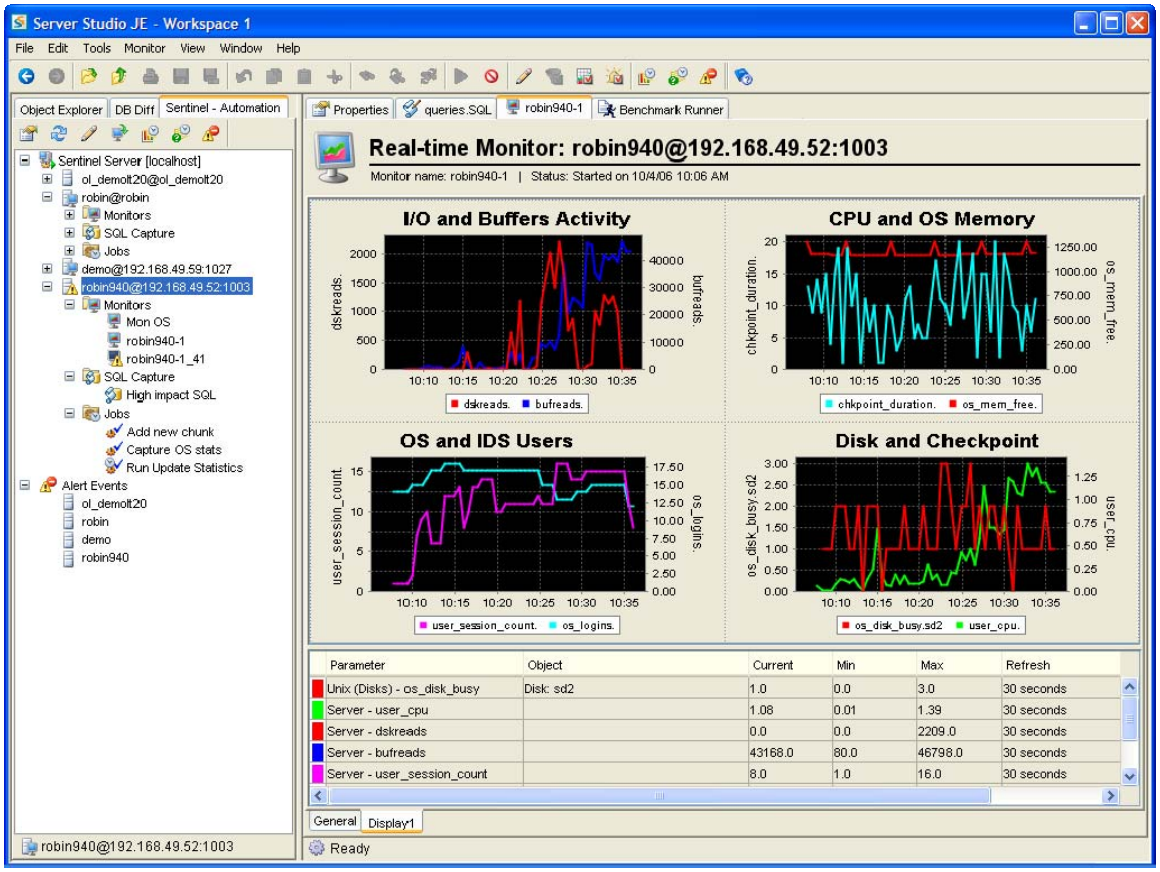


Sentinel™

Real-Time Performance and Event Monitoring

New

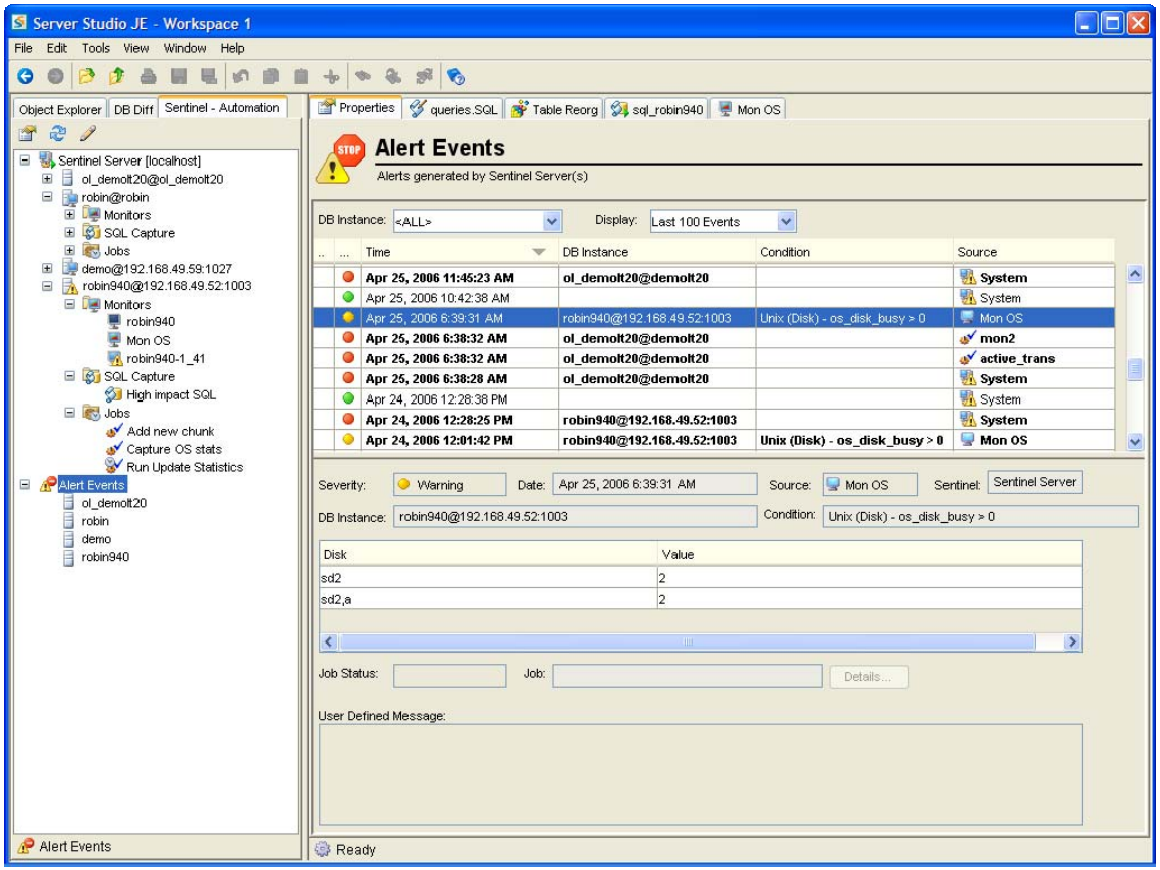
- New fully integrated support for monitoring host's operating parameters.
- Create customized performance tracking monitors from nearly 200 IDS-specific and host's operating system parameters.
- For each IDS instance, real-time monitors can be defined at the level of:
  - Server
  - Chunk
  - Dbspace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



Sentinel™

Event Alerts and Autonomic Response

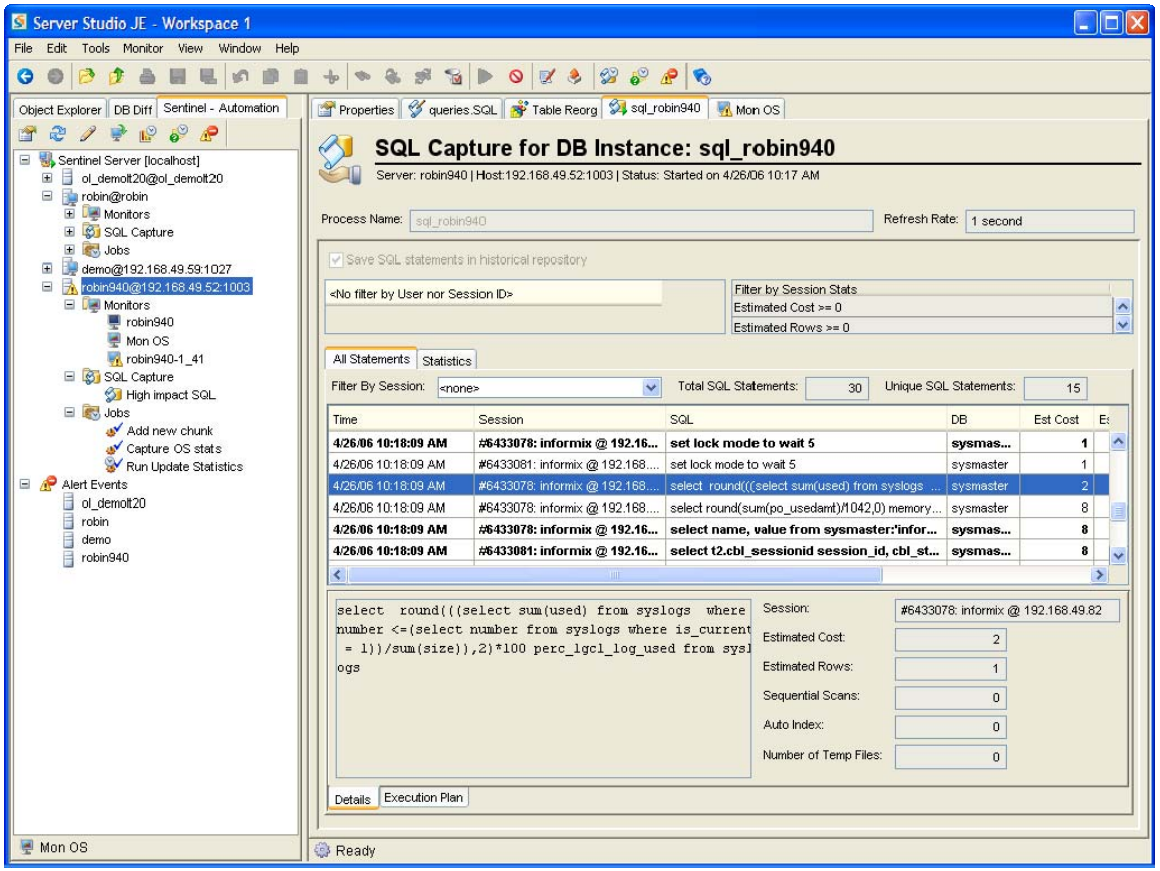
- Assign multi-level threshold Alerts to each performance parameter being monitored.
- Centralized console for managing all alert events.
- Notification via email, pager, cell phone, etc.
- Autonomic response to system events by:
  - User-defined administration scripts
  - OS commands
  - SQL scripts
  - Stored procedures
  - IDS native utilities



Sentinel™

SQL Capture

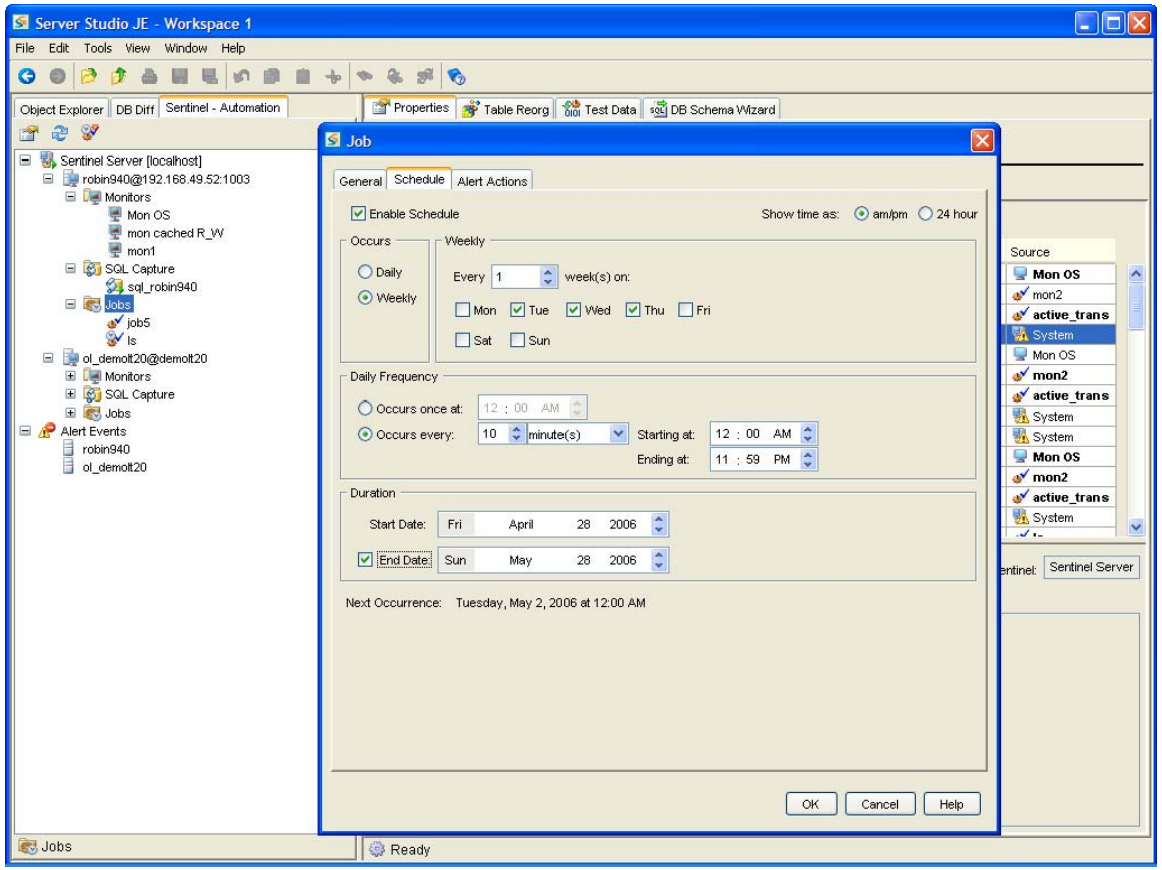
- Capture SQL statements for:
  - selected user sessions
  - specified user
  - statements originating from a specified host
- Review captured SQL in real-time
- Store captured SQL in the built-in data repository for future analysis.
- Use captured SQL for performing query analysis and optimization.



Sentinel™

Task Automation

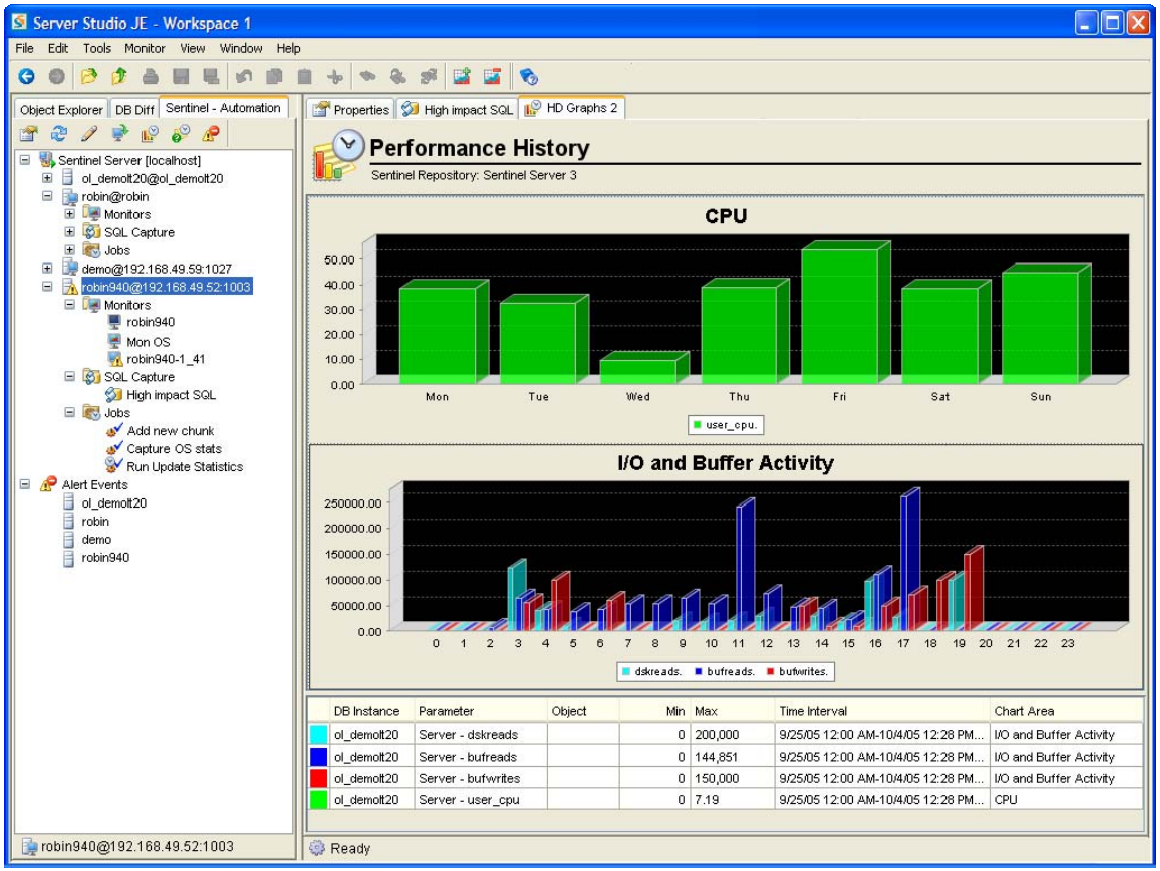
- Automation of regular maintenance tasks via scheduled custom-defined jobs.
- Define OS commands and SQL scripts as jobs.
- Highly flexible job scheduler.
- Map existing administration scripts and Informix utilities as jobs.
- Execute jobs as responses to user-defined alert events.
- Output produced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



Sentinel™

Performance Data Time-Series Analysis

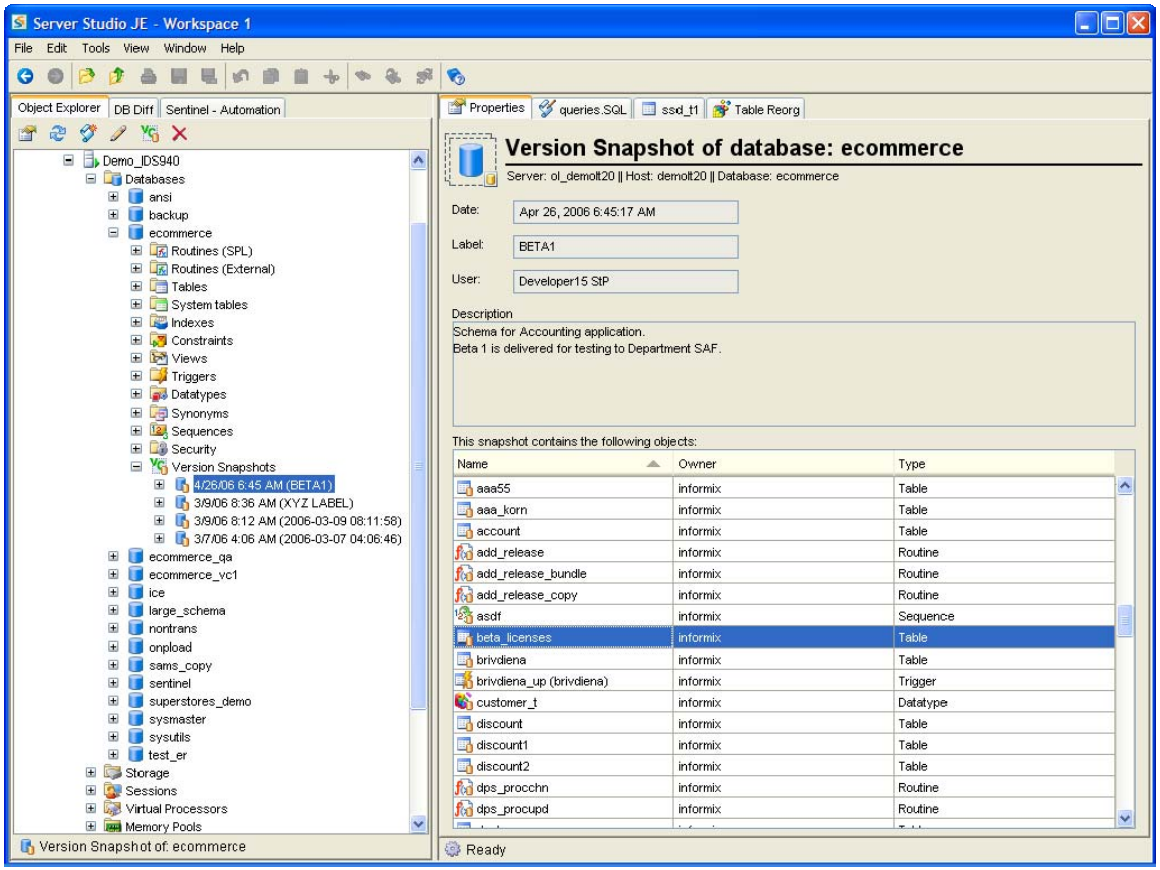
- For all IDS instances under monitoring, the time-series repository stores in its own built-in SQL-compliant database:
  - performance parameters data
  - Event Alerts history
  - SQL scripts captured from user sessions
  - Result sets captured from autonomic execution of administration scripts or IDS 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™

Configuration & Regulatory Compliance Auditing – Version Control

- Create snapshots of database schema for versioning of database changes in a built-in Version Control Snapshots repository.
- Create versions of individual objects such as stored procedures, tables, views, etc.
- Maintain versions of database security states, such as user's and role's permissions and track security changes for audit purposes.
- Preview versions of database schema objects using graphical tools and recover selected objects' schema
- Compare database versions with a current database state as well as between the schema snapshots stored in the Version Control Repository .
- Share the Version Control Repository among groups of DBAs and developers to support team work.
- Auto-detect any changes in the server or specified databases configuration.



Server Studio™ *with* Sentinel™ Release 6

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® DBMS 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 DBMS management tools, please visit:

- **IBM**
  - www.ibm.com/software/data/informix/ssje/
- **AGS**
  - www.serverstudio.com

Some of the Companies using Server Studio™ and Sentinel™

What Do IBM Informix Customers Have to Say?

"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

"I like Server Studio a lot. It is one of the best database tools I've used. The fact that I can view data in several instances at the same time, helps tremendously when testing software or comparing objects in development vs. production. The fact that I can change data in tables, given proper permissions, is of great importance when we have a data problem in production. I highly recommend Server Studio."

Clifford Jardine
Computer Sciences Corporation (CSC)

"We are operating parts of our billing systems in distributed Informix databases (largest productive instance consists of four machines with eight processors and 16GB RAM each, database volume about 40..60TB). Several thousand tables in active use, several ten thousand tables kept for statistics etc. ... I'm using Server Studio to create new databases, copy structure and data from other instances to them, managing extents, moving tables into other dbspaces when space gets tight, eying locks and lock conflicts and playing with SQL. Server Studio keeps being the best front-end for Informix Systems I've ever tried and has raised my productivity a lot since I started using it."

Norbert Karls
ePlus

"I'm new to Informix. I come exclusively from a SQL Server background. However, after using Server Studio for a while, I found that it has many features that are more powerful than MS Enterprise Manager and MS SQL Query Analyzer."

Jim Kodet
Talk America

Thank You

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