QZDASOINIT & QSQSRVR jobs:
Monitoring and auditing techniques

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Agenda

- Monitoring and auditing – definitions and examples
- QZDASOINIT & QSQSRVR job structure
- Challenges
- Monitoring & auditing
  - iSeries Navigator
  - IBM APIs, Commands, and Exit Points
  - Centerfield Technology tools
- Comparison of approaches based on different goals

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Monitor and Audit definitions

- Monitor
  - Permanent: Always on with low overhead (P-mon)
  - Temporary: Higher overhead, only on when required (T-mon)
- Audit
  - Recording selected data to permanent storage from P-mon sources
  - Focus for this presentation will be on monitoring with the idea that Auditing is just captured information from monitored jobs

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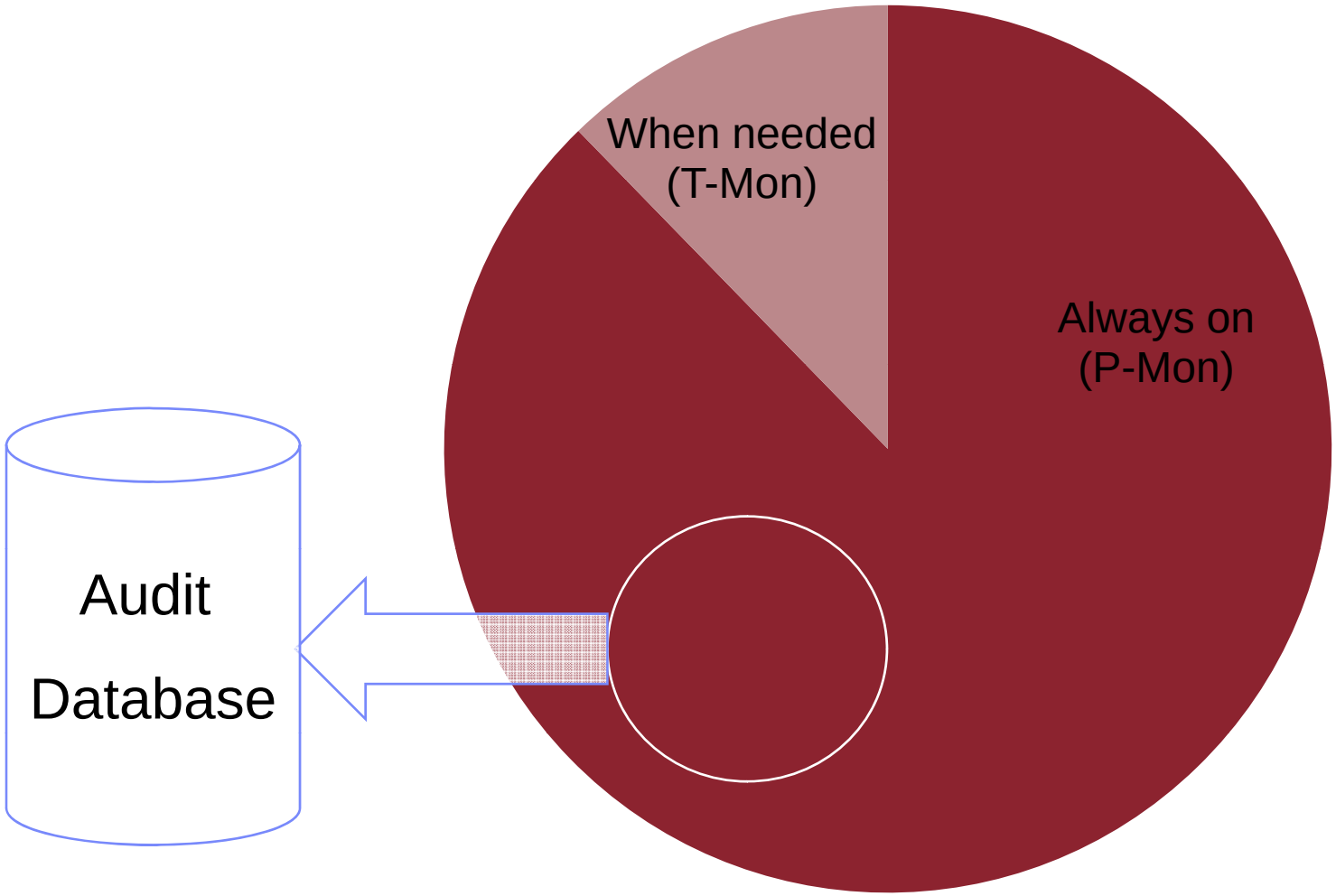
Monitoring categories



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Why monitor or audit?

- Monitoring
  - Diagnose functional problems when they occur
  - Identify and fix performance issues
  - Early warning when something is wrong
- Auditing
  - Security
  - Regulatory compliance
  - Historical analysis

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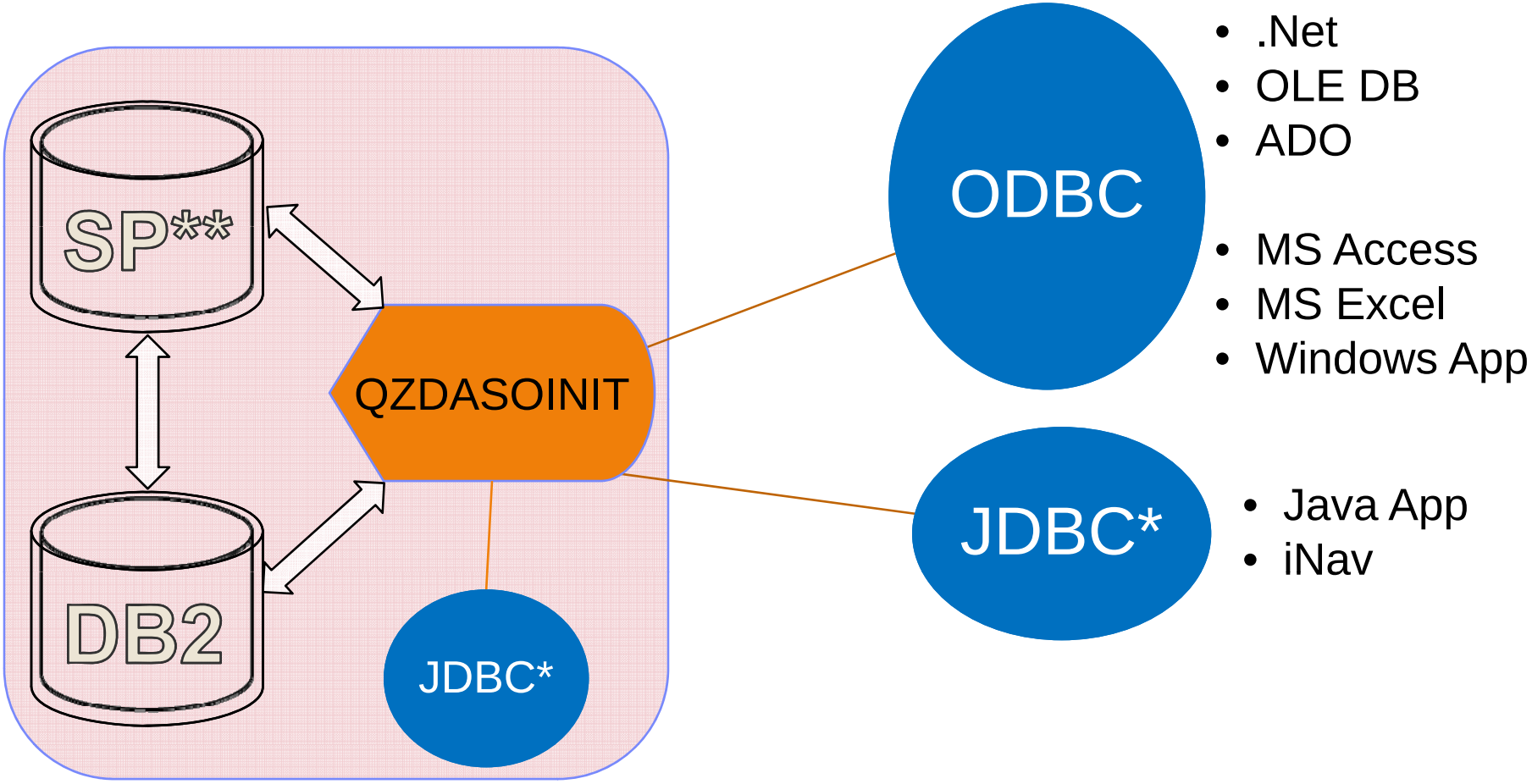
QZDASOINIT



iSeries

* Java Toolbox JDBC driver

** Stored Procedures

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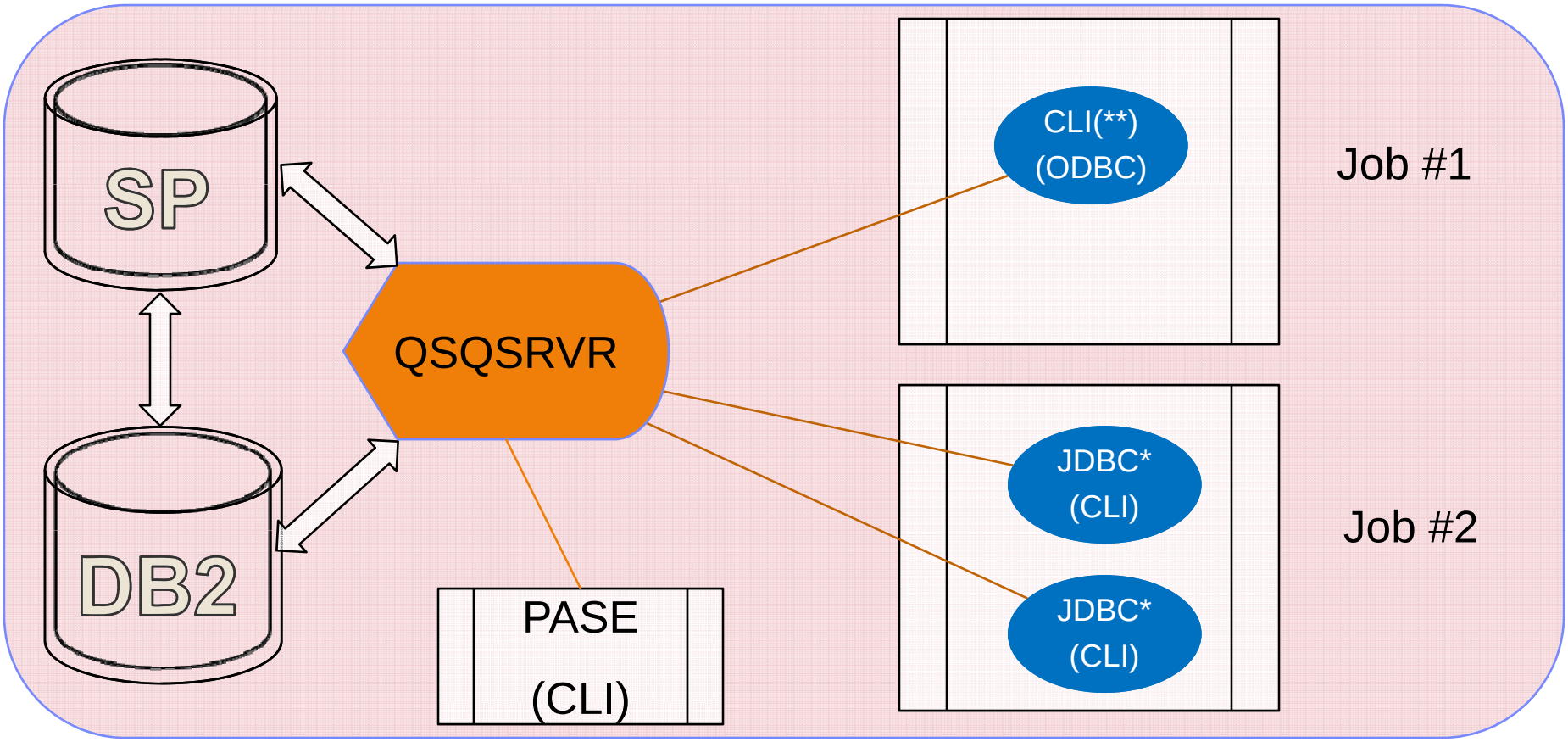
QSQSRVR



iSeries

* Native JDBC driver

** CLI = Call Level Interface

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Key challenges with Database Server jobs

- All of the issues with any job running SQL
  - Unpredictable or slow performance
  - High use of system resources
- All of the “delegation” issues which complicate diagnostics and auditing – lack of visibility
  - Who requested the work?
  - What if the user closes their window or application?
  - Multiple submissions of work
  - “Connecting the Dots” – which jobs relate to each other

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Information of interest

- When did the QZDASOINIT or QSQSRVR job become “active” (out of Prestart wait)?
- Who is currently connected to the job and requesting work be done?
- How much CPU and I/O are the job consuming?
- What SQL statements have run and are running?
- Why is a particular SQL statement running so long and what can I do about it?
- Is the QSQSRVR or QZDASOINIT job still connected to a user?

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iSeries Navigator

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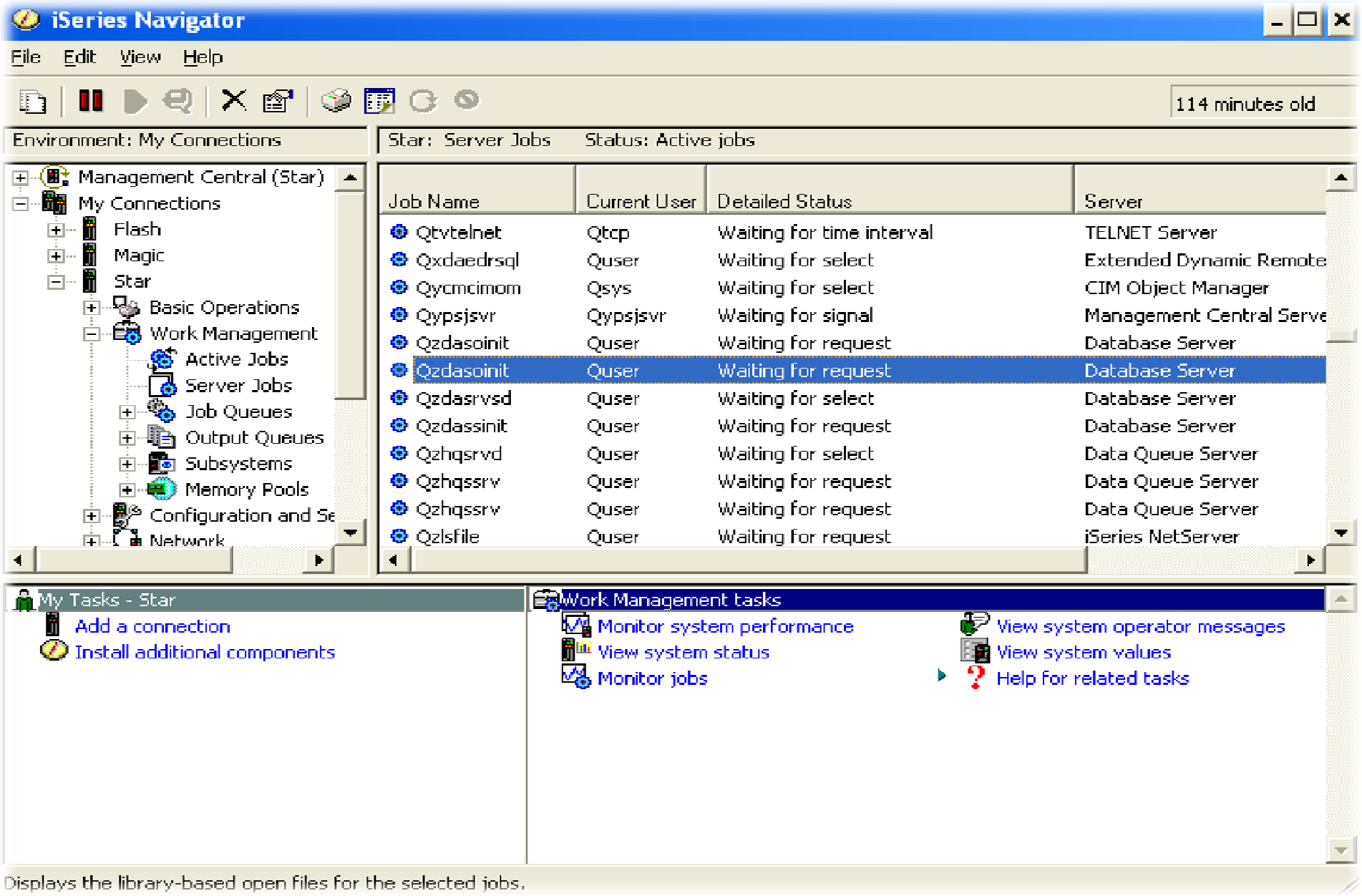
iSeries Navigator



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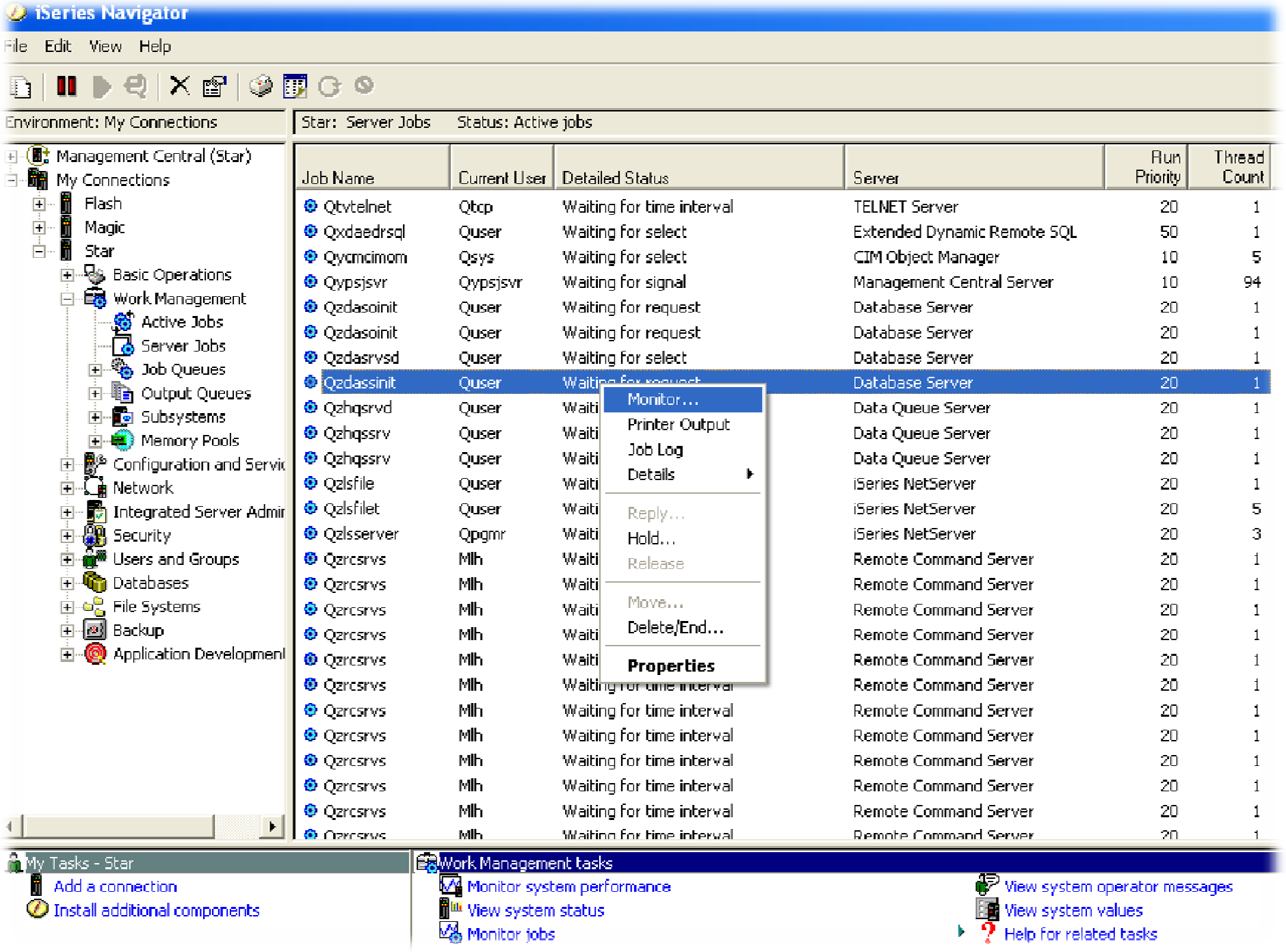

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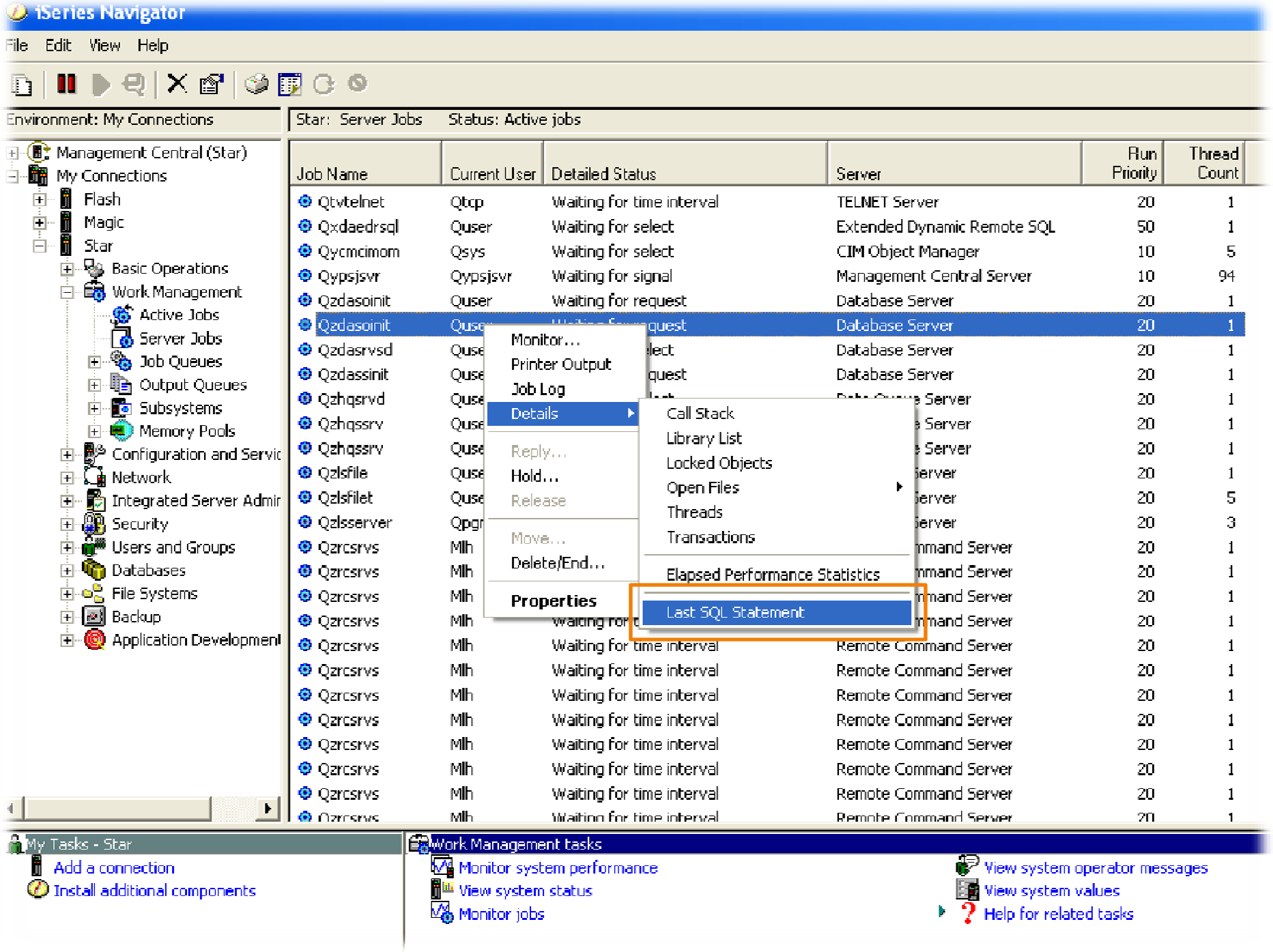

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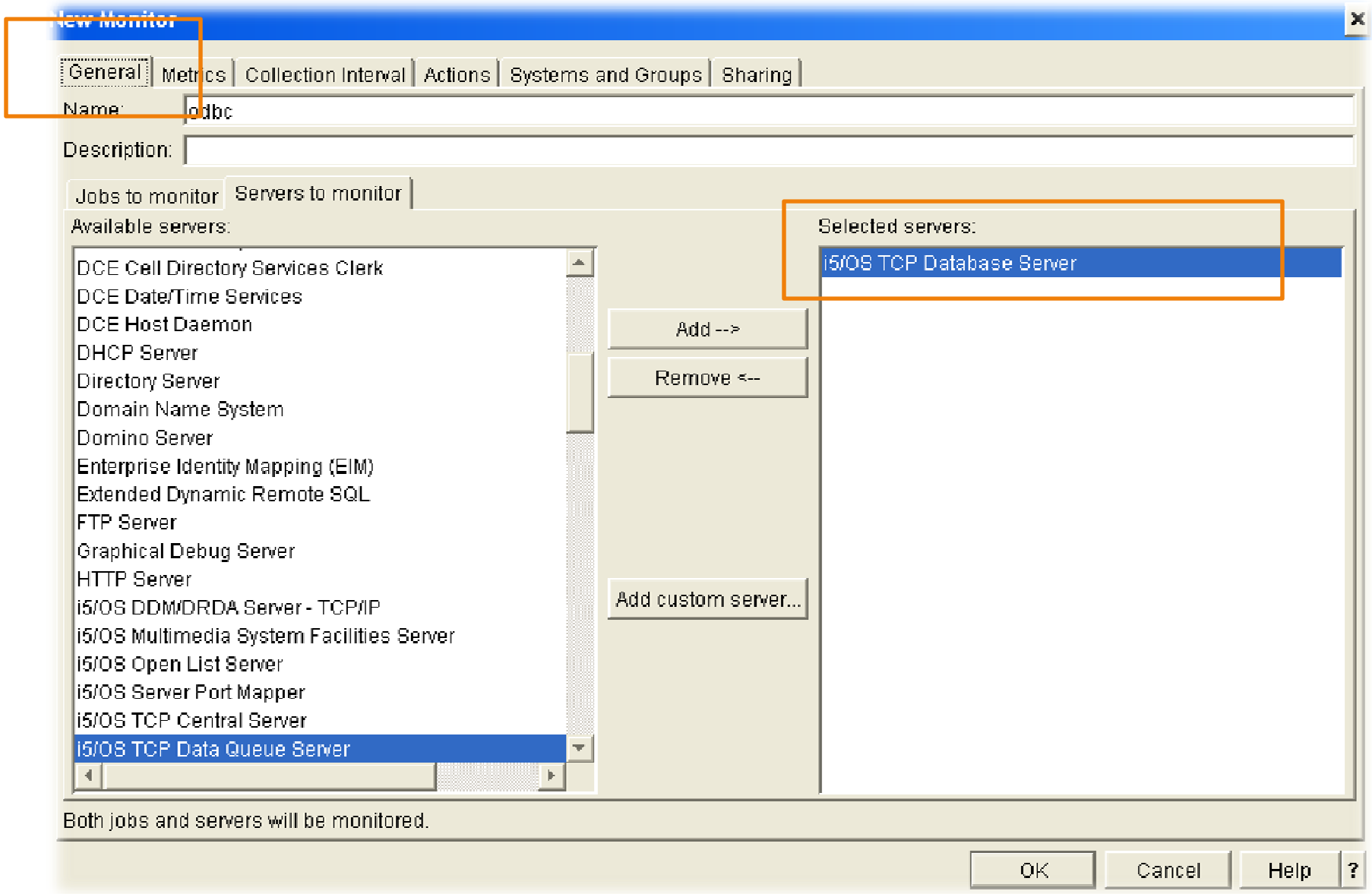

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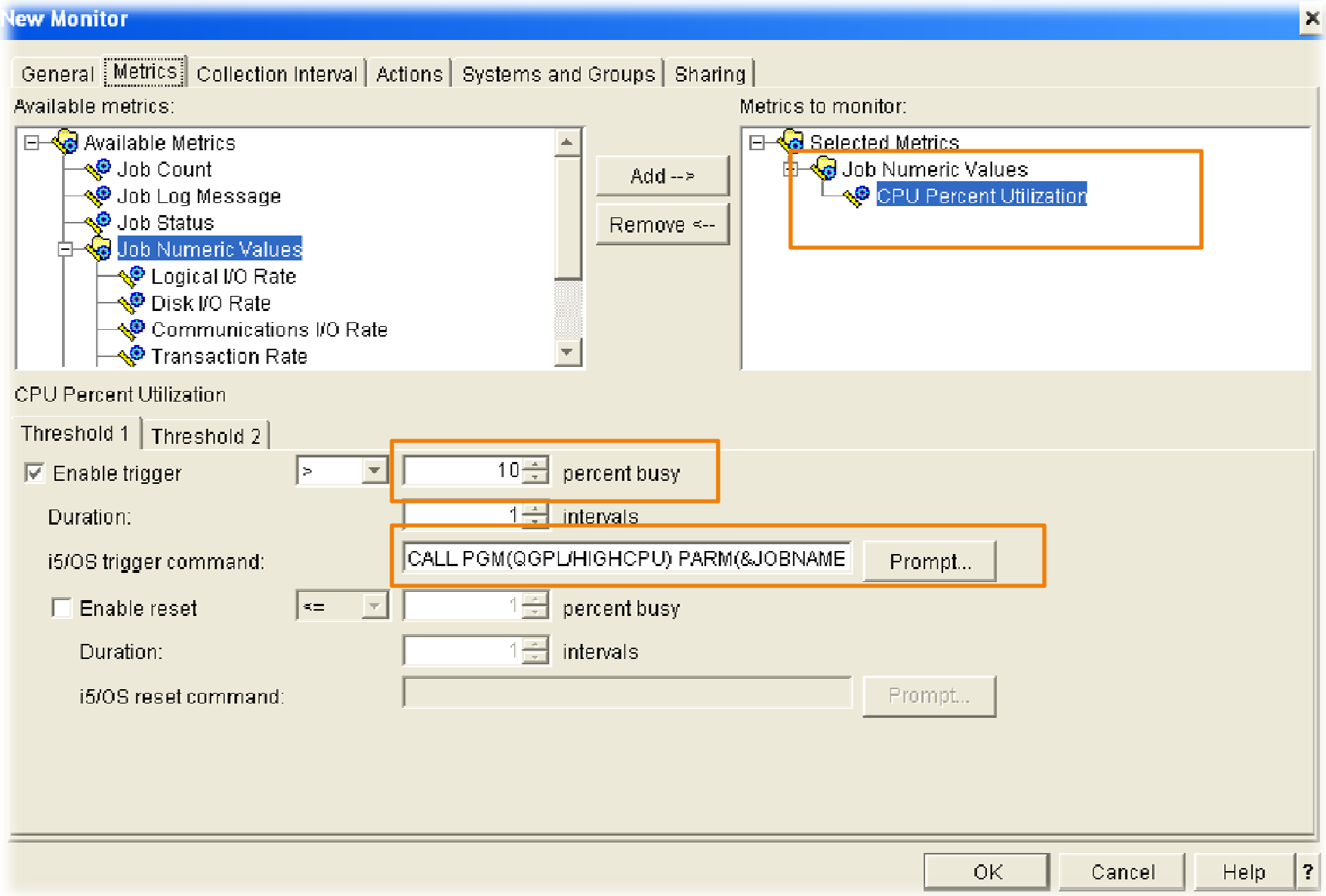

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iSeries Navigator Pros

+ Price is right (but not free!)
+ Much improved over a few years ago
+ Works well with any type of job
+ Integrated with Visual Explain
+ Fairly good database monitor collection facility
+ Shows current user

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iSeries Navigator Cons

- Good functions to monitor jobs but no audit capability
- Generic, limited support of server job information (missing many metrics)
- Lots of clicking to get to the data of interest
- Can be resource hungry (client and server)
- Still requires a fair amount of expertise to shoot DB performance problems and prioritize solutions
- Is not the strategic tool for IBM to manage the iSeries

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IBM APIs, Commands, and Exit Points

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APIs – Work Management

- QUSRJOBI – Retrieve job information
  - Information from WRKACTJOB + more
  - Active job SQL information
    - Current SQL
    - Open cursors & SQL statement names
    - Opens & pseudo open information
    - Server mode (QSQSRVR mode) information – V5R4+
- Job notification exit point (QIBM_QWT_JOBNOTIFY)
  - Not useful for ODBC
  - Partially useful for CLI

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DB APIs & commands – Database management

- STRDBMON – SQL trace & performance collector
  - Must be used with care & best with many filters (T-Mon category)
  - Not a good auditing alternative due to the overhead
- Memory resident monitor
  - Start SQL database monitor – QQQSSDBM
  - Lower overhead but not an auditing alternative because it is a summary not a detailed monitor
  - Light-weight DB performance collection mechanism

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DB APIs & commands – Database management

- Exit points
  - ODBC init – QIBM_QZDA_INIT
  - ODBC request – QIBM_QZDA_SQL2
  - CLI connection - QIBM_QSQ_CLI_CONNECT
  - Open database file exit point - QIBM_QDB_OPEN
  - Query Governor exit point - QIBM_QQQ_QUERY_GOVR

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API, Command, Exit point Pros

+ Almost anything can be monitored and captured for QZDASOINIT and QSQSRVR jobs
  - Job Metrics
  - Connection information
  - Individual requests
+ Pinpoint solutions can be developed for almost any need.
+ Functions can be used for not only monitoring and auditing purposes but for automated control.

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API, Command, Exit point Cons

- Fairly high degree of technical expertise required
- Some functions are dangerous to use without experience (like exit points)
- Some techniques can be highly invasive and cause performance issues
- Cost (time and resources) can be high to implement solutions

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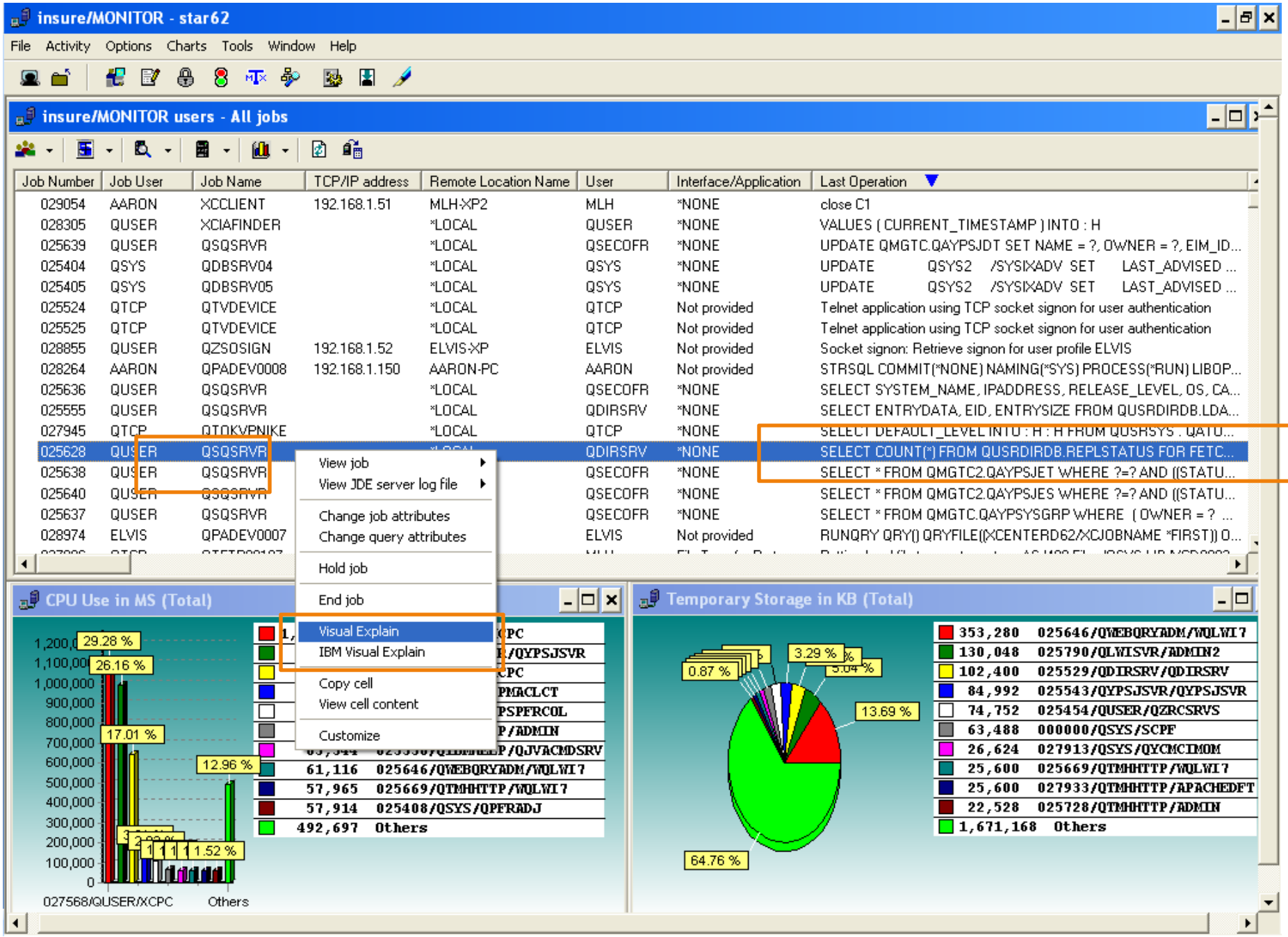

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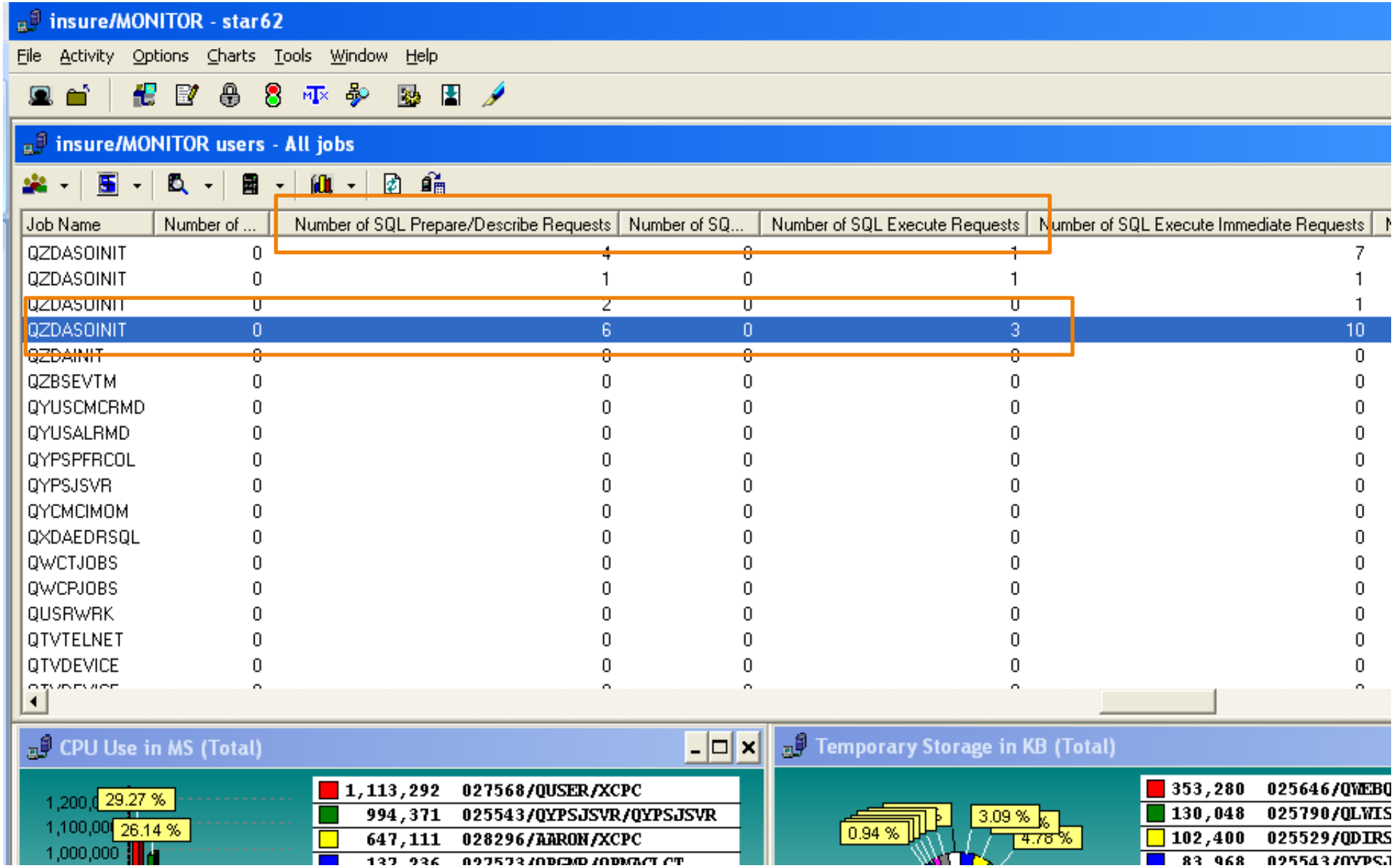

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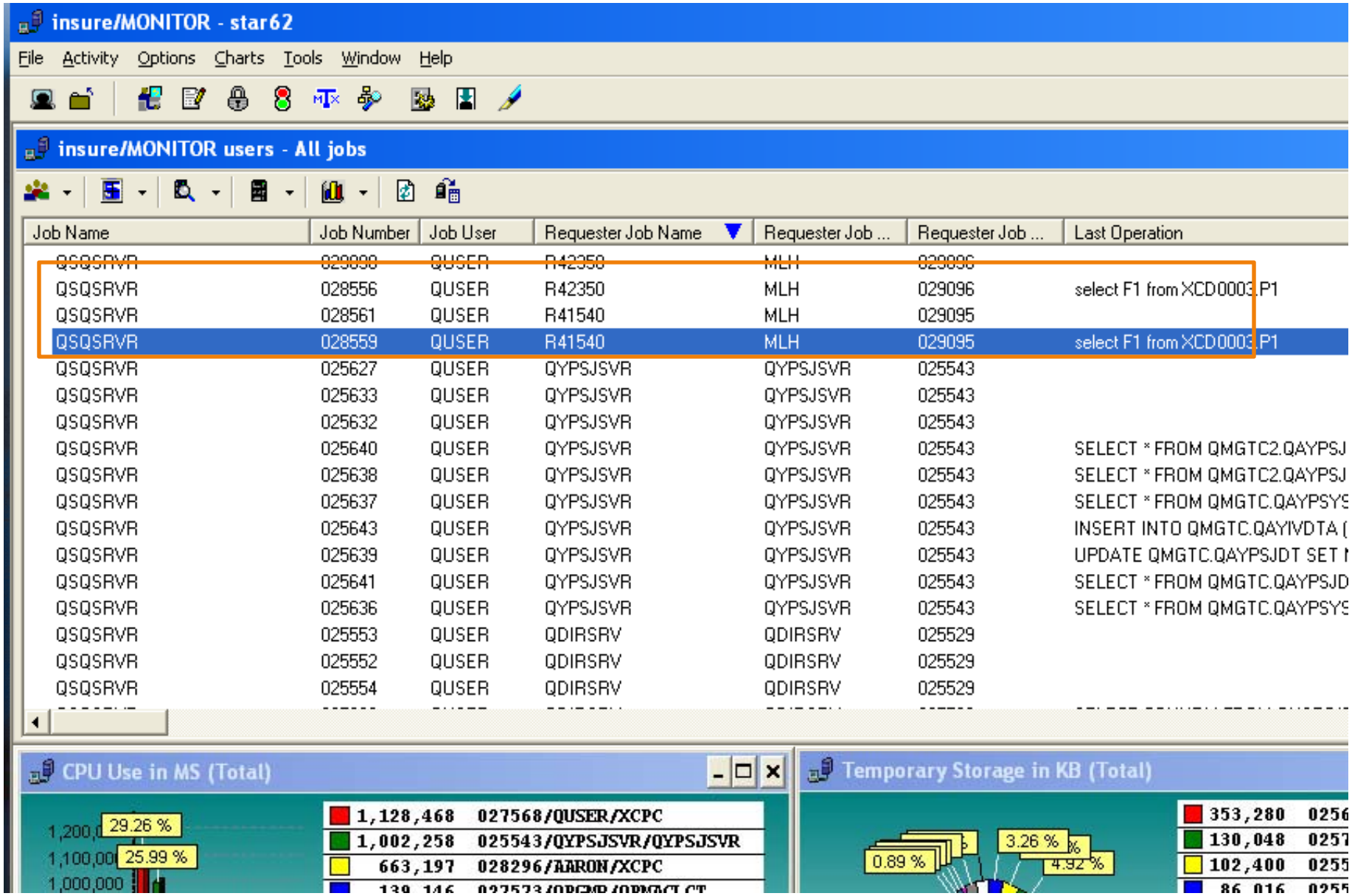

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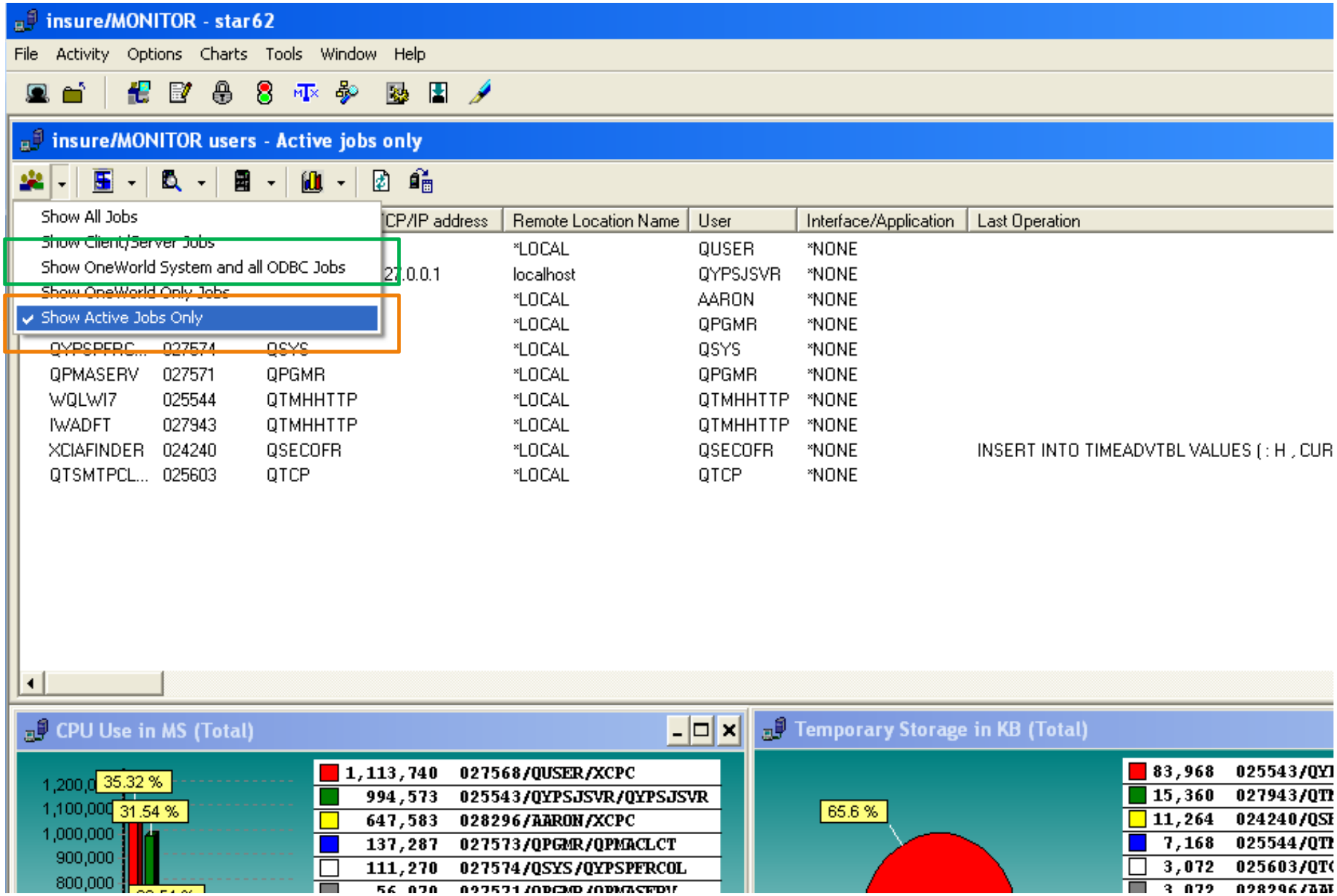

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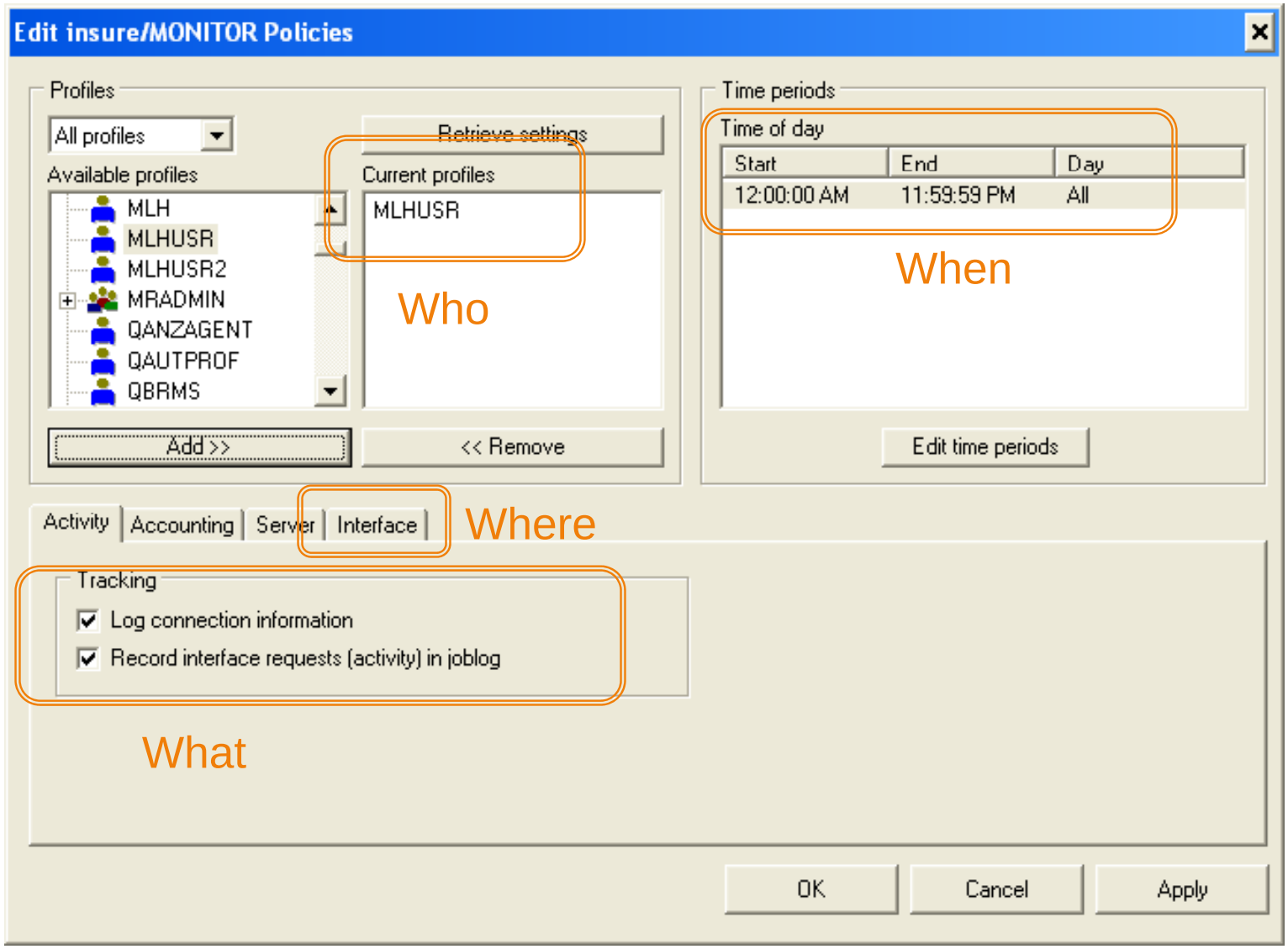

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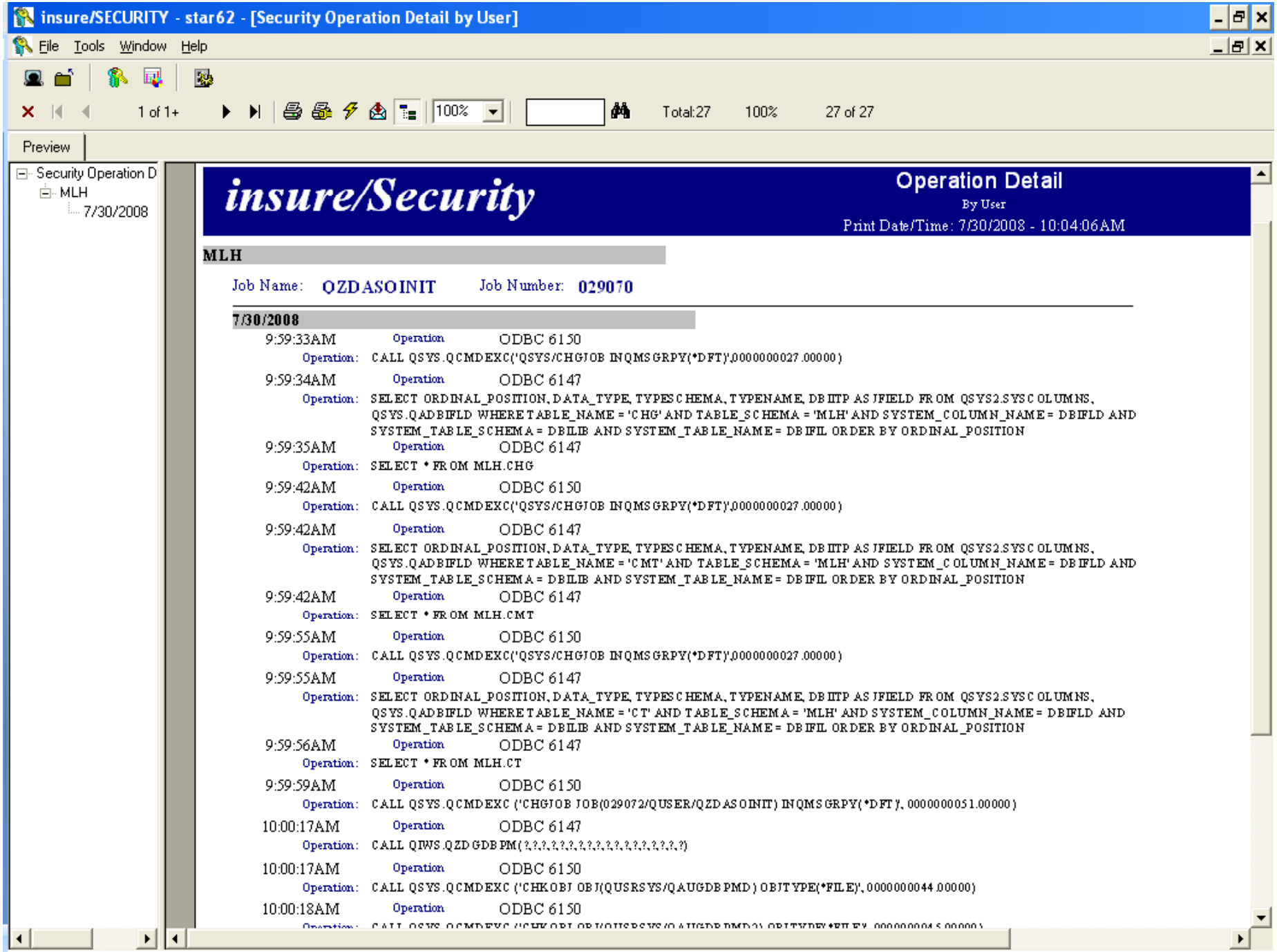

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Summary of techniques based on Specific Goals

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Performance

Goal	Navigator	API, CL, Exits	Centerfield
Monitor QSQ* and QZDA* performance metrics	Yes - Management Central	Performance tools, QPMLPFRD api	Yes – including just for active jobs
Alerts when performance metrics exceed limits	Yes – Management Central	QPMLPFRD api, Query Governor exit point (not 100%)	Audit logs can be used for notification via triggers
Collect SQL performance data based on user, job name, IP @ etc.	Yes	STRDBMON command	Yes – but can collect for multiple generic jobs, by subsystem, group profile, multiple IP @'s, scheduled time, etc. Safety net to prevent uncontrolled disk growth
Collect SQL performance data based on QSQSRVR requester job	No	CLI exit point, QUSRJOBI API	Yes
Launch Visual Explain from job view	Yes	No – Technically there **is** a Visual Explain API but not for general use	Yes – both Centerfield and Navigator versions

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User Monitoring

Goal	Navigator	API, CL, Exits	Centerfield
Monitor current users of QSQ* and QZDA* (active profile)	Yes	QUSRJOBI api	Yes
Put SQL statements in joblog for diagnostics purposes	No	ODBC request exit point, Query Governor exit point (CLI), Open database file exit point	Yes – for QZDASOINIT jobs
ODBC flow information	No	ODBC request exit point	Yes
QSQSRVR job use (requester job, i5/OS user profile and EP1/OW user profile)	No	CLI open exit point, QUSRJOBI information	Yes – special tool provided on request for EnterpriseOne or OneWorld accounts
Break ODBC into multiple subsystems	Partial – some gui some green-screen	No	See Centerfield website for directions

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Auditing

Goal	Navigator	API, CL, Exits	Centerfield
Record all SQL statements executed	No	ODBC request exit point, Query Governor exit point (CLI)	Yes – for QZDASOINIT jobs
Record connect and disconnect time	No	ODBC init exit point	Yes – for QZDASOINIT jobs
Record connection rejections	No	ODBC init and/or request exit points	Yes – for QZDASOINIT jobs
Job use and performance metrics for QZDASOINIT and QSQSRVR jobs	No	Performance tools, Performance collector APIs	Yes

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Summary

- There are a variety of ways to gain greater insight into QZDASOINIT and QSZSRVR jobs
- None are really “free” – your requirements, learning curve, and vendor support should dictate which options to use
- Each has strengths and weaknesses depending on your requirements and skill level

Contact Centerfield if you have unique needs or want to learn more!

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