helpsystems

User Guide
Powertech Database Monitor for IBM i
3.17

Copyright Terms and Conditions

202203160207

Welcome to Database Monitor

Database Monitor is a high-performance database monitor that helps you automate and centralize monitoring and user activity reporting for your IBM i servers. When a user accesses a database file, Database Monitor tracks what they see, where they go, and what they do, including changes they make to sensitive information like payroll files.

You can use Database Monitor to:

- *Automatically maintain a complete audit record of all database adds, updates, changes, reads, and deletes.*
- *Apply electronic signatures to database changes based on your specifications.*
- *Send notifications to users when changes are made based on custom criteria.*
- *Create workflow scenarios for routing and approval of changes.*
- *Collect records and eSignatures in a secured file outside of the primary database.*

This guide will help you quickly configure and begin implementing Database Monitor in order to explore some of its powerful capabilities.

Configuration and licensing

When you start Database Monitor for the first time you will be prompted with a few questions to help configure and customize your Database Monitor installation. After this process you will be asked to enter your license key. After you have licensed Database Monitor, you may want to review the jobs running on the Database Monitor subsystem and see a list of Database Monitor's commands. The steps in this section describe how to accomplish these objectives.

In this section you will learn how to:

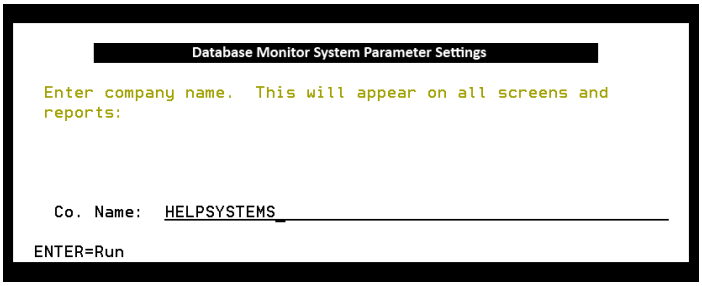
- *Start Database Monitor*
- *Configure Database Monitor with the name of your company, your system's IP address, and 'from' email*
- *Enter your license key*
- *View jobs running on the Database Monitor subsystem*
- *View a list of Database Monitor commands*

Starting, configuring, and licensing Database Monitor

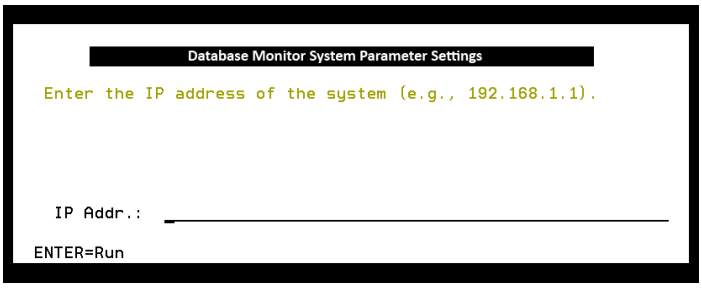
Use the following steps to start, configure, and license Database Monitor.

To start, configure, and license Database Monitor

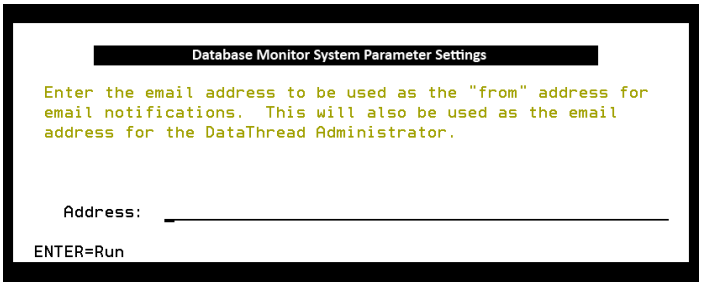
1. Execute the command **STRDT**. You are prompted to enter your company name.



2. Press Enter, then specify the IP address of the system.



3. Press Enter, then specify the email address to be used as the "from" address for email notifications.



4. Press Enter and the Database Monitor License Setup screen appears. Enter your License Code and press Enter.

Note: Database Monitor requires that you enter a valid license key. Contact keys@helpsystems.com if you need to request a new license key.

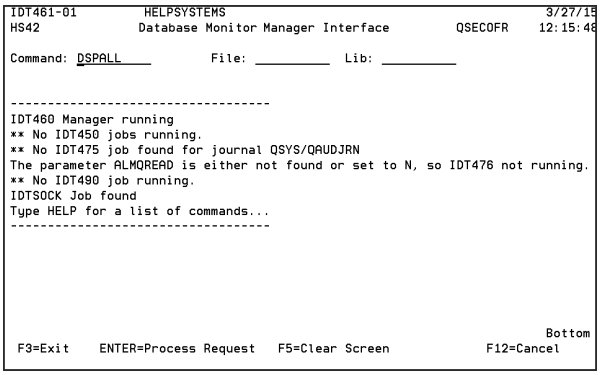
Viewing Database Monitor jobs and commands

After you have configured and licensed Database Monitor you can use the Database Monitor Manager to view the jobs running under the Database Monitor subsystem, as well as the status of those jobs. Also, you can use the Database Monitor Manager to acquire a list of Database Monitor's commands.

> **NOTE:** The Database Monitor Manager has previously been known as the *Database Monitor Console*.

To view jobs running under the Database Monitor subsystem and reference Database Monitor commands

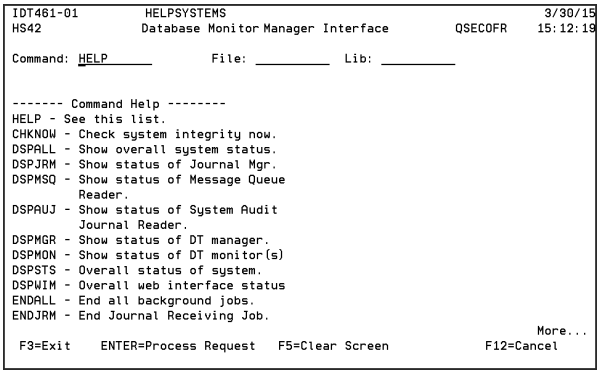
1. From the Main Menu, choose option **17**, Database Monitor Manager.



   Use the Database Monitor Manager to view a list of jobs running under the Database Monitor subsystem, and identify the status of those jobs. White indicates jobs are running normally. Red indicates warnings, such as parameters that have not been configured.

   > **NOTE:** Alternatively, to view these jobs, from a command line, enter **WRKSBS**, then enter option **8** for the DATATHREAD subsystem.

2. From the DataThread Manager, you can view all the commands available to you. Press **F5** to clear the screen. Then, in the Command field, enter HELP.



   Enter HELP to view all Database Monitor commands and their descriptions.

   Appendix B: Database Monitor Manager Interface on page 112 for more details.

Before you begin

The Database Monitor installation procedure creates libraries, profiles, authorization lists, commands, objects, and, in some cases, exit points on your system. Changing the configuration

of any of these installed application components may result in product failure.

Before configuring Database Monitor, note the following:

Proper Authorization

The installation of Database Monitor requires use of a profile with QSECOFR authority.

Simulation Database

Database Monitor ships with a simulation database. The intent of the files and maintenance programs is to allow you to play and simulate production conditions, without affecting production files.

Use of Triggers

As part of its functionality Database Monitor utilizes the IBM DB2 trigger facility. This allows Database Monitor to monitor and react to database changes without requiring any programming changes to your existing applications. Prior to the version 5.1 of IBM i, there was a limit as to the number of trigger programs per file. Database Monitor addresses this issue by having our trigger program call any existing trigger programs.

Impact on the System

The Database Monitor trigger program has been developed with efficiency as a core requirement. The bulk of the intelligence of this software resides in background processors which receive the before and after image of the database change. It is unavoidable, however, that a slight run time increase may be noticed for jobs that perform many updates to the database in short periods of time.

Journals

Database Monitor's system configurator has a choice of using journals for almost all of the functionality. There are several variables to be considered when making the choice between using journals or triggers, or even a combination of the two.

If within your systems environment you are currently using journaling, which captures both before and after images, the decision is simpler. Database Monitor can use the same journal receiver entries for its processing. The only reason to also use triggers is to support contemporaneous (pop up) signatures.

Database Monitor can also support journaling when only the after image of a change is captured. Some high availability systems are configured for only the after image. This setup does have some limitations within Database Monitor. Because both images are not captured, Database Monitor can not readily determine the fact that data in a particular field has changed. This disables some of the more advanced features of work flow and prevents capture of record deletes. In this specific condition, a combination of triggers and journals can be used to reach the desired results. We suggest you contact your HA vendor to see if they can support capturing both images.

Database Monitor will support use of journaling from either an existing journal or the Database Monitor journal which is shipped with the product.

When a file is currently not being journaled, HelpSystems suggests the use of triggers.

Sending Emails from IBM i

Database Monitor generates and transmits emails directly from IBM i.

For this to function, the SMTP server on your IBM i system must be configured and be active. (See Appendix I for SMTP Setup). The activation of the server should also be made part of a routine startup job to ensure maximum availability.

The command to start the SMTP server is:

STRTCPSVR *SMTP

Command CLRPFM on Files with Triggers

The standard IBM i database, DB2, places a restriction on files that have a trigger associated with them. Any file that has the delete trigger activated is not eligible for the clear physical file member command. To address this issue, Database Monitor ships with an alternate command. This command, which has all of the same parameters as the standard IBM command, deletes all of the records in the member, and then reorganizes the member. This has the same net effect as executing the IBM command, CLRPFM.

This restriction will not prevent you from accessing our simulation database and from performing any piloting you wish. It is only a concern if you have a file which has been "Database Monitored," and at some point will be cleared using the CLRPFM command. This is most obvious when there are multi-member files where the first member contains the production data and additional members are interim work areas. If this applies to your implementation, once you are ready to activate Database Monitor into your production environment, you will need to decide on one of these three options:

- Modify those CL programs which clear the file in question, to utilize the Database Monitor DTCLRPFM command.
- Rename the standard IBM command, and place the Database Monitor CLRPFM member command in QSYS.
- Configure Database Monitor to use journaling to monitor the affected file.

The option you choose will depend on the number of files that have been Database Monitored, and that may require to be cleared; your willingness to modify application code; and other internal policies and procedures.

HelpSystems personnel are ready to discuss the pros and cons of each approach and assist you in making the decision that is most appropriate for your installation. See the Appendix C for more detailed information on this issue.

Database Monitor Security Considerations

Database Monitor can function within any level of security setup. How our programs and files are secured will depend on the level of control required by your business and the security configuration required for its support. The FDA requirements for Part 11 are that the data be "secured and unalterable." This may require exclusion from the library and access only through the Database Monitor programs. These programs may need to be changed to be owned by a high security user profile and to adopt owner privileges. None of our programs permit alteration to the history database, and command line access through F21 is secured by user.

HelpSystems is not making any recommendations, simply raising a point to be considered.

Depending on your security setup, one Database Monitor program may be affected. Program IDT110 retrieves the user name based on the IBM i user profile. Under some security configurations the program may need to be changed to have the proper level of authority.

The symptom

When signatures are closed, the full name of the user is retrieved. In subsequent inquiries, if the full name of the signer is blank, IDT110 was not able to retrieve the name.

The Correction

The program should be changed so the owner is a profile with *ALLOBJ or QSECOFR privileges. Additionally, the program will need to adopt authority. The commands to achieve this are:

CHGOBJOWN OBJ(DATATHREAD/IDT110) OBJTYPE(*PGM) NEWOWN(QSECOFR)

CHGPGM PGM(DATATHREAD/IDT110) USRPRF(*OWNER) USEADPAUT(*YES)

Tracking Read Events

Database Monitor is able to monitor for and capture the reading of records from the database. This is achieved using IBM's read trigger functionality. The user, program, and data content can be captured at the moment a read takes place. This can be combined with the WorkFlow capabilities of Database Monitor to send out notifications to supervisory personnel, or even to require an immediate signature with reason coded for the read. The intent of this option is to monitor for access to sensitive information. HIPAA compliance and internal data security can be achieved using this technology.

It is important to be aware of how some application programs have been developed. For example, an inquiry screen that presents a screen with a choice of 15 patients to choose from has minimally read 15 records from the patient file. Each of these reads will be captured. This has the potential of capturing a very large amount of data. This option should be activated after serious consideration. HelpSystems is in the process of extending the capabilities of this feature with ability to exclude certain read records based on advanced configuration.

The read capture functionality is an independent feature and can be purchased from HelpSystems.

Implementing Database Monitor

Database Monitor can monitor any physical database file for changes. It can track an entire file, or, to maximize performance and efficiency, specific fields within a file. After a monitored field has changed, Database Monitor can respond by performing an action, such as sending an email notification including the change details. The following instructions guide you through the process of adding a file, selecting the field(s) you want to monitor, reviewing changes made to the file, and configuring Database Monitor to send an email notification when future changes to the file are made.

In this section you will learn how to:

- *Add a file to Database Monitor*
- *Configure the file for easy accessibility later*
- *Specify whether you want to use triggers or journal entries for tracking and signatures*
- *Validate and activate the file to begin monitoring*
- *Identify the file and view changes*
- *Configure a Workflow to respond to a change by sending an email alert*

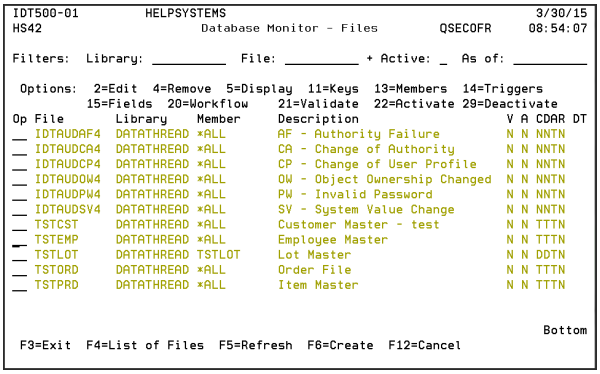
While these implementation instructions explore just a few of Database Monitor's many capabilities, they offer a practical method for taking advantage of some of Database Monitor's most essential functions. The example files used for this guide are included with your Database Monitor installation. We encourage you to follow along with these steps on your own system if you would like to explore these features first-hand.

Adding and configuring files

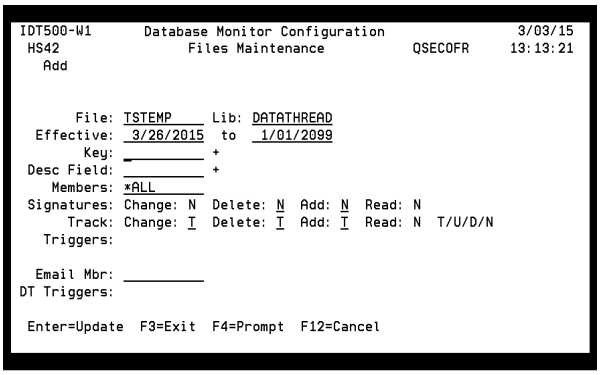
Use the following steps to add a file to Database Monitor and specify the criteria for monitoring.

To add and configure a file

1. From the Master Menu, choose option **1**, then **11**, Database Monitor Configuration.



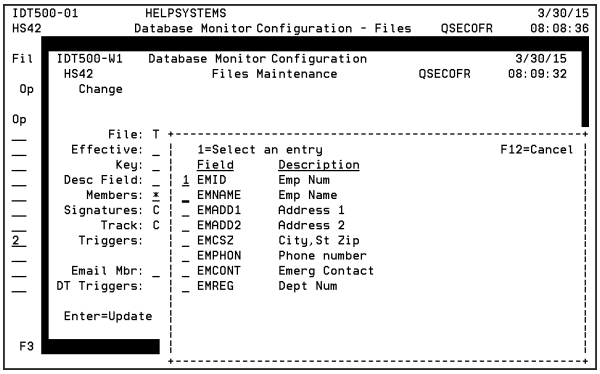
2. To add your own database file, press **F6** to open the Files Maintenance panel. Specify the file name and library of the file to be added and press Enter. For this example we will use the file TSTEMP, which is already included in the Database Monitor library. To follow along with these instructions using this test file, press **F3** and then enter **2** for TSTEMP, then delete the Key and Desc Field fields.



   The Files Maintenance panel allows you to specify how Database Monitor should monitor a file, for what duration, and how it can be identified in the future.

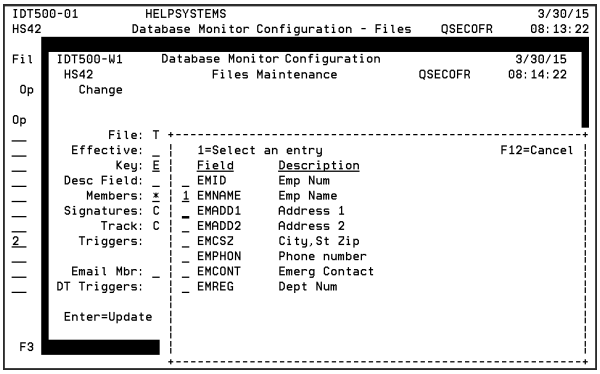
3. Next to Effective, specify the date range.
4. Move the cursor to the Key field and press **F4** to prompt. Database Monitor displays the fields within the file. Here, select the database field (or list of fields) that uniquely identify the records in the file. The Key is used by Database Monitor to group changes for inquiry and

reporting purposes. For example, an employee master file will probably have the employee ID as the Key.



For the Key, choose a unique identifier field, such as the employee, customer, or product ID number.

5. Use **1** to select the field (or fields) you want to monitor and press Enter.
6. Move the cursor to Desc Field and press **F4**. Database Monitor displays the same list.
7. Use **1** to select a Description. The Description field should have the name of the field in the file that most closely identifies the record is being shown. For example, in an employee master file, the employee ID may be the Key, but when a user is browsing the list, the employee name is probably easier to recognize. For such a file, the Name field should be entered here.



For the Desc Field, choose a descriptive field, such as the employee, customer, or product name.

> **NOTE:** Database Monitor uses the specified Key and Description information to help you quickly identify records that have changed. In order for Database Monitor to quickly identify changed files among a potentially large numbers of files being searched, select a Key and Description combination that is unique to that file.

8. For the Members field, the default *ALL value is most commonly used. Most often, only the first (or main) member of a file is tracked, as additional members of the file are often used only as temporary work members. In such a case, the name of the first member should be entered here. (By default, most files have the first member with the same name as the file itself). To track all members, enter *ALL in this field. Or, you can use option 13 in the

Database Monitor Configuration - Files panel to select from a list of the members you wish to track.

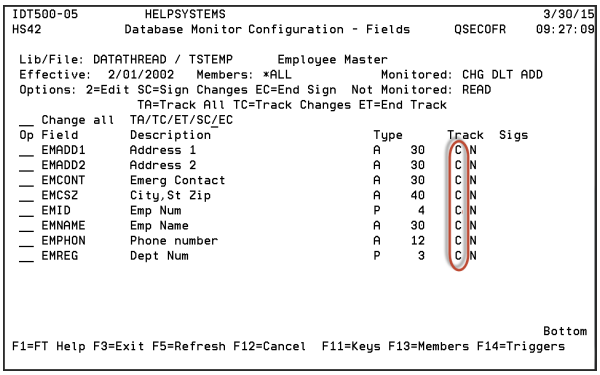
9. The Signatures and Track options allow you to specify whether you want to use Triggers or Journaling for monitoring when a record is changed, deleted, added, or read. There are three methods: T (Trigger), U (User Journal - if the file is already being monitored by, for example, HA journaling), and D (Database Monitor journal). Enter N to turn off monitoring.
10. Press Enter to accept changes and return to the Database Monitor Configuration - File panel.

Tracking specific fields

Whenever you choose to Track changes within a file, by default, all fields within the file are monitored. In order to reduce traffic, save disk space, and improve speed, Database Monitor allows you to isolate specific fields for monitoring.

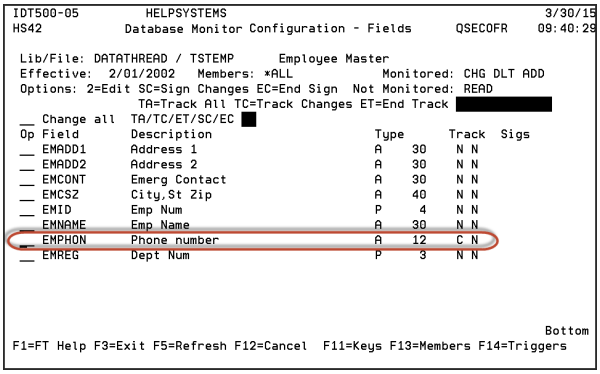
To monitor specific fields

1. In the Database Monitor Configuration - Files panel, enter option **15** for the file being tracked. The Database Monitor Configuration - Fields panel appears with all fields in the file listed. A "C" under the Track column indicates the fields being tracked.



Database Monitor monitors all fields by default.

2. For Change All, enter **ET** to change all fields under the Track column to N, which indicates they are not being tracked.
3. For the field(s) you want to track, enter **TC**.



For this file only the Phone number field is being tracked.

4. Press Enter to confirm your changes.

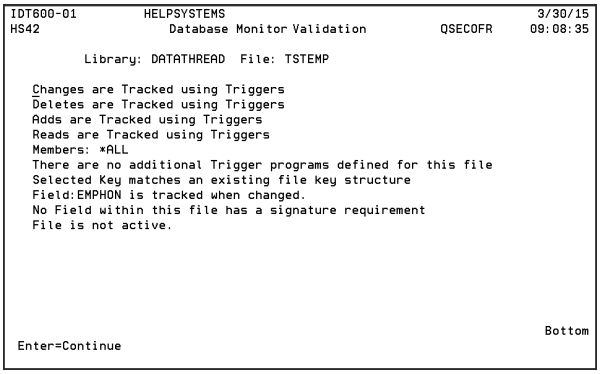
> **NOTE:** A (TA=Track All) indicates this field is included when other tracked fields change. C (TC=Track Changes) indicates only changed fields are tracked.

Validating and activating files

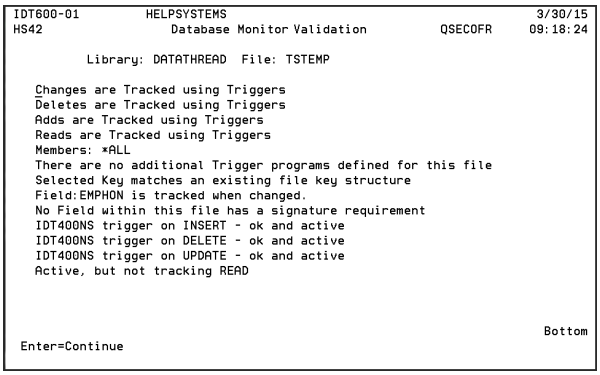
After you have configured how the file should be monitored, and which fields, you are ready to validate and activate. After this step, the file will be monitored by Database Monitor.

To validate and activate

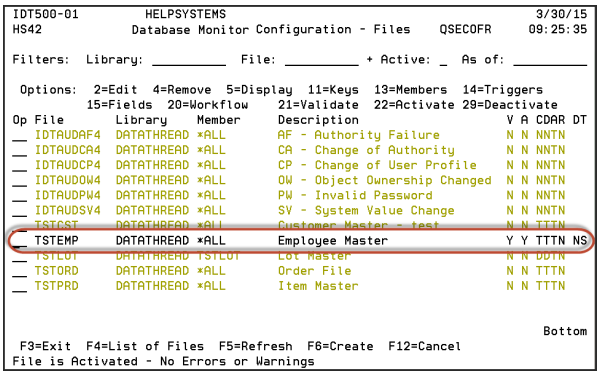
1. Enter **21** for the file. The Database Monitor Validation screen appears, listing the configuration details and any warnings.



2. Press Enter.
3. Enter **22** for the file to Activate. The following screen appears showing the actions taken by Database Monitor during activation.



4. Press Enter. The file is now colored white, indicating it is active.



The V, A, C, D, A, and R columns indicate whether the file has been Validated, whether it is Active, and what values (Triggers or Journaling) have been added for Change, Delete, Add, and Read. This file (TSTEMP) is both Validated and Active. It uses Triggers for changes, deletions, and additions. Reads are not tracked.

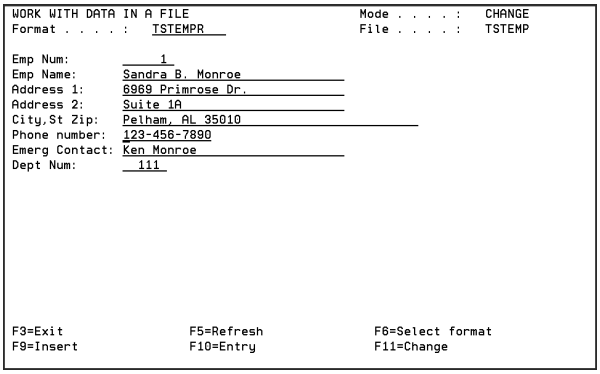
5. For the purposes of this demonstration, Validate and Activate the other files that begin with "TS" using options 21 and 22.

Viewing tracked changes

For this demonstration, in order to see how Database Monitor manages field changes, we will manually change a field in a file and then review Database Monitor's response to that change.

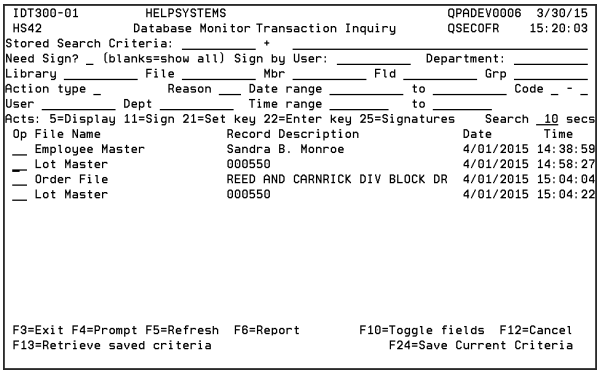
To view a changed field

1. First, we will make a change to a field in the file. Press **F3** to return to the menu screen and press **F21** to open the command prompt.
2. Enter **`UPDDTA DATATHREAD/TSTEMP`**.
3. Press Page Down to display the first record.
4. Change the Phone Number entry.

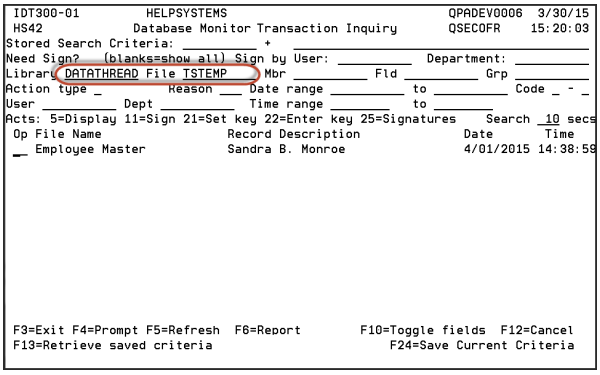


5. Press Enter, then **F3** to return to the Main Menu.
6. Choose option **0** to return to the Master Menu, then choose option **2**, Inquiries and Reports Menu.
7. Choose option **21**, Transaction Audit History. The Database Monitor Transaction Inquiry panel appears.

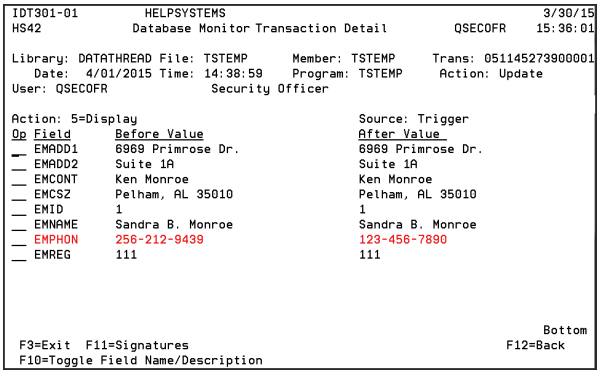
8. Press Enter to see an unfiltered list of all files with changes that have been tracked by Database Monitor. (For this example, additional files in the DATATHREAD library have been Validated, Activated, and changed.)



9. In the future, after many files are being tracked with Database Monitor, pressing Enter may yield hundreds or thousands of entries. To isolate specific files, or limit your search to a specific time range (and/or other factors), use the fields at the top of this screen to filter the list. For example, in this case, to show only the Employee Master file, enter "DATATHREAD" for Library and "TSTEMP" for Field.



10. Enter option **5** for a file to display the specific changes.



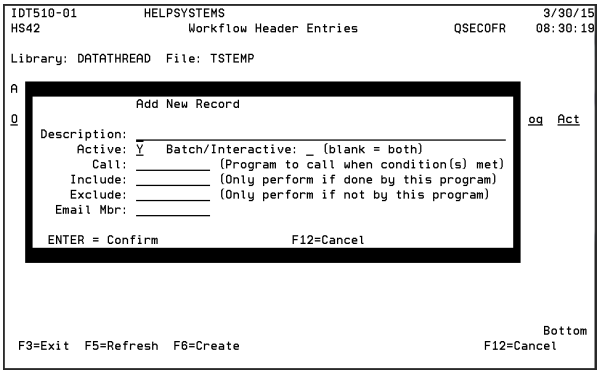
Changes are listed in red.

Sending change notifications using a Workflow

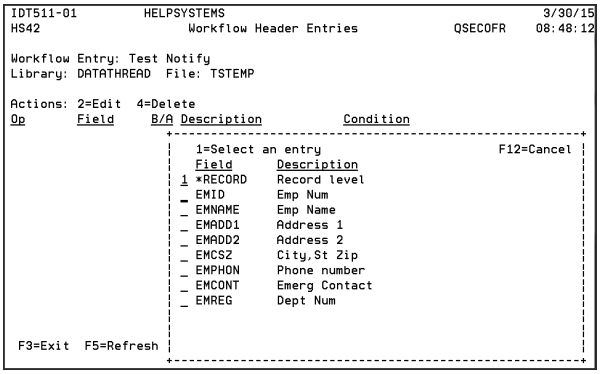
Database Monitor can automatically respond to database changes by either notifying one or more people, or by automatically launching custom programs. This part of Database Monitor is referred to as the Workflow component. For the following example, we will configure Database Monitor to notify a person by email when there has been a change to any record in the file TSTEMP.

To notify users that a file has changed

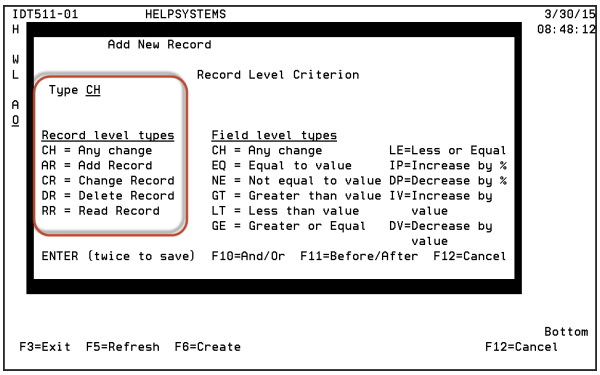
1. In the Database Monitor Configuration - Files panel, enter **20** for TSTEMP. Use **4** to delete the existing "Test Notify" Workflow. For this demonstration we will create a new one.
2. Press **F6**. The Add New Record panel appears.
3. For Description, enter "Test Notify" and ensure Active is set to **Y**.



4. Press Enter to create the Workflow.
5. Enter **10**, Criteria, then press **F6** to Create. Here, you define the Criteria for the Workflow (i.e. the fields you would like to report on).
6. Enter a **1** for *RECORD. This indicates you want to report whenever a change to any field in the file is made.



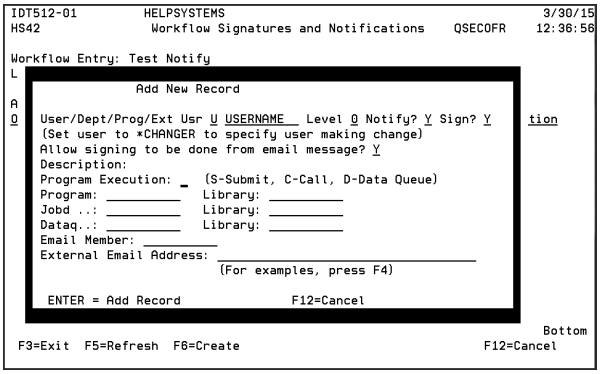
7. Since we selected *RECORD in the previous step, the options under the "Record level types" heading apply to this Workflow. For this example, we will enter **CH** to indicate we want to report any *change* to a record in the file.



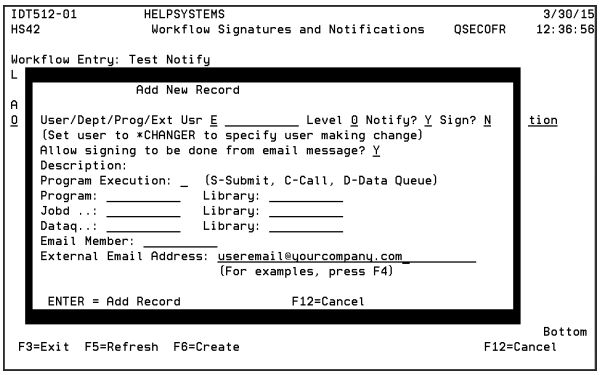
Use the Record Level Criterion panel to specify what kind of action to report on for this Workflow.

8. Press Enter twice. The specified Criteria has been added to the Workflow. Now, specify the action to take once this condition (a change to any record in the file) has been met. For this example, we will notify someone by email that the change has been made.
9. Press **F3** to return to the previous screen (IDT510-01) and enter option **11**, Users/Depts, for Test Notify.
10. Press **F6**, Create. An Add New Record panel appears with many options relating to who to alert. Here, you can tell Database Monitor to notify a user by email, and have that user digitally sign to acknowledge the change to the file.

    To send the email to a user who has already been configured as a Database Monitor user, configure this screen as follows.



To send the email to an external user, you can configure the screen as follows:

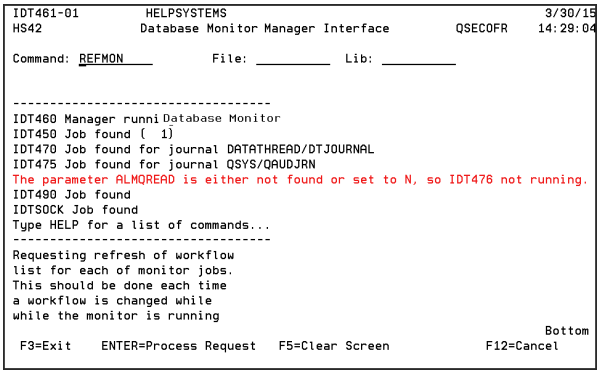


Note: See Workflow - Users in the Database Monitor Administrator's Guide for more details regarding the options on this screen.

11. Press Enter to save and review the recipient(s) who will be notified. Now, when a change is made to the file TSTEMP, a notification email will be sent to all the users/email addresses listed here.

    You must refresh the Workflow list in order for Workflow changes to take effect immediately. To do this:

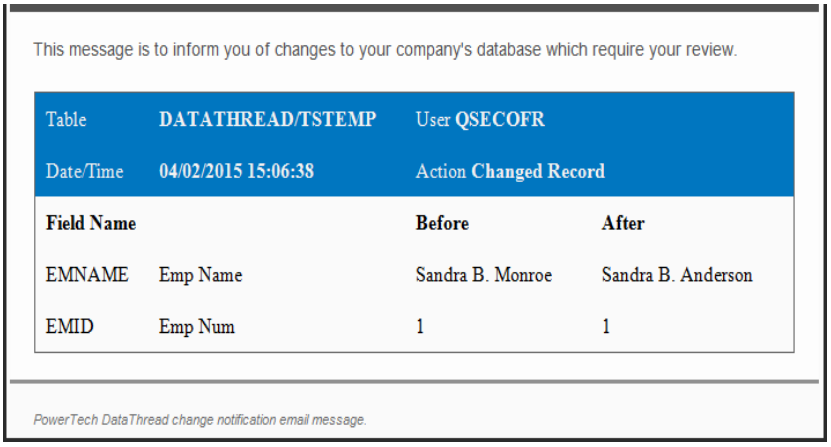
12. Press **F3** three times to return to the main menu.
13. Enter option **17** to open the Database Monitor Manager.
14. After Command, replace the existing text with **REFMON** and press Enter.



For Workflow changes to take effect immediately, you must run the REFMON command to refresh the Workflow list (otherwise, the Workflow change will take effect later after a periodic routine).

Note: Remember you can display a list of all Database Monitor commands using the command HELP.

15. If you would like to test this Workflow, simply change a record in the file. Press **F3** to return to the Main Menu and then press **F21** to open the command prompt.
16. Enter **UPDDTA DATATHREAD/TSTEMP**.
17. Press Page Down to display the first record.
18. Change one or more of the fields and press Enter. For this example, the Employee Name will be changed.
19. Press Enter. The email notification is sent to the defined recipients, including a list of all changes made to the file.



This message is to inform you of changes to your company's database which require your review.

Table	DATATHREAD/TSTEMP	User QSECOFR	
Date/Time	04/02/2015 15:06:38	Action Changed Record	
Field Name		**Before**	**After**
EMNAME	Emp Name	Sandra B. Monroe	Sandra B. Anderson
EMID	Emp Num	1	1

PowerTech DataThread change notification email message.

Code Types overview

Code Types can be used for assigning a variety of codes on an as needed basis. Programming must exist to recognize and properly work with the codes created through the Powertech Code Types Maintenance panel; however unlike parameters maintenance, code types can be used to assign multiple values to a Code Type.

Once Code Types are established, valid codes for each type can be maintained. For example, the Code Type 'DEPARTMENT' might include one for PURCHASING, one for QUALITY, one for MARKETING and so on. Database Monitor comes pre-loaded with several Code Types that are described below.

Pre-Loaded Database Monitor Code Types

Code Type	Description
CHGREASON	Reasons for making a record change.
This code type allows you to establish any number of reason codes for categorizing the meaning of signatures. Examples might be: REV for review, APP for approval and so on.	
DEPARTMENT	**List of valid departments**
Codes for this category might include a 10-character name for each department. Remember, departments can be set to receive notifications through Database Monitor.	
TIMEZONES	**Time zone codes and offsets from GMT**
The system comes pre-loaded with a list of the world's time zones for use in calculating time offsets between local and system time.	

Adding a new Code Type

A code type can be created at any time. Remember; however, that they will only work if there is underlying programming developed to recognize and properly support their use. Examples of pre-loaded code types are- Departments, Time Zones, and Change Reasons.

To add a new Code Type

1. From any menu select option **13** to open the Powertech Code Types Maintenance panel.
2. Press **F6** to open the Add New Record panel for code types.
3. Enter the requested information and press Enter.

Changing a Code Type

A code type can be edited at any time. The description and Code length fields can be maintained. Be aware that changing the length to any number less than the current value in effect before the change may render those values as invalid.

To change a code type

1. From any menu select option **13** to open the Powertech Code Types Maintenance panel.
2. Enter **2** for an existing Code Type.
3. Change the information as required and press Enter.

Deleting a Code Type

A code type can be deleted at any time. Be aware however that once deleted, if it is later determined to re-add the code type, it must be done so as if it were a brand new code type. Also, once deleted, the code type can no longer be used for any purpose by Database Monitor functions including notifications and reporting.

To delete a code type

1. From any menu select option **13** to open the Powertech Code Types Maintenance panel.
2. Enter **4** for an existing Code Type and press Enter.

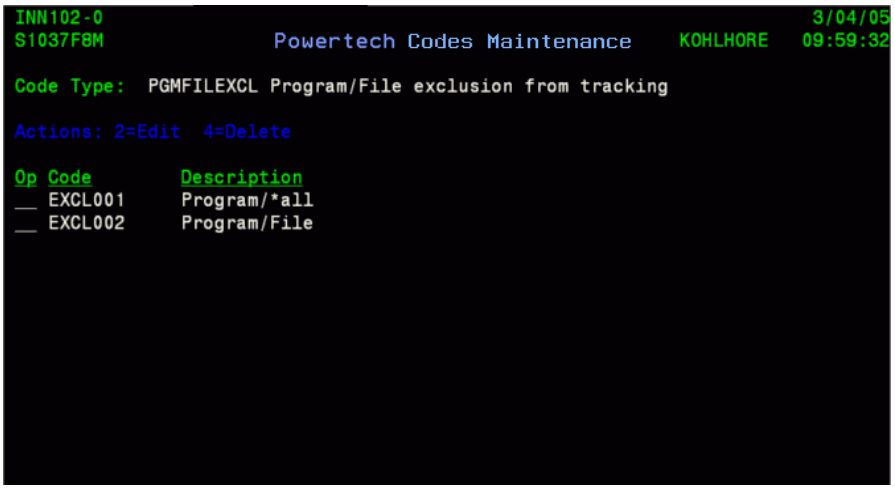
Program File Exclusion

Excluding tracking by program and file

You can exclude tracking for a particular file within a particular program.

To exclude tracking by program and file

1. From any menu select option **13** to open the Powertech Code Types Maintenance panel.
2. Enter **11** for the code type **PGMFILEXCL**. The entries within this code table tell Database Monitor weather or not to exclude tracking for a particular file within a particular program.



The code itself can be any name up to 10 characters to describe the exclusion. The description is what is used by Database Monitor to determine if a program/file combination should be excluded from tracking.

Entry of Program/*all will exclude all files updated by that program from tracking - where program is the name of the program you wish to exclude from tracking e.g. PGM01.

Entry of Program/File will exclude only updates to the file specified from tracking - where program is the name of the program you wish to exclude from tracking e.g. PGM01and file is the name of the file you wish to exclude from tracking e.g. FILE01

A file entry can be a single file, or *ALL for all files within the program.

See Also:

Powertech Code Types Maintenance panel

Powertech Code Maintenance panel

Configuration overview

The initial display upon entry to the Database Monitor Configuration is the Files List. This is the primary configuration panel for all of Database Monitor. Here, files can be added to Database Monitor for monitoring, specific attributes of tracking may be maintained, and workflow entries can be accessed and edited. The entries in this list are color-coded as to the status of setup. White entries are files that are currently active, and being tracked by Database Monitor. Yellow entries are in the process of being set up and are currently not tracked by Database Monitor. Red entries are in ERROR, and need to be investigated.

There are six primary edit panels which can be accessed from the file listing panel shown below. Click on each of them to access a more detailed description of its operation:

Files Configuration

Parameters overview

The following instructions describe how to work with parameters in Database Monitor.

Adding a new System Parameter (non-Data Queue type)

A new parameter can be added when needed. Program logic must be added in order to manage the information and syntax within the parameter.

To add a new parameter

1. In the Powertech System Parameters Maintenance panel, press **F6**. The Add New Record panel appears.
2. Enter the parameter details and press Enter.

Changing a System Parameter

A parameter may be revised as needed.

To change a system parameter

1. From the Powertech System Parameters Maintenance panel, enter **2** for the parameter to be revised.
2. Press Enter. The Change Record panel appears.
3. Revise the parameter and press Enter.

Deleting a System Parameter

From time to time a parameter may need to be deleted.

To delete a system parameter

1. From the Powertech System Parameters Maintenance panel, enter **4** for the parameter to be deleted.
2. Press Enter. The Delete This Record panel appears.
3. Revise the parameter and press Enter.

Adding a new System Parameter (Data Queue type)

A new data queue may be added to Database Monitor when needed. Note that this option is for experts only and could have negative impacts on overall system performance if done properly.

To add a new Data Queue System Parameter

1. From the Powertech System Parameters Maintenance panel, enter **18** for the parameter to be deleted.
2. Press Enter. The Add New Queue panel appears.
3. Enter the required values and press Enter.

Changing a Data Queue

A data queue may be changed on the fly, but updates to the data queue may not take place right away, since it may be in use at the time. The Database Monitor Manager (IDT460) will attempt to correct data queues which are different than their parameter settings on a periodic basis.

Parameters Listing

Data Queues

Add New Queue

Powertech System Parameters Maintenance panel

File Groups overview

File Groups can be created in order to associate a series of files with each other for reporting purposes. For example, the Marketing Department may be interested in records that are in the Customer Master file and in the Customer Order file. It may make reporting against these files easier when viewed together.

Additionally, file groups can be used to limit access of users to data in their appropriate functional areas. Once a set of files has been identified, they can be grouped together. The name of the group can then be associated with the user in User & Security Maintenance function. All inquiries and reports will then "hide" archived data changes of files outside the group.

Adding a new File Group

You can add a file group in order to establish the name or category for the files that you would like to treat as a related set of files for reporting purposes. This is done through Database Monitor File Groups Maintenance IDT101-01.

To add a new file group

1. From any Database Monitor menu, enter option **14** or **24** to open the Database Monitor File Groups Maintenance panel.
2. Press **F6**. The Add New Record panel appears.
3. Enter the Group Name, Description, and specify whether this group should be secure, then press Enter.

Changing a File Group

You can make changes to a file group's description and its security status through IDT101-01.

To change a file group

1. From any Database Monitor menu, enter option **14** or **24** to open the Database Monitor File Groups Maintenance panel.
2. Choose option **2** for a group.
3. Change the Description and/or Secure setting and press Enter.

Deleting a File Group

You can delete a file group if necessary through IDT101-01.

To delete a file group

1. From any Database Monitor menu, enter option **14** or **24** to open the Database Monitor File Groups Maintenance panel.
2. Choose **4** for a group and press Enter.
3. Press Enter again to confirm.

Adding a new file to a File Group

You can add a file to a file group through IDT102-01.

To add a new file to a File Group

1. From any Database Monitor menu, enter option **14** or **24** to open the Database Monitor File Groups Maintenance panel.
2. Choose **11** for a group to open the File Maintenance for File Groups panel, then press **F6**.
3. Type the File and Library and press Enter to add the record.

Changing a file in a File Group

You can make changes to a file's Library through IDT102-01.

To change a file in a file group

1. From any Database Monitor menu, enter option **14** or **24** to open the Database Monitor File Groups Maintenance panel.

2. Choose **11** for a group to open the File Maintenance for File Groups panel.
3. Enter **2** for the desired file and press Enter.
4. Change the file as needed and press Enter.

Deleting a file from a File Group

You can delete a file from a file group if necessary through IDT102-01.

To delete a file from a file group

1. From any Database Monitor menu, enter option **14** or **24** to open the Database Monitor File Groups Maintenance panel.
2. Choose **11** for a group to open the File Maintenance for File Groups panel.
3. Enter **4** for the desired file and press Enter.
4. Press Enter again to confirm.

See Also:

Database Monitor File Groups Maintenance panel

File Maintenance for File Groups panel

Criteria overview

Criteria Maintenance can be used to store report criteria for reports that are used routinely. Specifying and saving the criteria through will make the task of generating standard reports a very easy process.

Adding a new Criteria Set

You can add a new criteria set in order to make transaction inquiry an easier task based on criteria that might be used repeatedly or on some routine schedule. This is done through IDT103-01.

To add a new criteria set

1. From any Database Monitor menu choose option **15** or **25** to access the Database Monitor Report Parameters Maintenance panel.
2. Press **F6**.

Changing a Criteria Set

You can revise an existing criteria set in order to make transaction inquiry an easier task based on a criteria that might be used repeatedly or on some routine schedule. This is done through IDT103-01.

To change a Criteria Set

1. From any Database Monitor menu choose option **15** or **25** to access the Database Monitor Report Parameters Maintenance panel.
2. Enter **2** next to the record you want to change.

Deleting a Criteria Set

You can delete an existing criteria set when necessary through IDT103-01.

To delete a Criteria Set

1. From any Database Monitor menu choose option **15** or **25** to access the Database Monitor Report Parameters Maintenance panel.
2. Enter **4** next to the record you want to delete and press Enter.
3. Press Enter to confirm.

Powertech security - overview

Database Monitor comes pre-loaded with its own security. This security is additive to the user's existing security and the system will always default to machine and primary application security prior to granting access to any Database Monitor functions. Security profiles can be established for individual users or for templates. Template security can then be assigned to groups of users, making the setup more convenient and allowing for consistency within user categories.

There are three primary sections to Powertech Security, accessed from the following screens:

Powertech Security - Users

Powertech Security - Processes

Powertech Security - Matrix

Security - Users

Database Monitor security must be assigned at the program level through the Powertech Security - Users screen as well as at the machine level in order to allow access to screens and functions in Database Monitor.

Adding a new user to Powertech Security

Adding a new profile for security in Database Monitor is a very simple yet feature-rich process. Using the INN201-01 F6 key you can: create a profile, assign it to a security template, attach it to a department, specify the time zone that profile is working in, indicate an e-mail address for automatic notification, select the methods used for notification, or if desired, copy security from another user's profile.

To add a new record

1. From any Database Monitor menu, choose option **16** to open Powertech Security - Users.
2. Press **F6** to Add.
3. Enter the user values (see Add New Record) and press Enter.

Editing a user profile in Powertech Security

An existing user profile may be maintained for all fields available from the INN201-01 Change Record window. This only excludes the Record Type and User/Name

To edit a user profile in Powertech Security

1. From any Database Monitor menu, choose option **16** to open Powertech Security - Users.
2. Place a **2** beside the user you wish to edit.
3. Edit the record and press Enter.

Deleting a user profile in Powertech Security

An existing user profile can be deleted from the Database Monitor Security file from INN201-01, deleting this record window. Caution: Once deleted, should the record need to be re-added later it must be done as if it were a brand new record. It may not be 'reactivated'.

To delete a user profile in Powertech Security

1. From any Database Monitor menu, choose option **16** to open Powertech Security - Users.
2. Place a **4** beside the user you wish to delete and press Enter.
3. Press Enter to confirm.

Security - Processes

This section provides instructions for INN202-01, Powertech Security. Occasionally there may be a need to maintain the processes used by the system. For example, if a new program were written that allows the user to prepare an output report for automatic secured transmission over the internet, you would need to grant privileges around that capability to certain people in the organization. Add the new program name to the security file through INN202-01, Powertech Security - Processes. Once created here, it may be added to template and user profiles' authority as needed through the Powertech Security - Matrix INN203 program.

Adding a new program or transaction to Powertech Security

In order to add a new program for use by Database Monitor use the instructions in this section.

To add a new Program or Transaction to Powertech Security

1. From any Database Monitor menu, choose option **16** to open Powertech Security - Processes.

2. Press **F11**.
3. Press **F6** to open the Add New Record panel.
4. Enter the desired values and press Enter to add the record.

Editing a process in Powertech Security

If an existing process description needs to be revised perform this maintenance through INN202-01.

To edit a process in Powertech Security

1. From any Database Monitor menu, choose option **16** to open Powertech Security - Processes.
2. Press **F11**.
3. Enter **2** for a program or transaction to open the Change Record panel.
4. Make the desired change and press Enter to change the record.

Deleting a process in Powertech Security

If an existing process needs to be removed from the list of those available, functionality to perform this maintenance is available through INN202-01

NOTE: All of the processes which ship with the Database Monitor product or any other Powertech product are static and should not be removed. The only instance where the delete of a process might be warranted is in the situation where the customer is using Powertech security for additional purposes.

To delete a user profile in Powertech Security

1. From any Database Monitor menu, choose option **16** to open Powertech Security - Processes.
2. Press **F11**.
3. Place a **4** beside the program or transaction to be removed and press Enter.
4. Press Enter to confirm.

Security - Authorities

Once users have been created in the Database Monitor Security files, their authority must be maintained to allow or disallow their access to certain transactions, processes and actions. They can be granted access to transactions, to whole programs or just to certain actions from within a program. This section will describe the process for adding security to processes. When accessed through Powertech Security - Users (INN201), Powertech Security - Matrix (INN203) displays the user or template in the header and the processes are listed below. When accessed through Powertech Security - Processes (INN202), Powertech Security - Matrix (INN203) displays the Process in the header and the users are listed below. You may also toggle between the two views within INN203 by placing a 9 in the Op field beside the user or process.

Depending on the type of maintenance being performed, the use of INN201 or INN202 for accessing INN203 may be preferred for ease of implementing the desired security. For example, if a new process is added, it might be easier to assign it to those users and templates who need it through INN201, rather than through INN202. On the other hand, if a new user is added it will be easier to maintain his/her security by accessing INN203 through INN202.

In review- when INN203 is accessed through INN201, the user or template is shown in the header and the programs are shown in the listed detail. The programs to which the user or template has access can be allowed, disallowed, or actions can be maintained. When INN203 is accessed through INN202, the process is shown in the header of the screen and the users and templates are shown in the listed detail. The users/templates can be given or denied access to the process shown in the header.

There are two primary means of adding security for a user. You may choose the user and then browse through the list of processes you wish to give that user or you may choose a process and then browse through the list of users you would like to grant authority to for that process.

Adding Program Authority and Actions Authority to a User or Template

1. From the user list, select the User or Template by entering **9** for the one desired.

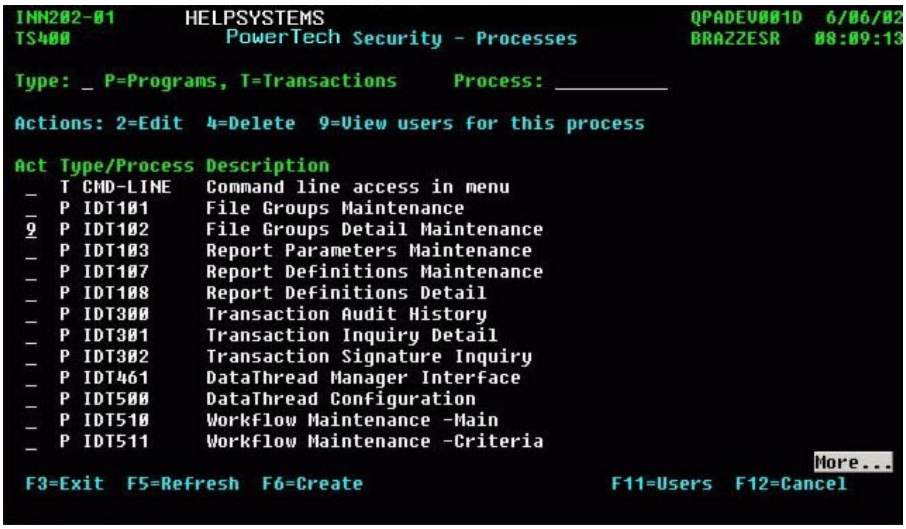
   The Powertech Security - Matrix screen appears, showing the access status of the specified user or template for each transaction or process.

2. Enter **1** For each of the processes or transactions that the user or template needs. To remove access use a **3**. If access is added the line will go from red to white and the Allow column will show 'Y'. If access is revoked the line will go from white to red and the Allow column will show 'N'.

3. Edit the actions allowed through a program using **2**. This will create a pop-up window with 20 open lines for adding allowed actions. If all actions should be allowed, enter '99' in the first of these fields and press enter. Otherwise, beginning in the first of the 20 open fields place a 1 or 2-digit number for access to each desired program action.

Adding Users/Templates to a Program's Authority List

4. Select the Process or transaction by entering **9** in the Act field for the one desired. This will bring up INN203-01 showing the access status to the specified process for each user and template.



5. For each user or template that needs access, enter **1** in the Op field beside the desired one (s). This will change the line's color from red to white and place a 'Y' in the Allow column. To revoke access, use **3** in the Op field beside the desired one(s). This will change the line's color from white to red and place an 'N' in the Allow column.

6. Edit the actions allowed through a program using **2** in the Op field beside the desired user or template. This will create a pop-up window with 20 open lines for adding allowed actions. If all actions should be allowed, enter '99' in the first of these fields and press enter. Otherwise, beginning in the first of the 20 open fields place a 1 or 2-digit number for access to each desired program action.

Workflow overview

A major component of the Database Monitor software is the ability for Database Monitor to watch the database for important events and to respond to these events by either notifying one or more people, or by automatically launching custom programs. This part of Database Monitor is referred to as the Workflow component. Files that are added to Database Monitor are constantly being watched and have all of their activity logged to the audit trail files. In addition, for each action that takes place that affects the database, just after logging the transaction, Database Monitor will analyze the change against the existing workflow entries for the file being affected and, if the criteria for the workflow entry are matched by the changes that have been made, the actions specified in the workflow will be performed.

Simple Workflow example

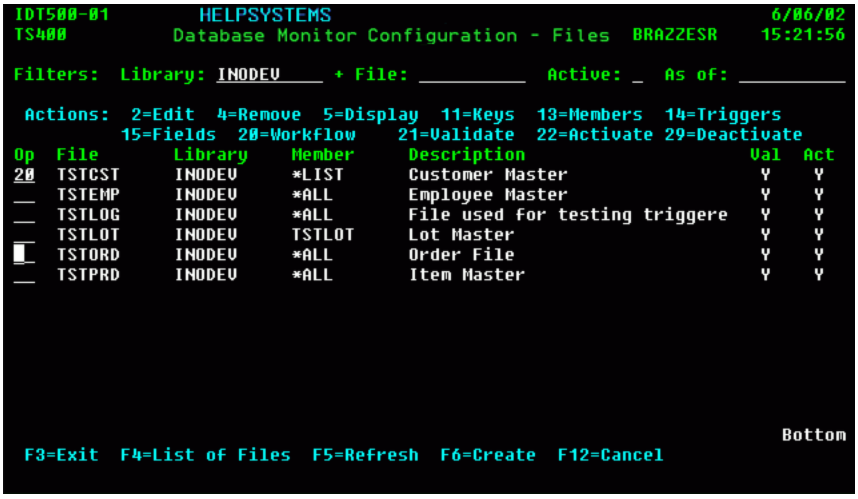
Consider the following simple example: The traffic manager, Bob, needs to know each time a shipment is sent to BigBoy Motors, the company's largest customer, because Bob likes to call Ed Big, BigBoy's owner, and let him know personally that a shipment is on its way. Database Monitor can do this easily. The general steps for setting it up are as follows:

1. Add the Shipment file to Database Monitor in the Database Monitor Configuration - Files panel.
2. Create a new workflow entry, calling it "Notify Bob about shipment to BigBoy."
3. Add a criterion to the workflow saying only react when "record added to file."
4. Add a criterion to the workflow saying only react when "customer" is "BigBoy."
5. Add Bob as a user to be notified for the workflow.

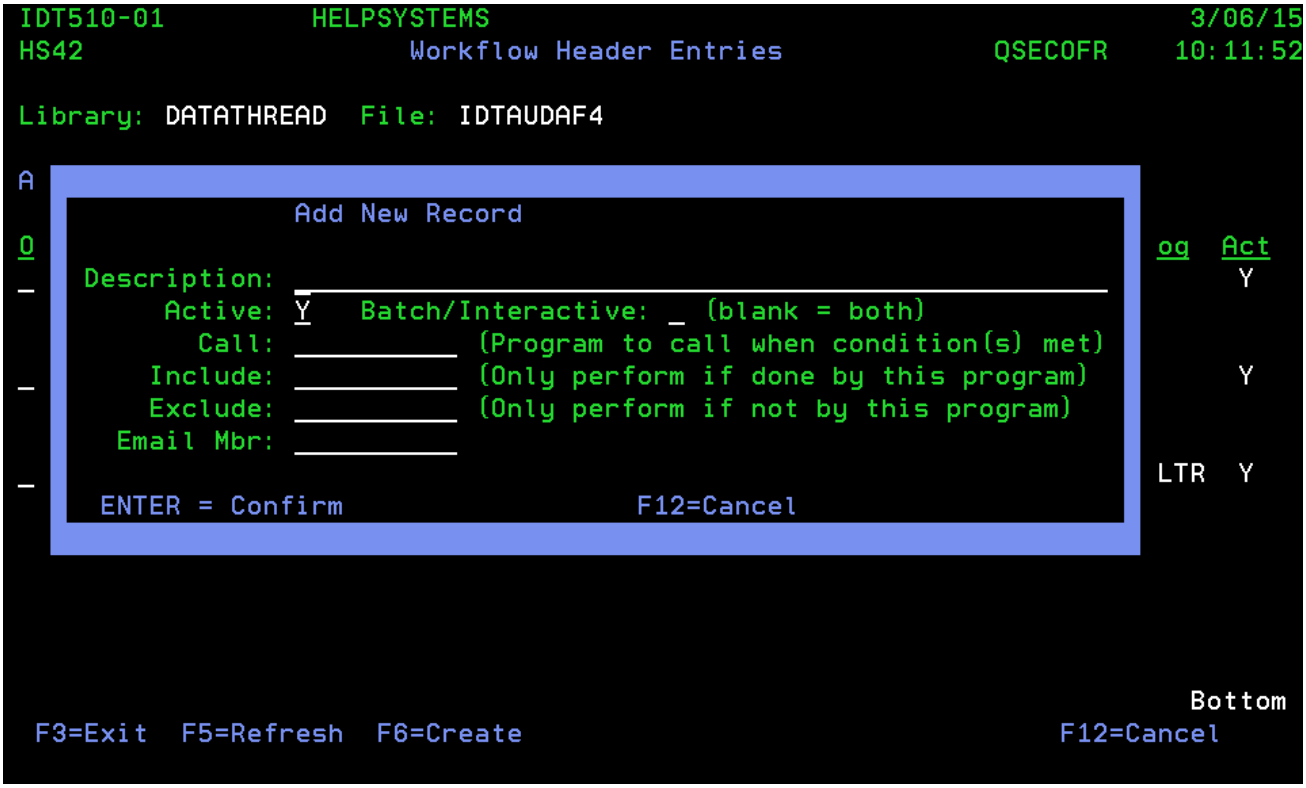
Using these steps you can set up a "notification" workflow in a matter of minutes. Even the simple criteria shown can be quite useful. The following procedure describes how to create this Workflow:

To create a new workflow

1. Choose option **11** from the Database Monitor Menu system to open the Database Monitor Configuration - Files panel.
2. To add a file, enter its library at the top of the screen. You can use F4 to prompt for the file in the File field. See Configuration - Files.



3. After the file has been added, enter **20** for the file that requires a workflow. Choosing action 20 for a file in Database Monitor will bring up the Workfow Header Entries panel (IDT510-01). From here you can see a listing of the existing workflows for this file, along with a shorthand notation showing the various criteria that make up the workflow.
4. Press **F6** to add a new workflow. The following screen appears.



The description can be anything that uniquely describes this workflow. There are also two canned entries that can be made into the description to perform specific functions within Database Monitor.

The first is *NOTRACK. A *NOTRACK entry is made to prevent the tracking of a record change based on the selection criteria of the workflow. When a *NOTRACK workflow is entered for a file, the Database Monitor program that is in charge of selecting which record changes to track will determine if this record should be included based on the entered selection criteria within this workflow. NO TRACKING DATA WILL BE KEPT FOR A RECORD THAT MEETS THE SELECTION CRITERIA WITHIN A *NOTRACK WORKFLOW.

The Second is *CONTEMP. The *CONTEMP entry allows the use of the workflow selection criteria to determine if a contemporaneous signature screen is required for a database change. There can be any number of *CONTEMP entries per file. They can be defined by entering a description after the *CONTEMP entry in the description field. This description will be displayed within the contemporaneous signature screen to let the user know what they are signing for. When multiple CONTEMP entries are used for a single file, there is the option of allowing one signature to propagate for all changes, or enforcing a signature for each change within the record. This entry can be found within the system parameters and is called SGNALL*C. If this entry is a N the system will require the individual signature for all *CONTEMP entry selection criteria that is met.

Note: For a *CONTEMP the field being tested requires a 'Y' in the signature position within option 15 of the table maintenance.

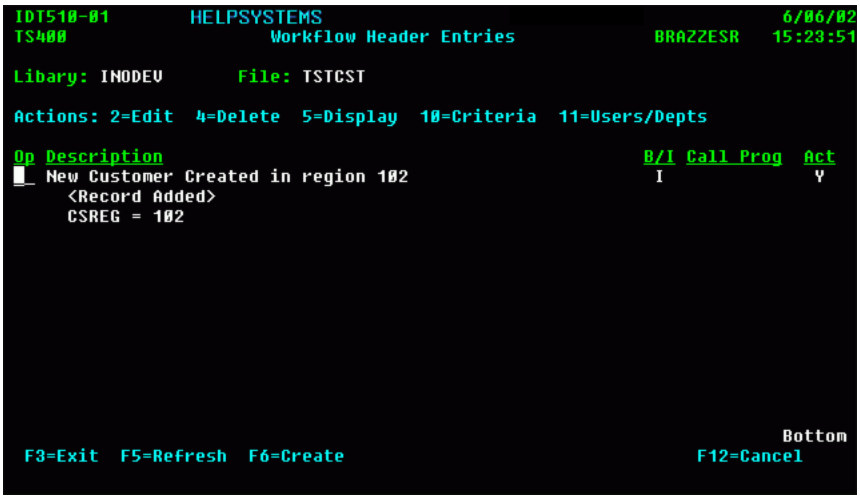
All of the selection criteria defined later in this document are valid for use within the *NOTRACK and *CONTEMP entries. An Email Member can be entered to customize the e-mail sent when a change is processed that activates this workflow.

Please see the section on custom E-Mail Members for further help.

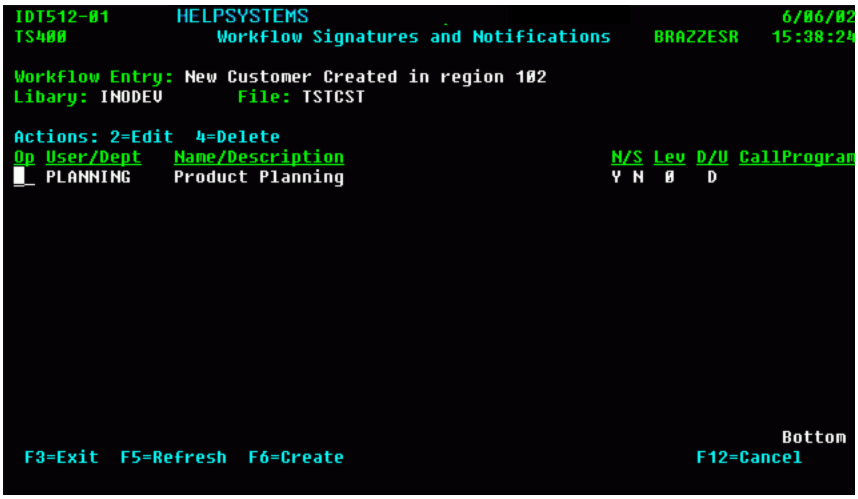
Consider the example shown below. Here, the file TSTCST, in library INODEV, has one active workflow entry, called "New Customer Created in Region 102". There are two conditions that must both be met for this workflow to be activated:

- A record was added to the file, and
- The region field (CSREG) is equal to 102.

One other minor condition is listed under the B/I column, which specifies that this workflow only activates when from an "interactive" job. Batch updates will not cause this workflow to fire.



The screen above shows a very simple example of a workflow, with its conditions. The only piece not yet mentioned has to do with "what to do" when these criteria are met. You may see this by placing an 11 on the workflow to see its users assigned and other actions. Below is a sample of what this might look like:



As the screen above shows, when this workflow gets activated the planning department gets notified. For a detailed look at the aspects of workflows, see the following sections:

Workflow - Conditions

Workflow - Users

Workflow - Cascading Signatures

Workflow - Examples

Workflow - Conditions

This section deals how workflow criteria, also called conditions, operate. (See Workflow Overview for information of setting up workflows).

All of the files you place into Database Monitor may have workflows attached and there is no theoretical limit to the number of workflows that may be created. Each workflow operates independently of every other one, meaning that if you have 10 workflows on a file it is conceivable that all 10 will get activated by a file change.

Within each workflow are created what are called "criteria". There are two types of criteria:

- Record-Level
- Field-level

Record-level criteria

Record-level criteria are based on the type of change occurring to the database record, regardless of the field values involved. For instance, if you want a workflow to activate only when a record is deleted, then you would add a record-level criteria of "Record Deleted" to the workflow. Below are the record-level conditions which you may use:

CH = Any Change
Causes the workflow to activate when any field on the record changes. Note that added records and deleted records are considered applicable to this condition. So, if a record is added, deleted, or has at least one of its field values (any one) changed, the CH criteria will be met.

AR = Add Record
This condition is only met when a database record is added to the file. Some workflows are only concerned with a certain value in a record when it first appears. For instance, when a customer is created, someone in Accounts Receivable may want to be notified. In this case, you would use an AR condition.

CR = Change Record
Change Record conditions cause the workflow to fire only when the type of activity is a record update. This will specifically exclude Adds and Deletes of records, unlike the CH (Any Change) criterion above.

DR = Delete Record
Is only true when a record is physically deleted from the file.

Field-level criteria

Field-level changes have to do with individual fields (also called columns) in a file. When we are only concerned with activity that affects a particular field in a file, we use field-level criteria on its workflows. These criteria allow you to monitor for "changed to" or "new" or "deleted" values by testing for the actual contents of the field. The contents checked may refer to the "before" value or the "after" value. The valid field-level criteria are as follows:

CH = Any Change to the field's value
This is a basic criterion that states that if the field in question is changed from any value to any different value the workflow is activated. Note that this condition only evaluates to true during a record change, not during adding or deleting records.

EQ = Only activate when field is equal to a given value

With the EQ condition, you are presented with a field into which you enter a comparison value. If the "before" value is specified and the value of the field before the change equals this value (or the "after" value is specified and the "changed to" value is equal to the comparison value, the workflow will be activated (assuming it passes all other criteria).

NE = Only activate when field is not equal to a given value

This is just the opposite, of course, to the EQ condition. When a field's before or after value does not match the value input, this condition is met.

GT = Only activate when field is greater than a given value

Here, the field's value (before or after) is compared with the comparison value entered on the criterion. If the field's actual value is greater than (either quantitatively, in the case of numeric fields, or alphabetically, for character fields), then the condition is qualified.

LT = Only activate when field is less than a given value

The same as GT, except that the field's value must be less than that of the comparison value.

GE = Only activate when field is greater than or equal to a given value

The same as GT, except that if the field's value is exactly equal to that of the comparison value the condition is met.

LE = Only activate when field is less than or equal to a given value

The same as LT, except that if the field's value is exactly equal to that of the comparison value the condition is met.

IP = Only activate when field is increased by a given percentage

This condition only applies to numeric type fields. Here, the "before" value of the field is compared with the new value of the field. If the new value is greater than or equal to the old value increased by the percentage indicated in the comparison value field, then the condition qualifies. Specifically, if newvalue >= oldvalue * (1 + comp/100), where comp = comparison value, then the condition is met.

DP = Only activate when field is decreased by a given percentage

This condition only applies to numeric type fields. Here, the "before" value of the field is compared with the new value of the field. If the new value is less than or equal to the old value decreased by the percentage indicated in the comparison value field, then the condition qualifies. Specifically, if newvalue <= oldvalue - (oldvalue * (comp/100)), where comp = comparison value, then the condition is met

IV = Only activate when field is increased by a given value

This condition is the same as IP (increase by percentage) except an actual value is used for the comparison. Specifically, if newvalue >= oldvalue + comp, then the condition is met.

DV = Only activate when field is decreased by a given value

This condition is the same as DP (decrease by percentage) except an actual value is used for the comparison. Specifically, if newvalue <= oldvalue - comp, then the condition is met.

Multiple criteria in one workflow

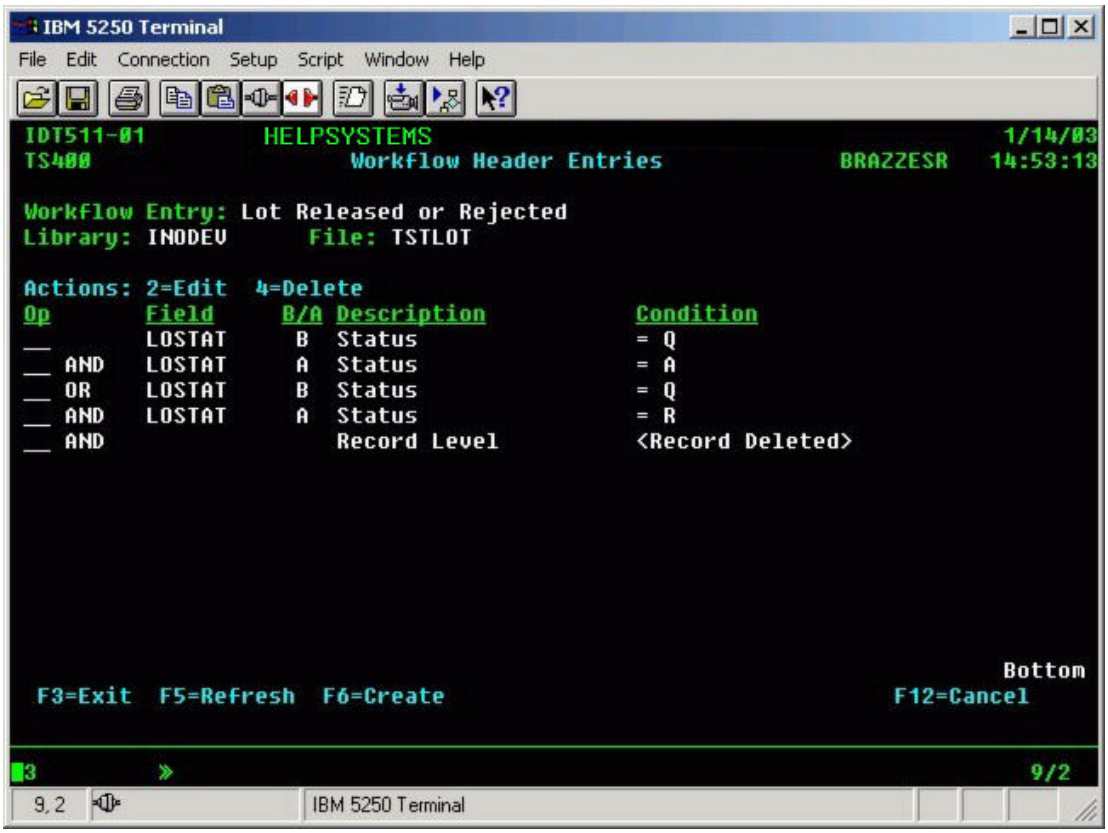
A combination of "AND" and "OR" relationships can be used to manage the activation of a WorkFlow. Every time an "OR" is encountered a new set of criteria is being considered.

In the example below, three combinations are possible:

Combination 1
Lot's status (LOSTAT) before change was Q
AND
Lot's status after the change is an A

Combination 2
Lot's status (LOSTAT) before change was Q
AND
Lot's status after the change is an R

Combination 3
Lot is deleted from the file.



Workflow - Users

In this section we will discuss and demonstrate how users can be administered within Database Monitor. The following screen also is used to specify workflow programs that get called or user-

defined data queues that Database Monitor can write to when a workflow is kicked off. That topic is explained in more detail in the section on CustomWorkflowProcessing.

Users in this context can be- a person, a department, or a communication device such as a cell phone. We will discuss each here briefly. Regardless of the form the user is taking for a workflow, it must be set up in user security- INN201. If the 'user' is a department it must also exist as a valid entry in Code Types through INN101.

The one exception to this rule is that if P is specified (call program or send to data queue), the user field is not required.

User as a Person - This 'user' represents an individual person. She must be properly set up through INN201. Refer to the section for User and Security Maintenance for detailed set up instructions. She must also be a properly authorized AS/400 userid.

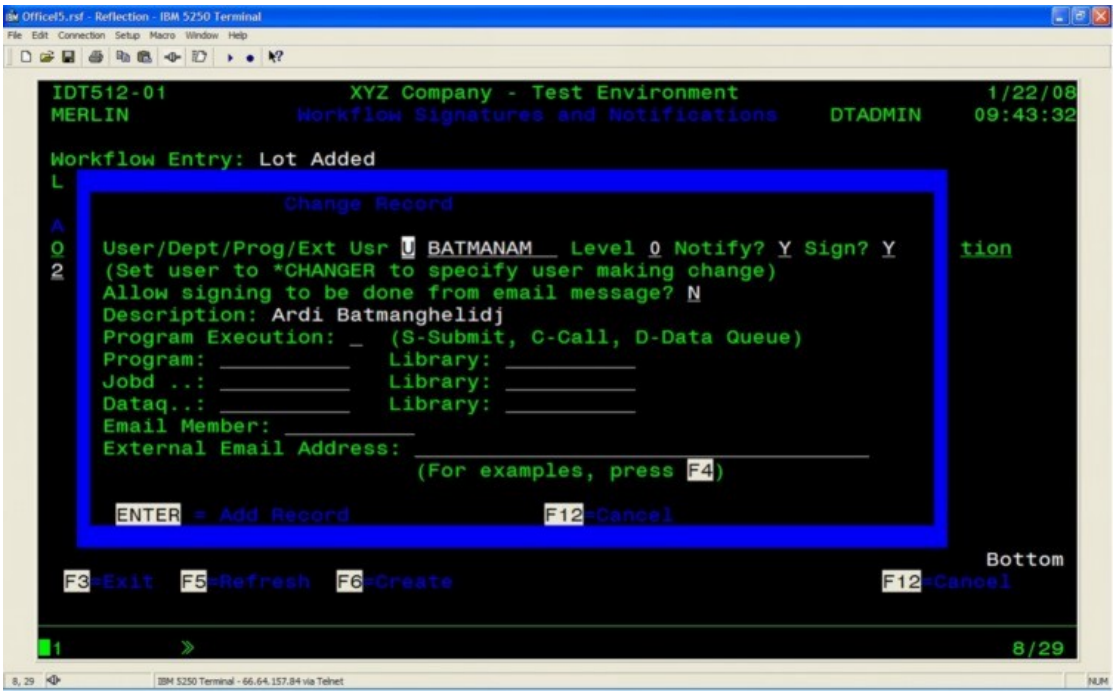
User as a Department - When a department is specified in the Workflow, assuming the department has been properly created in Code Types and has been properly associated with userid's through User and Security Maintenance, Database Monitor can send notifications to the userid's assigned to the department.

User as a Device - As example of this type of user would be a pager or cell phone. For instance, if let us say someone in the sales organization has temporary responsibility, on weekends for instance, to be notified immediately when an order over a certain dollar amount is received. A Database Monitor user could be set up and the phone number and/or email address could be used by the system to call or send email to that device.

Adding a User

Navigation To

From any menu enter option 11 and press enter. From IDT500-01, put the number 20 in the Op field beside the file to which the workflow will belong, press enter. From IDT510-01, put the number 11 in the Op field beside the Workflow description for which you need to maintain users. This will bring you to IDT512-01. From here you can create a new user by pressing F6.



Field level entries – IDT512-01

Workflow - Users

Field	Description	Valid Entries	Needed?
User/Department	There are actually two fields for this entry, a single character- 'U' for user or 'D' for department. And a 10-character field for the proper user id or department name. Specify *CHANGER to send a notification to the person making the actual change. This can be useful as a level 2 entry, where a reviewer will look over the change, sign for it, and then a notification will be sent to the original user.	U or D plus a valid userid or department name as set up in INN201 and in INN101 if it is a department. Alternatively, enter a P here is calling a program or sending to a data queue instead.	Yes

Field	Description	Valid Entries	Needed?
Level	Specify the level of notification this user is at in the Workflow chain beginning with a '0' for the first user to be notified up to and including the number '9'	Any number 0 - 9.Note: the first user in a chain must be either 0 or 1. If there are multiple levels, the first must be level 1, subsequent users may be any number 2 - 9. There may be multiple users to a level.	Yes
Notify?	If notification is to be sent immediately to this user, enter Y, if notifications will be grouped and available through Database Monitor Reports, enter N.	Y or N	Yes
Sign?	If the user's signature is required for the workflow, enter 'Y' otherwise enter 'N'.Note: If Y is chosen the workflow process will be held in abeyance until the user has signed off on the change.	Y or N	Yes
Allow signing from email message?	Set this field to a Y if you want the person who is notified of this change to be allowed to sign for the change from the email received. If set to Y, the reason code and comment will be fields available in the HTML email and the uer may simply click on the Approve button to sign for the change. A browser window will be launched verifying the signing was done.	Y or N	No

Field	Description	Valid Entries	Needed?
Program Execution	S = Submit program C = Call program D = Send to data queue	S, C, D	No
Program	If the completion of the workflow step should be used to start a program, indicate the program name here.	Valid program name up to 10 characters	No
Library:	The name of the Library that contains the program that will be called.	Valid Library name up to 10 characters	No (Yes if a program name is specified above)
JobD	Job description to use if job being submitted	Valid job description	No
Library	Library of Job description	Valid Job/Library must exist	No
Dataq	Data Queue to send to if Program Execution = D	Valid data queue name	No
Library	Library for this data queue		No
Email Member	An Email Member can be entered to customize the e-mail sent to this user when a change is processed that activates this workflow. An external e-mail address can be specified by placing an E in the User/Dept/Prog/Ext Usr field. This allows an external user to be notified when this workflow is activated. Please see the section on custom E-Mail Members for further help.	Valid Email member from the ID HTM file.	No

Workflow - Cascading Signatures

Database Monitor allows you to set up a process whereby users are notified in sequence depending upon the level they are at within the workflow. For example, if we want Melissa to be the last person to sign off on a change that was initiated by Carl and subsequently reviewed by Amanda, we might have them set in the workflow as:

Carl	Level 1
Amanda	Level 2
Melissa	Level 9

Rules for using levels

General Rules:

- Level 0 users activate as soon as the workflow is activated.
- Level 0 users may sign off at any time and do not affect subsequent levels' notifications or signature activations.
- There may be several users at any given level; however, users at higher numbered levels will receive notification only after all signatures are posted by all users at all lower levels
- There MUST be at least one user at level 0 OR level 1.
- Workflows with multiple levels must start with a level 1.
- Level numbers do not have to be assigned in sequential fashion. For example, you can establish a sequence such as- 1, 2, 3, or 1, 3,9. Either of these would be valid. Levels of 2, 3, and 4, however, would be invalid as all workflows with levels 2 or above must have a level 1.

Levels Defined

Level	Function
0	Level 0 is used if all notifications are sent at the same time to all recipients. Note: a workflow must have at least one level 0 or level 1 user
1	Level 1 is used if notifications are to be sent in a sequential manner. Note: a workflow must have at least one level 0 or level 1 user
2..9	Level 2 through level 9 will receive notification only after all users at all lower levels have signed.

Workflow - Examples

Example 1- Several People must sign for a change and it is not necessary that one must sign prior to another.

In this example, suppose that there is a new item being set up in the item master file and several departments and individuals must enter data for their fields, but that there is no dependency on other groups. A notification might be sent to all departments- Planning, Finance, Purchasing, Quality, Engineering, Manufacturing, Customer Service and Sales. Each department or a representative of each would be assigned to receive notification after an item master add transaction is processed. Each would then go in and update their portion.

All users for this workflow would be set to level 0.

Example 2- Several People must sign for a change and after they are done someone else must perform a final step.

Let's take the prior example and say that after the Planning group completes their task, then the Quality Group must go in and perform a final review and approval. In this workflow, the initiation would begin with an add record workflow going to all departments at level 1 except Planning and Quality. Quality wants to review after all other departments have made their change and since the last group to make changes before Quality reviews is Planning, we would have all users at level 1 except Planning (level 2) and Quality (level 3 or higher up to 9). Also, since Quality is very busy and does not want to be interrupted for this type of change we might have set their Notify? flag to N. Then perhaps once at the beginning of each day they would enter the system and go to IDT300-01 through option 22 to see what new records have arrived for their signature.

Example 3- One person wants notification but does not need to sign off.

The Sales Manager, John, for Region 3 wants to welcome new customers to his territory. In this scenario, we need to create a workflow that notifies John for any Customer Master record where the Region is equal to 3. Since Database Monitor is only looking at changes on a going forward basis, the workflow would have the criterion set for the region field level 'EQ' for the value '3'. In this way, John will be notified whether it is a new customer for the company or if it is an existing customer that has moved or added a location to his region. John would be at level 0 with no signature required and immediate notification.

We hope that these simple examples give you some idea of why and how to set up and use Database Monitor to help your business run more efficiently.

Workflow - Custom Programming

The workflow module of Database Monitor is highly extensible. With its ability to call any custom program at any of the steps of the workflow, actions can be performed that are specific to the underlying application being run. This is covered in detail in the Appendix, Database Monitor Custom Interfaces.

Transaction inquiry
Transaction inquiry overview

What is the point of gathering all this historical data if one cannot gain access to it efficiently and clearly?

Database Monitor has been designed with great emphasis on ease of data extraction. It supports three methods of accessing the historical data:

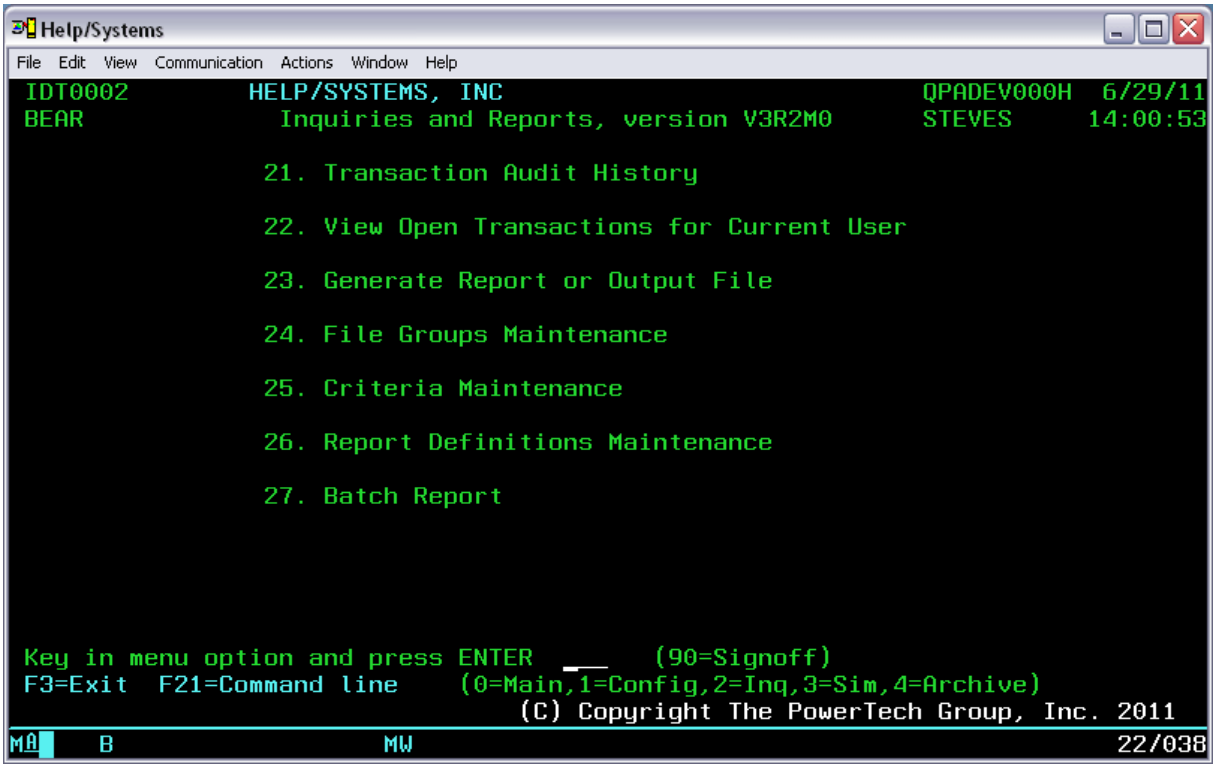
- Online Inquiry
- Reporting
- File Export

Each of these methods shares the same conduit for selecting the data that is retrieved. For example, if a set of selection criteria is used to view all Item Master changes by user XYZ123 between April 11, 2014 and May 12, 2015 where the cost field was altered; the filter entries can be saved. The criteria can then be retrieved to generate a report and/or to generate a downloadable extract file.

The methodology around data retrieval has its foundation on three functions:

- Filtering the data to get exactly those records you need
- Grouping of files into logical business units, for reporting purposes
- Remembering the filters for repeated subsequent use

Inquires and reports can be accessed from the menu of the same name.

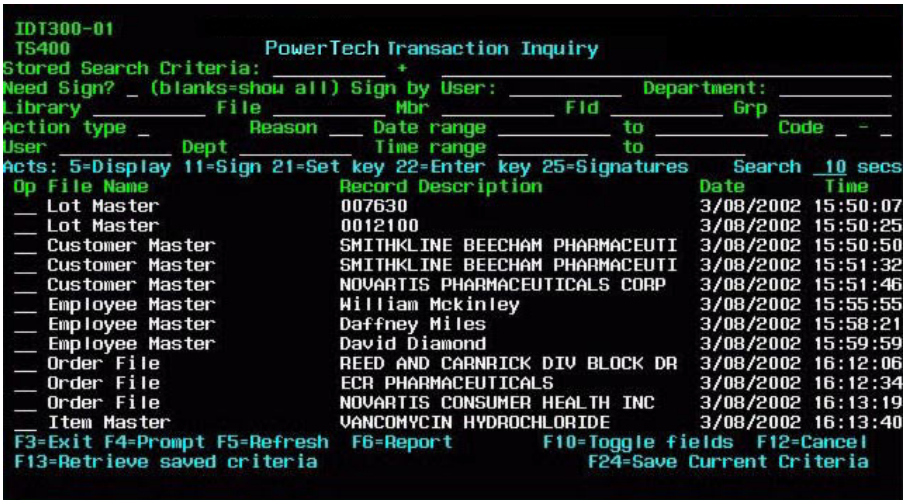


Database Monitor Transaction Inquiry

This central, and probably most utilized, user function in Database Monitor serves two main purposes:

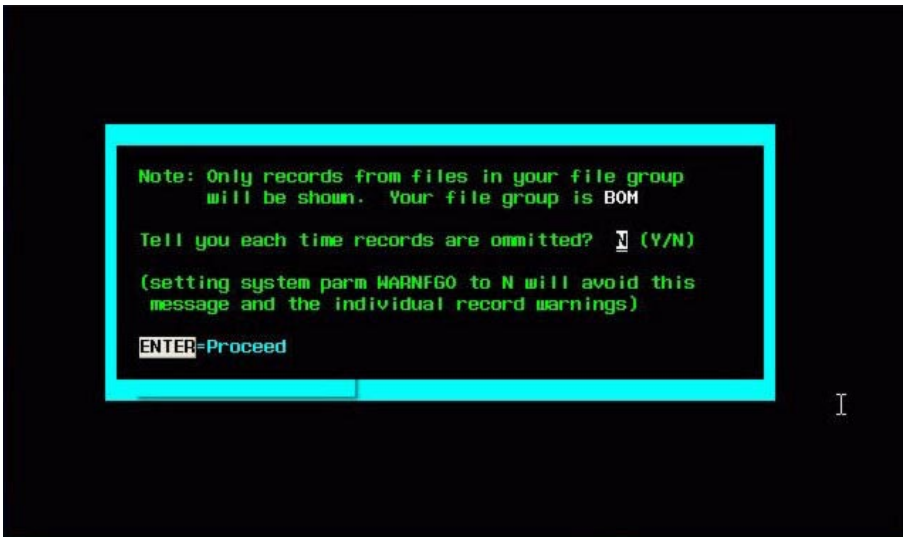
- To gain access to history of changes made to files that have been "DataThreaded"
- To review and react to open signatures. See Workflow - Cascading Signatures for greater detail on the concept

All of the selection criteria work together to refine your search. A record must satisfy all of the limits before it is displayed.



A Note on File Group Security

If a user has been set with limited access to a group of files, and the system parameter has been set to warn users, the following panel will be displayed at the begriming of each inquiry session. This function allows a system administrator to segregate users' data access to their appropriate functional area.



Field level entries – IDT300-01

Transaction Inquiry

Field	Description	Valid Entries	Needed?
Stored Search Criteria	This is the name of a previously defined set of search criteria. By entering a value here and pressing the enter key, the panel is loaded with the appropriate search information. F4 can be pressed to show the user a list of available pre-defined search criteria	Any set of characters up to a maximum of 10.	No
Description	40 characters of description, which help the user, identify in picking the correct pre-defined search criteria.	Any set of characters up to a maximum of 40.	No

Field	Description	Valid Entries	Needed?
Need Sign?	This filter controls viewing of changes that have associated signature requirements. "Y" will show only those records that have open signatures. Blank will show changes with both open and closed signature requirements. "N" will show changes that do not have a signature requirement associated. Use this filter together with the "Sign By User" or "Department" to access changes that need signature by particular entities.	"Y", " ", "N"	No
Sign by User	For records that require or did require signature by a specific user, you may enter the valid userid here. Note: You may only specify either a user or a department or neither but not both.	A valid userid up to 10 characters.	No
Department	For records that require or did require signature by a specific department, you may enter the valid department here. Note: You may only specify either a user or a department or neither but not both.	Any set of characters up to a maximum of 10.	Yes
Library	Enter the valid Library name for the library containing the file that will be used as the basis for the report.	A valid library name up to 10 characters	No

Field	Description	Valid Entries	Needed?
File	Enter the File name for the file containing the records that will be used as the basis for the report. Note: include only if a Group name has not been or will not be specified.	A valid file name up to 10 characters	No
Member	Enter the File Member name for the file member containing the records that will be used as the basis for the report.	A valid file member name up to 10 characters	No
Field	By entering a field name in this location, you will limit your report or inquiry to only those changes that affected this field. For example, you may select to see record changes only when the lot number was modified	A valid field name up to 10 characters	No
Group	Enter a valid Group name for the Group containing the information that will be used as the basis for the report. Note: include only if a file name has not been or will not be specified.	A valid group name up to 10 characters	No
Action Type:	Enter an 'A' for Add, 'C' for Change, or 'D' for Delete. This will only select records that meet the specified add, change, or delete criteria.	'A', 'C', or 'D'	No

Field	Description	Valid Entries	Needed?
Reason:	Any valid 3-character reason code as set up in Code Types maintenance. This will limit your search to only those changes where the selected reason code was assigned. For example show me all changes to the Lot file where a reason code of REJ was used	Valid 3-character code type.	No
From: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
To: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
From: Code	Enter an 'E' for Earliest, 'T' for Today, 'D' for Date, or 'L' for Latest date. The system will use the associated date and complete the 'From' date field appropriately. Note: include E, T, or L only if a date has not been or will not be specified.	An 'E', 'T', 'D', or 'L'	No
To: Code	Enter an 'L' for Latest date or 'T' for Today. The system will use the associated date and complete the 'From' date field appropriately. Note: include T or L only if a date has not been or will not be specified.	An 'L' or 'T' or 'D'	No
Changed By User:	For records changed by a specific user, enter the valid userid here. Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No

Field	Description	Valid Entries	Needed?
Changed By Dept:	For records changed by a specific department, enter the valid Department name here. This must be a valid department as set up in Code Types Maintenance. Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No
From Time	Enter a time of Day. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second. Note the From time must be before the to time if the from and to date is the same.	Any valid time.	No
To Time	Enter a time of Day. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second	Any valid time.	No
Search _ Seconds	Given the volume of data that may need to be searched prior to presenting the information, you may limit the search time.	Up to 999 seconds	No

Action entries - IDT300-01

Transaction Inquiry

Action Number	Short Description	Description
5	Display	Shows detail of the change
11	Sign	Allows user to sign for changes
21	Set Key	Once option 21 is used, only records with a key that matches this record are displayed

Action Number	Short Description	Description
22	Enter Key	Allow for manual entry of key values to limit the search.
25	Signatures	Shows all signatures for this record

Function keys- IDT300-01

Transaction Inquiry

Function Key	Short Description	Description
F3	Exit	Returns the previous menu screen IDT0002 Inquiries and Reports.
F4	Prompt	Allows the viewing and selection of choices for fields designated with the "+" sign.
F5	Refresh	The F5 key will refresh the screen showing any new applicable information, if any.
F6	Report	Allows for the printing of the report for the records that would be displayed on the screen.
F10	Toggle Fields	*Switches between the three different views of the data.*
F12	Cancel	Press F12 to close the window and return to IDT0002 Inquiries and Reports.
F13	Retrieve saved criteria	Loads the filter fields with the values saved in a search criteria
F24	Save Current Criteria	Saves, for future recall, the criteria entered on the screen

Transaction detail inquiry

Option 5 from Transaction Inquiry shows the detail of each transaction. A unique number is assigned to every transaction and information about the event is shown. If a contemporaneous signature was captured at the time of change, that information is also displayed.

For the detail of each change, two types of data are displayed. The values in white are informational and allow for easy identification of the record. The red values are the actual changes. Normally, only key fields and changed values are captured. However, the very first time

that Database Monitor becomes aware of a record, all of the fields are captured. The same applies when a record is deleted.

Action entries - IDT301-01

Transaction Detail Inquiry

Action Number	Short Description	Description
5	Display	Shows detail of the change where field sizes exceed what can be shown on this screen

Function keys- IDT301-01

Transaction Inquiry

Function Key	Short Description	Description
F3	Exit	Returns the previous menu screen IDT0002 Inquiries and Reports.
F10	Toggle Fields	Allows the user to toggle the Field column between the actual field name and field description.

Function Key	Short Description	Description
F11	Signatures	Shows history of signatures and allows the user to sign their own outstanding records
F19	Prior	This function allows the user to step back through all of the changes for this particular record. In our example order number 116. On the first captured change the F19 key not shown
F20	Next	This function allows the user to step forward through all of the changes for this particular record. In our example order number 116. On the last captured change F20 key not shown
F12	Back	Returns to the previous screen

Keyed access to data - Who made changes to lot# 12345

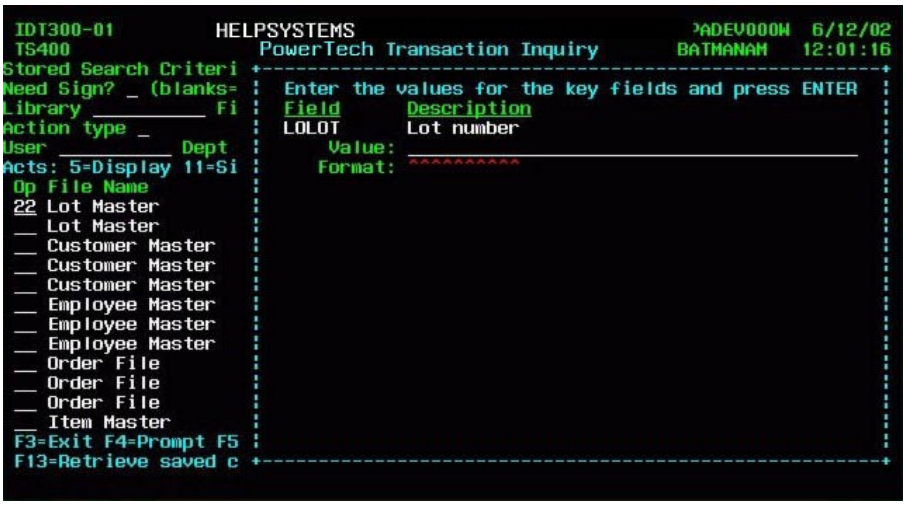
One of the unique features of Database Monitor is the ability to see changes specific to a particular record. You can, for example, see the progression of changes to lot number 12345. This can be achieved in one of two ways.

On the Transaction Inquiry panel, option 21 will automatically set the key for the search. It will use the key of the selected record. From that point on, only records matching the selected key and the selection criteria will be displayed.

The red literals **Key Set** indicate that changes matching a particular record are being displayed. Function key 17 will remove the key limit.

Option 22 will perform a similar function, but allows the user to actually enter the required key values.

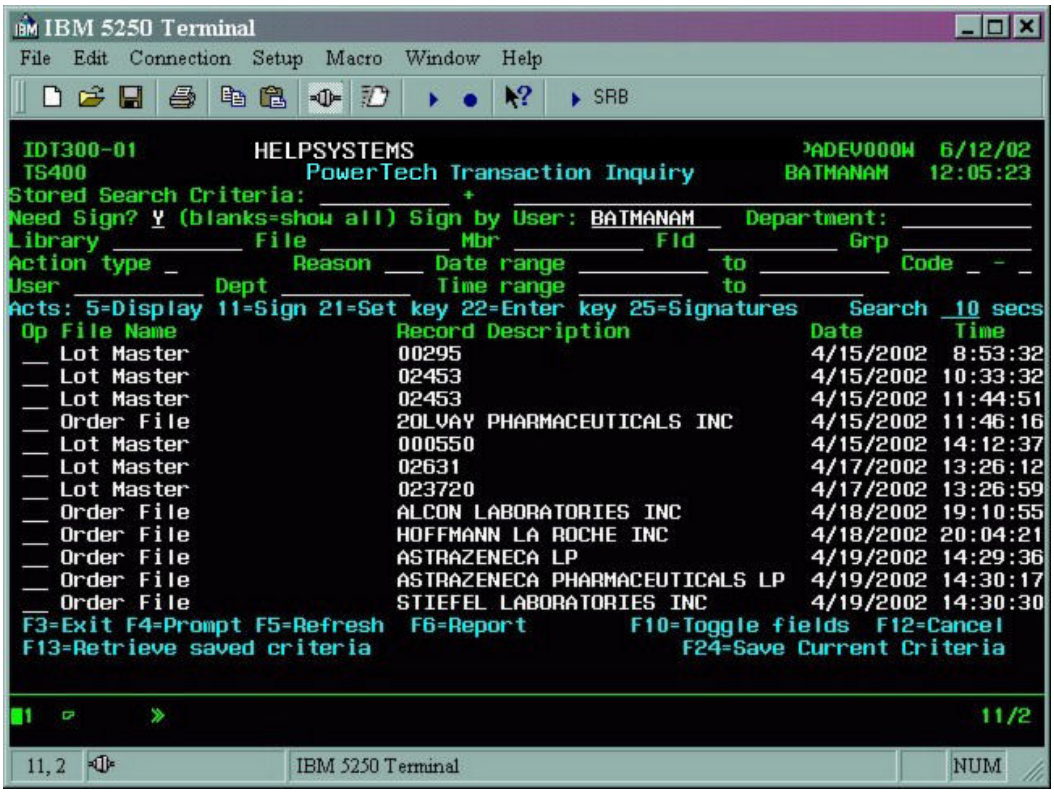
As can be seen below, Database Monitor is aware of the keys associated with each file, and displays the format and size of each key field.



Open transactions - signatures

22. View open transactions for current user

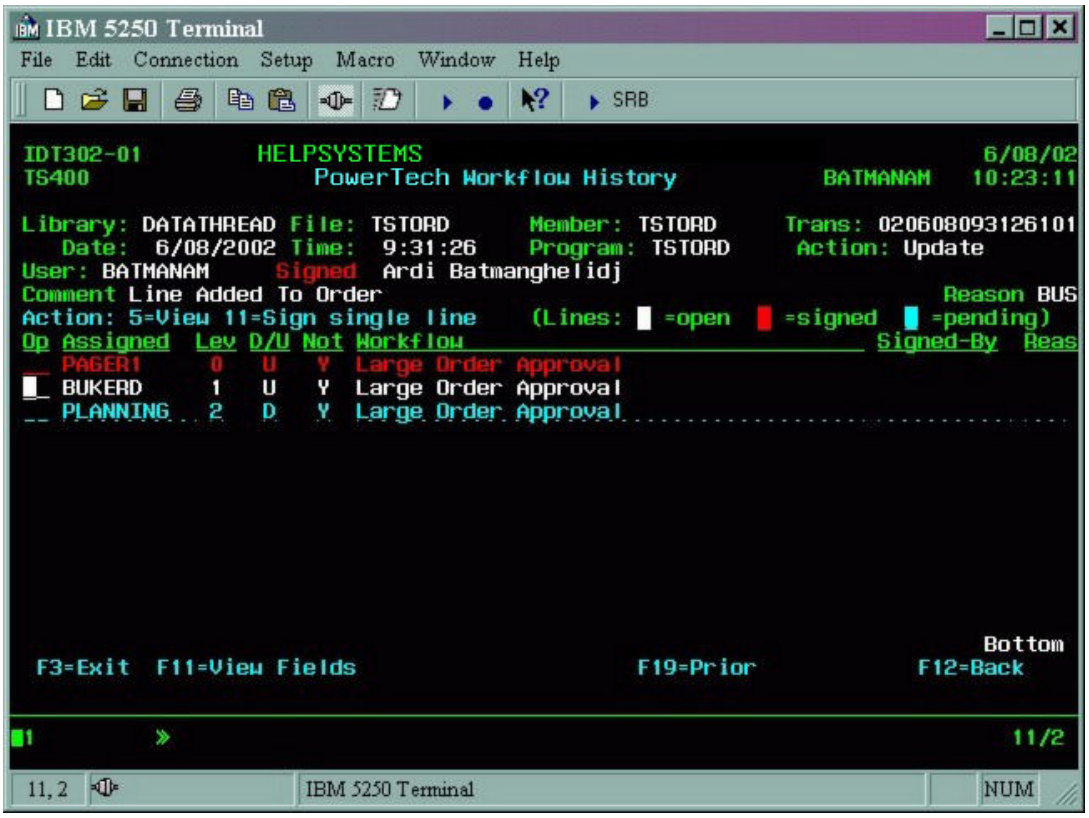
This option is a fast path for users to access their own open workflow signatures. The program retrieves the name of the user signed on and limits the search to those records that have not yet been signed



Database Monitor controls workflow through a function called signatures. For a more detailed description, refer to the section on Work Flow Concepts.

As users review their signature requirements or as functions are performed (EG notification to a pager) the signature is "signed" or closed. In addition to the descriptive information about the change, the screen below shows the work flow. In this case orders over $ 10,000 triggered a user to be paged and user BUKERD has an open signature. Closed or satisfied signatures are shown in red. Open signatures are shown in white. Pending signatures are shown in turquoise. Once BUKERD signs, the Planning department will be notified that they have an open signature.

It is useful to know that at any point in the 10 possible levels of workflow, a program can be initiated. For example in this way, as the last signature is completed, the interface to allocations could be called to initiate the next stage of order processing.



Action entries - IDT302-01

Workflow History

Action Number	Short Description	Description
5	Display	Shows detail of the Signature
11	Sign Single Line	Sign the workflow. Could be approval or rejection or simple acknowledgment.

Function keys- IDT302-01

Workflow History

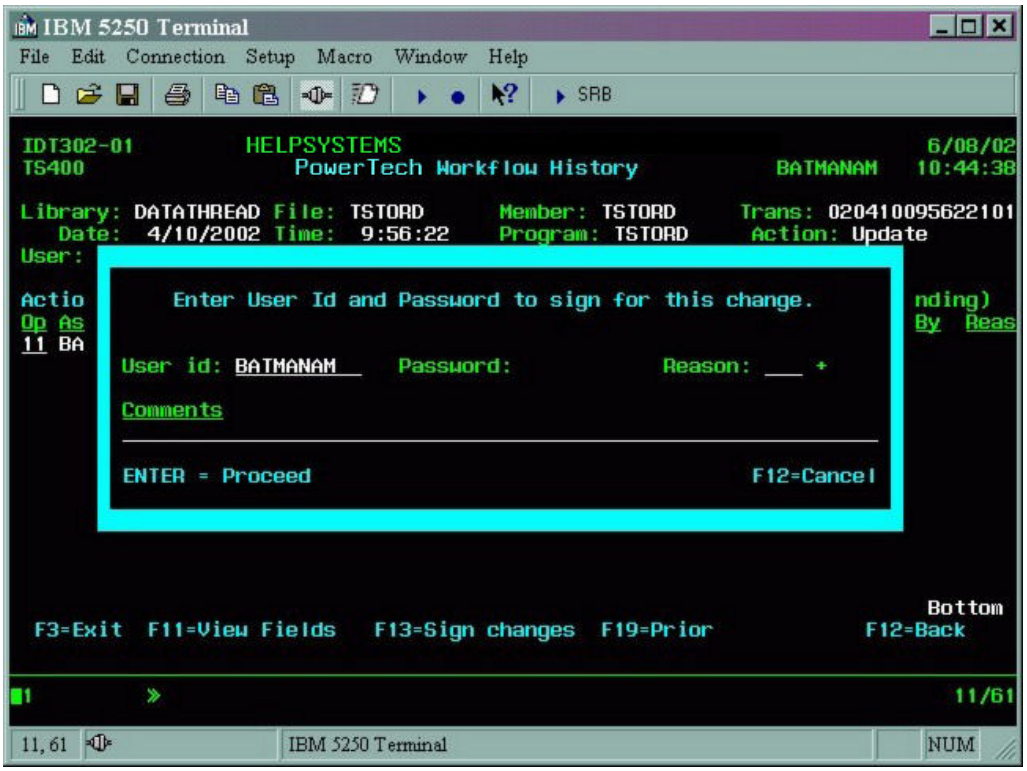
Function Key	Short Description	Description
F3	Exit	Returns the previous menu screen IDT0002 Inquiries and Reports.

Function Key	Short Description	Description
F11	View Fields	Switch to the field change view to see the data impact.
F19	Prior	This function allows the user to step back through all of the changes for this particular record. In our example order number 116. On the first captured change the F19 key not shown
F20	Next	This function allows the user to step forward through all of the changes for this particular record. In our example order number 116. On the last captured change F20 key not shown
F12	Back	Returns to the previous screen

How to close a signature (on AS/400)

The signature window is displayed from several different functions. It allows the user to sign for the change they just performed, or for workflow requirements.

It is important to note that this feature uses the AS/400 password processing functionality. If an invalid combination of user ID and password is entered, the AS/400 will react as if an invalid sign on had been attempted. Once the number of attempts exceeds the limits set on the system, the user profile may be disabled and will have to be reset.



Field level entries

Signatures Window

Field	Description	Valid Entries	Needed?
Password	Specify a 10-character alphanumeric password which must match the AS/400 password associated with the userid on the screen.	Any set of characters up to a maximum of 10.	Yes
Reason Code	A 3 character code. This value is promotable and is edited against the codes file. Entries are user defined and can be added to the codes file.	Edited against the codes file.	Yes
Comments	Sixty characters of comments	Any	No

Function keys

Signatures Window

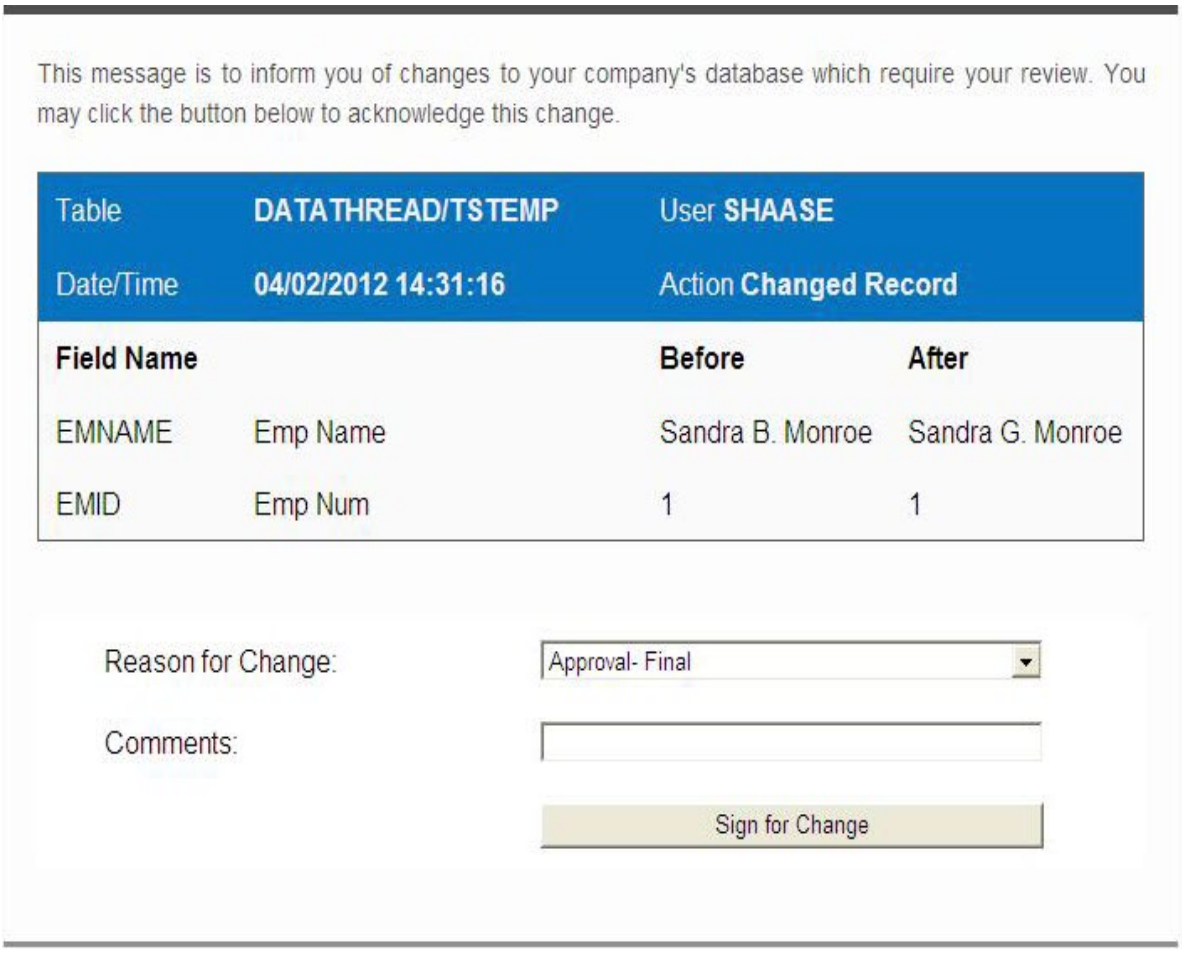
Function Key	Short Description	Description
F4	Prompt	List of valid reason codes
F12	Back	Returns to the previous screen

How to close a signature (from email)

The HTML email sent to a user for notification may be used to sign for the change, assuming the following conditions are met:

1. The system setting, ALLOWWEB must exist and have a value of Y (yes).
2. The workflow must be set up with "Allow signing to be done from email message?" set to Y (yes).
3. The user must be receiving email in HTML format (see User Security maintenance for this setting).

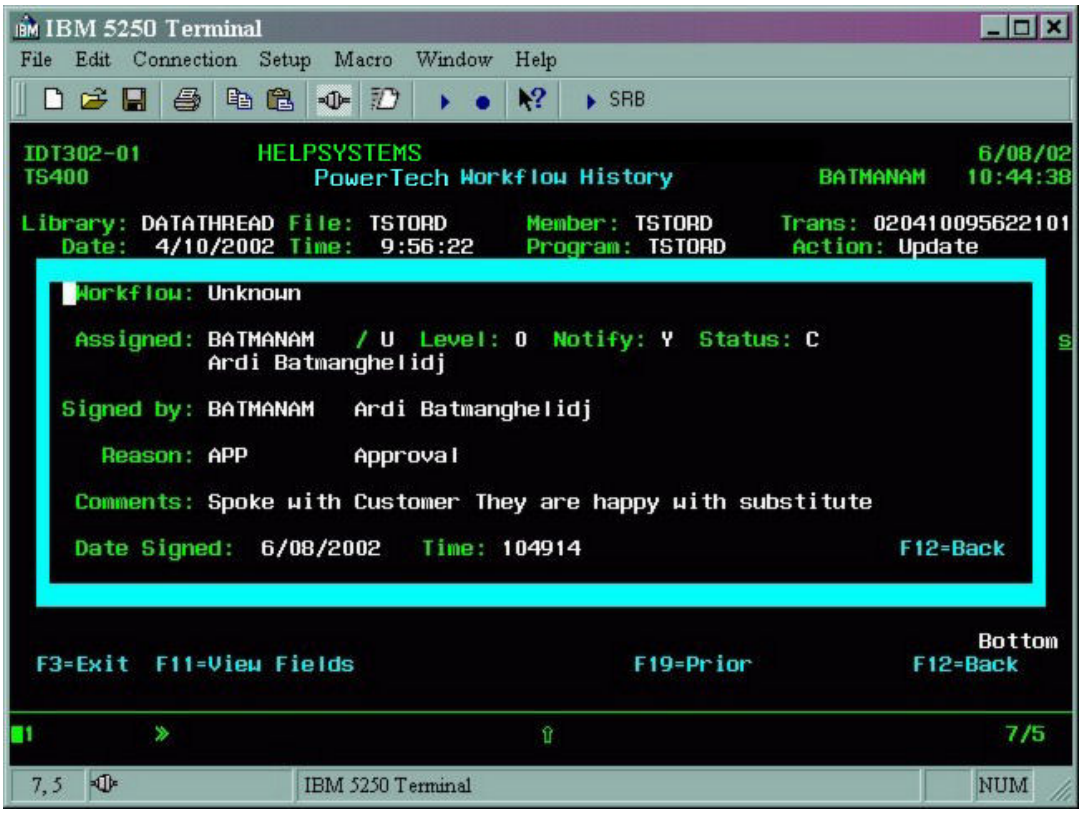
The email received should look something like the following:



To sign for the change, simply select a reason code, key in the appropriate comments and click the Sign for Change button. Once the change has been signed, a confirmation browser window should be displayed as follows:

Signature detail window

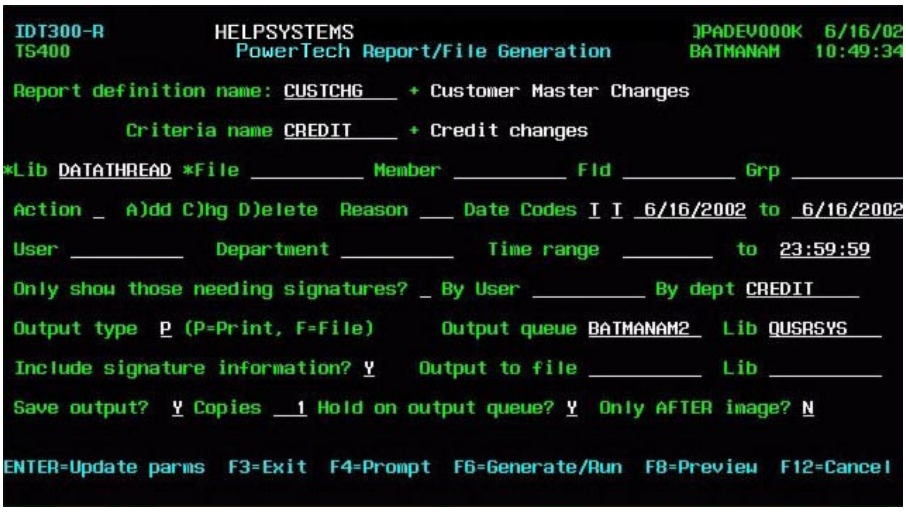
This screen shows the detail about each signature requirement. It is accessed by taking option 25 from the Transaction Inquiry screen and then taking option 5.



For more information about email signatures, see Appendix E.

Database Monitor report/file generation

The same processes and tools generate output for printed reports and downloadable files. Each output format is given a name, much like queries on the AS/400. Please refer to the section on Report Definitions Maintenance for greater detail on report setup.



To generate output, minimally the report definition name must be specified. This identifies to the program, the format of the output, data elements to be included, and the location to which the output should be sent.

Once the format has been identified, the user needs to enter filters to limit the change history that is included. This can be achieved by entering a criteria name to retrieve pre-defined values. It is also an option to simply enter one-time selection criteria.

Field level entries – IDT300-R

Report / File Generation

Field	Description	Valid Entries	Needed?
Report Definition Name	Specify an alphanumeric name for the Report definition to be retrieved.	Must be an existing report definition	Yes
Criteria Name	Specify an alphanumeric name for the search criteria to be retrieved	Must be an existing criteria definition	No
Library	Enter the valid Library name for the library containing the file that will be used as the basis for the report.	A valid library name up to 10 characters	No
File	Enter the File name whose changes will be used as the basis for the report. Note: include only if a Group name has not been or will not be specified.	A valid file name up to 10 characters	No

Field	Description	Valid Entries	Needed?
Member	If a member is specified, only changes made to that member will be included in the report.	A valid file member name up to 10 characters	No
Fld	If the field name is specified, only changes that impacted this field will be included. If other changes were made at the same time as this field change, those will also be included in the report.	A valid field name up to 10 characters	No
Group	Enter a valid Group name for the Group containing the information that will be used as the basis for the report. Note: include only if a file name has not been or will not be specified.	A valid group name up to 10 characters	No
Action Type:	Enter an 'A' for Add, 'C' for Change, or 'D' for Delete. This will only select records that meet the specified add, change, or delete criteria.	'A', 'C', or 'D'	No
Reason:	Any valid 3-character reason code as set up in Code Types maintenance. If this value is entered, only changes that were assigned with this particular reason code will be included. One could for example, choose to see only when a particular lot was rejected.	Valid 3-character code type.	No

Field	Description	Valid Entries	Needed?
From: Code	Enter an 'E' for Earliest, 'T' for Today, 'D' for Date, or 'L' for Latest date. The system will use the associated date and complete the 'From' date field appropriately. Note: include E, T, or L only if a date has not been or will not be specified.	An 'E', 'T', 'D', or 'L'	No
To: Code	Enter an 'L' for Latest date or 'T' for Today. The system will use the associated date and complete the 'From' date field appropriately. Note: include T or L only if a date has not been or will not be specified.	An 'L' or 'T' or 'D'	No
From: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
To: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
Changed By User:	For records changed by a specific user, enter the valid userid here. Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No
Changed By Dept:	For records changed by a specific department, enter the valid Department name here. This must be a valid department as set up in Code Types Maintenance. Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No

Field	Description	Valid Entries	Needed?
From Time	Enter a time of Day. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second. Note the From time must be before the To time if the From and To date is the same.	Any valid time.	No
To Time	Enter a time of Day. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second	Any valid time.	No
Need Sign?	This filter controls viewing of changes that have associated signature requirements. "Y" will show only those records that have open signatures. Blank will show changes with both open and closed signature requirements. "N" will show changes that do not have a signature requirement associated. Use this filter together with the "Sign By User" or "Department" to access changes that need signature by particular entities.	"Y", " ", "N"	No
Sign by User	For records that require or did require signature by a specific user, you may enter the valid userid here. Note: You may only specify either a user or a department or neither but not both.	A valid userid up to 10 characters.	No

Field	Description	Valid Entries	Needed?
Department	For records that require or did require signature by a specific department, you may enter the valid department here. Note: You may only specify either a user or a department or neither but not both.	A valid department up to 10 characters.	No
Output type	P=Print, F=File	P,F	Yes
Output queue	A valid output queue	Must exist on the system	Yes if output is to be printed
Library	The library in which the output queue has been defined	Must be valid for the output queue	Yes if being printed
Include signature information?	There is associated signature information for each change that is captured. If you would like to see this information on your report or in the output file make this value equal to Y.	"Y", " ", "N"	No
Output to file	If the output is to be sent to a file, enter the name of the file in this field. Database Monitor will not delete or clear a file. If the file already exists you will need to delete it prior to running the report.	Up to a ten character file name which should not already exist.	Yes if the output is to go to a file.
File library	The name of the library in which the output files should be created.	A currently existing AS/400 library	Yes if the output is going to a file.
Save output?	This variable controls if the printout is saved on the AS/400 after it has been printed.	"Y", " ", "N"	No
Number of copies	Number of copies of the report to be printed.	Will default to one but may be increased.	No

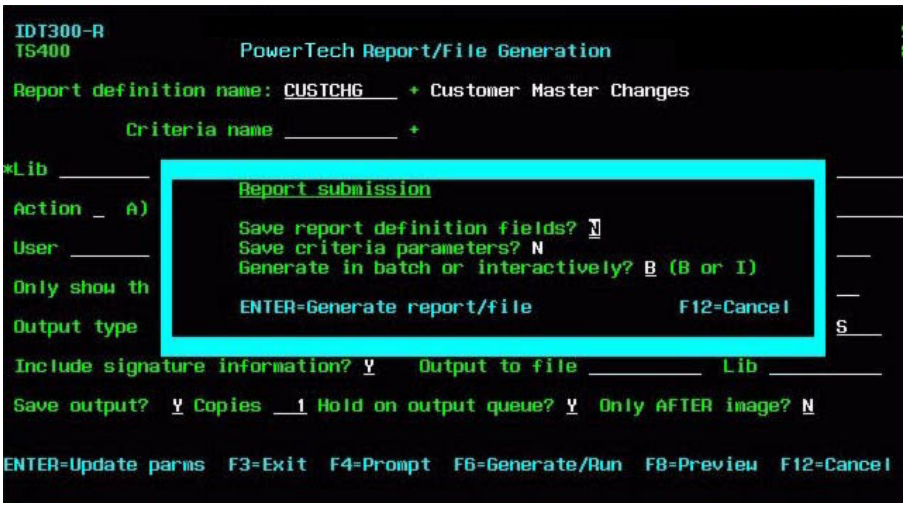
Field	Description	Valid Entries	Needed?
Hold on output queue?	If you wish to hold your output on the out queue and then manually release it when you are ready, change this value to Y.	"Y", " ", "N"	No
Library	Each change captured by Database Monitor has a before image and an after image. If you wish to see only the after image of a change enter a Y. in this field.	"Y", " ", "N"	No

Function keys- IDT300-R

Report / File Generation

Function Key	Short Description	Description
F3	Exit	Returns the previous screen
F4	Prompt	There are two promptable fields in this screen. The first is the name of the report; the second is the name of the selection criteria which have been pre-defined.
F6	Generate/Run	Once all of the criteria have been entered to generate the report or output file, F6 is used to start the program. A window will be displayed to give you additional choices for processing.
F8	Preview	The reporting module works in conjunction with the transaction inquiry program. Once your selection criteria have been entered, you have the option of pressing F8 and seeing the actual records that will be included in your report or output. It is also by the use of F8 that you can enter a key value to limit your report or file output. For example you can request only records for lot number 123456.
F12	Back	Returns to the previous screen.

Once F6 is pressed, it is here that additional choices are given for the processing of the report or file output. The changes to the report parameters can be saved. And the process can be performed interactively, or it can be submitted to batch. For larger reports it is recommended that the report be submitted for batch processing.



Field level entries – submission window

Report / File Generation

Field	Description	Valid Entries	Needed?
Save report definition fields	If definition fields which were retrieved at the beginning of this process where changed on the screen, a user is given the option of updating those into the saved definition of the report.	"Y", "N"	Yes
Save criteria parameters	This entry is protected on this window and cannot be changed.	"N"	No
Generated in batch or interactively	The user has the choice of running the report or file output using an interactive session, or they can submit it for a batch process. It is strongly recommended that processing occur in batch when there is a potential for large reports.	"B", "I"	Yes

Batch report

A command is available to create a report or downloadable file of transaction data within Database Monitor. The command is DTRPT. With this command transaction data can be selected and viewed within a printed report, XML file and/or CSV Document. This file can also be accessed by an exit program for custom processing.

The command can be executed from a command line, or by a job scheduler. The command contains numerous parameters, they are listed below:

Parameter	Function
Run Code (RUNCODE)	The RUNCODE parameter determines what mode the command will run in.
Start Date (STARTDATE)	This parameter sets the starting date for the report.
Start Time (STARTTIME)	This parameter sets the starting time for the report.
End Date (ENDDATE)	This parameter sets the ending date for the report.
End Time (ENDTIME)	This parameter sets the ending time for the report.
Days Offset (DAYSOFFSET)	This parameter is used when the DATECODE is S or E. It denotes how many days after the start date or before the end date the report will run for.
File Name (FILENAME)	This parameter allows you to specify a specific file for the report to be run over.
Library (LIBRARY)	This parameter specifies the library of the file in the previous parameter.
File Member (MEMBER)	This parameter allows you to sharpen the focus of the report to a single member in a file.
File Field (FIELD)	This parameter allows you to focus solely on a single field in a specified file.
File Group (FILEGROUP)	This parameter allows you to focus on all files in a specified file group.
Transaction Id (TRANSID)	This parameter allows you to report on a single transaction.
User Making the Change (CHANGEUSER)	This parameter allows you to report on changes made by a specific user.

Parameter	Function
Program Making the Change (CHANGEPROG)	This parameter allows you to report on changes made by a specific program.
Department making the change (CHANGEDEPT)	This parameter allows you to report on changes made by a specific department.
Reason Code for Change (REASONCODE)	This parameter allows you to report on changes made for a specific reason. Use the Database Monitor reason codes for this parameter.
Records Requiring Sigs Only (NEEDSIGONL)	This parameter allows you to decide whether you want to report on unsigned workflows. This parameter does not pertain to contemporaneous electronic signatures.
User who Signed for the change (SIGUSER)	This parameter allows you to report on the signature activity of a single user.
Dept who signed for the change (SIGDEPT)	This parameter allows you to report on the signature activity of a specific department.
Include Adds (INCADD)	This parameter denotes whether to include ADDed records.
Include Changes (INCCHG)	This parameter denotes whether to include CHANGEd records.
Include Deletes (INCDEL)	This parameter denotes whether to include DELETEd records.
Include Reads (INCREA)	This parameter denotes whether to include READ records.
Include Workflow Signatuers (INCSIGINFO)	This parameter is not active, and is reserved for future development.
Add Fields to Include (INCADDWHIC)	This parameter allows you to select which fields will be included for ADD actions.
Delete Fields to Include (INCDELWHIC)	This parameter allows you to select which fields will be included for DELETE actions.
Print a Report (Y/N) (REPORTYN)	This parameter tells the program whether to produce a printed report. If you only want the resulting CSV or XML file, you would select N for this parameter.

Parameter	Function
Output Queue Name (OUTQUEUENA)	This parameter specifies which Output Queue you want the printed report to go to. If you do not specify an Output Queue, the print job will be directed to the user's Output Queue.
Output Queue Library (OUTQUEUELI)	This parameter specifies in which library the Output Queue resides.
Save on Queue (SAVEONQUEU)	This parameter allows you to place the print job in SAVE status so it will be available in the Output Queue after printing has completed.
Hold Report (HOLDONQUEU)	This parameter allows you to place the print job on HOLD status in the Output Queue.
Number of Report Copies (COPIES)	This parameter tells the program how many copies of the report should be printed.
Report Size (REPORTSIZE)	This parameter tells the program how wide you wish the printed output to be.
Primary File Sort (PRISORT)	This parameter tells the program how you want the data sorted.
Secondary File Sort (SECSORT)	This parameter allows you to specify a secondary sorting method for the data. If the Primary Sort is by Date, this parameter is ignored, since Date sorts records by date/time.
Export File Type (EXPORTTYPE)	This parameter tells the program what format you want the output file in.
Export File Name (EXPFILENAM)	This parameter allows you to provide for a specific export file name. If you do not specify a filename, one will be created.
Export File Library (EXPFILELIB)	This parameter allows you to specify the library of the export file you wish to use. If you specify 'QTEMP', the generated XML file will be deleted when you sign off.
Replace/Append Export File (REPLACEAPP)	This parameter allows you to decide whether to append data to an existing export file, or replace the data in that file with the new data.
Exit Program Name (EXITPROGNA)	This parameter allows you to specify a program to call after the export file has been created for further processing. This program is a creation of your own.

Parameter	Function
Exit Program Library (EXITPROGLI)	This parameter sets the library that the exit program resides in.
Network File Name (NETWORKFIL)	This parameter accepts the full path to a network file on the IFS where you want the XML or CSV file to reside.
Filter Exit Program (FLTEXPRG)	This parameter allows you to specify a program that will perform additional checking of each record that is returned to the program. Before the new records are written to the file, your program will be passed the Transaction ID of the current record. After your program performs its additional checks on the record, it will return 1 for "Valid" or 0 for "Invalid". Only valid records will be included in the final file.
Filter Exit Program Library (FLTEXPRGLI)	This parameter specifies the library in which the filter program resides.
Key(s) for record Selection (KEY)	This parameter allows you to tell the program that you wish to specify the keys for the file. If you answer *YES, you will be prompted for the keys.
Archive Library (ARCHIVELIB)	This parameter allows you to specify the name of a Database Monitor archive library that you wish the program to run over.
XSL Reference (XSLREF)	This parameter allows you to specify where the XML Stylesheet resides. If you do not specify a location, no stylesheet will be used.

Run Code (RUNCODE)

The RUNCODE parameter determines what mode the command will run in.

This is a required parameter.

The possible values are:

I
Interactive. Run the report as an interactive job.

B
Batch. Run the report as a batch job.

Date Code (DATECODE)

This parameter specifies how the date range for the report will be calculated.

This is a required parameter.

The possible values are:

D
Date Specified. Run the report for all days between the dates specified on the STARTDATE and ENDDATE parameters.

T
Today. Run the report for today's date only.

Y
Year-to-date. Run the report for all days from January 1 of the current year until the current day.

M
Month-to-date. Run the report for all days from the first day of the current month until the current day of the current month.

S
Start Date + Offset. Run the report from the specified start date until an end date which is calculated using the value specified on the DAYSOFFSET parameter.

E
End Date - Offset. Run the report for the days between a start date and the end date. The start date is calculated by subtracting the value of the DAYSOFFSET parameter from the ending date.

Start Date (STARTDATE)

This parameter sets the starting date for the report.

This parameter is required if the DATECODE is D or S.

This parameter will be ignored if the DATECODE is T, Y, M, or E.

The date format is the same as your job-date. For users in the United States, this format is usually MMDDYYYY or MMDDYY. For users outside the United States, this format is usually DDMMYYYY or DDMMYY. If you are unsure, check with your IT Department or System Engineer.

Start Time (STARTTIME)

This parameter sets the starting time for the report.

This parameter is optional if the DATECODE is D or S. If it is not specified in these cases, it will default to 00:00:00.

This parameter will be ignored if the DATECODE is T, Y, M, or E.

The time format is HHMMSS using the 24-hour clock.

End Date (ENDDATE)

This parameter sets the ending date for the report.

This parameter is required if the DATECODE is D or E.

This parameter will be ignored if the DATECODE is T, Y, M, or S.

The date format is the same as your job-date. For users in the United States, this format is usually MMDDYYYY or MMDDYY. For users outside the United States, this format is usually DDMMYYYY or DDMMYY. If you are unsure, check with your IT Department or System Engineer.

End Time (ENDTIME)

This parameter sets the ending time for the report.

This parametr is optional if the DATECODE is D or E. If it is not specified in these cases, it will default to 23:59:59.

This parameter will be ignored if the DATECODE is T, Y, M, or S.

The time format is HHMMSS using the 24-hour clock.

Days Offset (DAYSOFFSET)

This parameter is used when the DATECODE is S or E. It denotes how many days after the start date or before the end date the report will run for.

The possible values are:

00000-99999
Any number in the above range is valid.

File Name (FILENAME)

This parameter allows you to specify a specific file for the report to be run over.

This parameter is optional.

Library (LIBRARY)

This parameter specifies the library of the file in the previous parameter.

This parameter is optional.

LIBNAME

Specify the library the file resides in.

File Member (MEMBER)

This parameter allows you to sharpen the focus of the report to a single member in a file.

This parameter is optional.

File Field (FIELD)

This parameter allows you to focus solely on a single field in a specified file.
This parameter is optional.

File Group (FILEGROUP)

This parameter allows you to focus on all files in a specified file group.

This parameter is optional.

Transaction Id (TRANSID)

This parameter allows you to report on a single transaction.

This parameter is optional.

User Making the Change (CHANGEUSER)

This parameter allows you to report on changes made by a specific user.

This parameter is optional.

Program Making the Change (CHANGEPROG)

This parameter allows you to report on changes made by a specific program.

This parameter is optional.

Department making the change (CHANGEDEPT)

This parameter allows you to report on changes made by a specific department.

This parameter is optional.

Reason Code for Change (REASONCODE)

This parameter allows you to report on changes made for a specific reason. Use the Database Monitor reason codes for this parameter.

This parameter is optional.

Records Requiring Sigs Only (NEEDSIGONL)

This parameter allows you to decide whether you want to report on unsigned workflows. This parameter does not pertain to contemporaneous electronic signatures.

This is a required parameter.

The possible values are:

{Blank}
Blank. Report on all records, regardless of their signature requirements.

Y
Yes. Report only on records with workflows still requiring a signature.

N
No. Report only on records that do not still require a workflow signature.

User who Signed for the change (SIGUSER)

This parameter allows you to report on the signature activity of a single user.

This parameter is optional.

Dept who signed for the change (SIGDEPT)

This parameter allows you to report on the signature activity of a specific department.

This parameter is optional.

Include Adds (INCADD)

This parameter denotes whether to include ADDed records.

This is a required parameter.

The possible values are:

Y
Yes. Include ADDed records.

N
No. Do not include ADDed records.

Include Changes (INCCHG)

This parameter denotes whether to include CHANGEd records.

This is a required parameter.

The possible values are:

Y
Yes. Include CHANGEd records.

N
No. Do not include CHANGEd records.

Include Deletes (INCDEL)

This parameter denotes whether to include DELETEd records.

This is a required parameter.

The possible values are:

Y
Yes. Include DELETEd records.

N
No. Do not include DELETEd records.

Include Reads (INCREA)

This parameter denotes whether to include READ records.

***** WARNING ** Setting this parameter to 'Y' will print a record of all records that have been read, if you are tracking READs in Database Monitor.***

This is a required parameter.

The possible values are:

N
No. Do not inlcude READ records.

Y
Yes. Include READ records.

Include Workflow Signatuers (INCSIGINFO)

This parameter is not active, and is reserved for future development.

This parameter will allow you to choose whether to include workflow signature information.

This is a required parameter.

The possible values are:

N
No. Do not include signature information.

Y
Yes. Include signature information.

Add Fields to Include (INCADDWHIC)

This parameter allows you to select which fields will be included for ADD actions.

This is a required parameter.

The possible values are:

T
Tracked. Include only Database Monitor tracked fields, key fields, and description fields.

A
All. Include all fields from the record captured at the time of the ADD.

Delete Fields to Include (INCDELWHIC)

This parameter allows you to select which fields will be included for DELETE actions.

This is a required parameter.

The possible values are:

T
Tracked. Include only Database Monitor tracked fields, key fields, and description fields.

A
All. Include all fields captured during the DELETE.

Print a Report (Y/N) (REPORTYN)

This parameter tells the program whether to produce a printed report. If you only want the resulting CSV or XML file, you would select N for this parameter.

This is a required parameter.

The possible values are:

Y
Yes. Produce a printed report.

N
No. Do not produce a printed report.

Output Queue Name (OUTQUEUENA)

This parameter specifies which Output Queue you want the printed report to go to. If you do not specify an Output Queue, the print job will be directed to the user's Output Queue.

This parameter is optional.

Output Queue Library (OUTQUEUELI)

This parameter specifies in which library the Output Queue resides.

This parameter is optional.

Save on Queue (SAVEONQUEU)

This parameter allows you to place the print job in SAVE status so it will be available in the Output Queue after printing has completed.

This is a required parameter.

The possible values are:

Y
Yes. Save the printed report on the Output Queue.

N
No. Do not save the printed report on the Output Queue.

Hold Report (HOLDONQUEU)

This parameter allows you to place the print job on HOLD status in the Output Queue.

This is a required parameter.

The possible values are:

N
No. Do not place the print job on HOLD.

Y
Yes. Place the print job on HOLD.

Number of Report Copies (COPIES)

This parameter tells the program how many copies of the report should be printed.

The possible values are:

001
Print one copy of the report.

number-of-report-copies

Print any number of copies from 1-999.

Report Size (REPORTSIZE)

This parameter tells the program how wide you wish the printed output to be.

This is a required parameter.

The possible values are:

132
Print a report 132 characters wide.

198
Print a report 198 characters wide.

080
Print a report 80 characters wide. The leading zero is required.

Primary File Sort (PRISORT)

This parameter tells the program how you want the data sorted.

This is a required parameter.

The possible values are:

F
File. Sort the data by file.

D
Date. Sort the field by date.

Secondary File Sort (SECSORT)

This parameter allows you to specify a secondary sorting method for the data. If the Primary Sort is by Date, this parameter is ignored, since Date sorts records by date/time.

The possible values are:

D
Date. Sort the data by date as a secondary sort.

K
Key. Sort the data by key as a secondary sort.

{Blank}
Blank. No secondary sort.

Export File Type (EXPORTTYPE)

This parameter tells the program what format you want the output file in.

This is a required parameter.

The possible values are:

X
XML. Produce the output file in XML.

C
CSV. Produce the output file in CSV format.

When selecting this option, you can request either an Export File or a Network File.

N
No Export File. Specifying 'N' causes the report to run faster, because the data is passed to the report generator through a data queue instead of through an intermediate file. If you do not wish to keep the file, you may specify the filename and 'QTEMP' as the library. The file will then be automatically deleted when you sign off.

Export File Name (EXPFILENAM)

This parameter allows you to provide for a specific export file name. If you do not specify a filename, one will be created.

This parameter is optional.

Export File Library (EXPFILELIB)

This parameter allows you to specify the library of the export file you wish to use. If you specify 'QTEMP', the generated XML file will be deleted when you sign off.

This parameter is optional

Replace/Append Export File (REPLACEAPP)

This parameter allows you to decide whether to append data to an existing export file, or replace the data in that file with the new data.

This is a required parameter.

The possible values are:

A
Append. Append data to an existing export file.

R
Replace. Replace the data in an existing export file.

Exit Program Name (EXITPROGNA)

This parameter allows you to specify a program to call after the export file has been created for further processing. This program is a creation of your own.

This parameter is optional.

Exit Program Library (EXITPROGLI)

This parameter sets the library that the exit program resides in.

This parameter is optional.

Network File Name (NETWORKFIL)

This parameter accepts the full path to a network file on the IFS where you want the XML or CSV file to reside.

Filter Exit Program (FLTEXPRG)

This parameter allows you to specify a program that will perform additional checking of each record that is returned to the program. Before the new records are written to the file, your program will be passed the Transaction ID of the current record. After your program performs its additional checks on the record, it will return 1 for "Valid" or 0 for "Invalid". Only valid records will be included in the final file.

This is an optional parameter.

Filter Exit Program Library (FLTEXPRGLI)

This parameter specifies the library in which the filter program resides.

This is an optional parameter.

Key(s) for record Selection (KEY)

This parameter allows you to tell the program that you wish to specify the keys for the file. If you answer *YES, you will be prompted for the keys.

This is a required parameter.

The possible values are:

***YES**
Yes. I wish to specify the keys.

***NO**
No. I do not wish to specify the keys.

Archive Library (ARCHIVELIB)

This parameter allows you to specify the name of a Database Monitor archive library that you wish the program to run over.

This is an optional parameter.

XSL Reference (XSLREF)

This parameter allows you to specify where the XML Stylesheet resides. If you do not specify a location, no stylesheet will be used.

This parameter is optional.

Report definitions maintenance

Let us first review some of the concepts around the Database Monitor and the challenges that it presents in generating formatted output or coma separated files.

The software has been designed to function irrespective of the database over which it has been implemented. Consequently, all of the reporting and file output has to be dynamically formatted based on the file which is being reported. To achieve this, Database Monitor has a completely soft coded report generation module.

The next few panels provide the ability to configure reports or file output by selecting a series of choices, and sequencing the fields which should be included in the report.

Below, you will find the Database Monitor report definition maintenance panel.

One record is displayed for each report that has been defined. There are two filter capabilities on the panel. The report filter can be used with a partial entry. For example, if the letters "AR" are entered, then reports with names starting with AR will appear in the list. The list can also be limited to those reports generated by a particular user, who is the owner of the report.

Field level entries - IDT107-01

Report Definition Maintenance

Field	Description	Valid Entries	Needed?
Report	The report filter can be used with a partial entry. For example, if the letters "AR" are entered, then reports with names starting with AR will appear in the list.	Anything	No
Owner	The list can also be limited to those reports generated by a particular user, who is the owner of the report.	Anything	No

Action entries - IDT107-01

Report Definition Maintenance

Field	Short Description	Description
2	Edit	Modify header level entries for the report. These are the variables that control the behavior of the report.
3	Copy	On occasions when a new report needs to be defined and is very similar to an existing report, option 3 can be used to copy the existing report. Then option 2 and option 11 can be used to modify the new report.
4	Delete	This option is used to delete an existing report
5	Display	Shows the definition of the report's controlling features.
11	Define fields	Once the controlling information about a report has been identified, it is necessary to associate fields from the file to be printed on the report or to be outputted to a downloadable file.

Function keys- IDT107-01

Report Definition Maintenance

Function Key	Short Description	Description
F3	Exit	Returns the previous screen
F5	Refresh	Refreshes the screen by, again, retrieving the data from the database.
F6	Create	This function key is used to access the report definition creation screen.
F12	Back	Returns to the previous screen.

The window below is displayed whenever a report definition record is added, changed or displayed.

Field level entries - IDT107- window

Report Definition

Field	Description	Valid Entries	Needed?
Report name	Specify a 10-character alphanumeric name for the new report definition.	Any set of characters up to a maximum of 10.	Yes
Description	A description that identifies the report to the user	Any set of characters up to a maximum of 40.	Yes
Owner	The system will determine the owner based on the user profile of the person creating the report.	System assigned	Yes

Field	Description	Valid Entries	Needed?
Secure	It is the choice of the owner whether a report definition is secured or not. A report can be defined and secured by the owner, but it can be used by others to generate output. A secure report can also be copied to a new report which will then be owned by the new owner and can be modified. This feature can be utilized to generate standardized reports which are then run by operational personnel.	"Y', "N"	Yes
File/Group	Throughout Database Monitor, the concept of file groups is supported. Please refer to that section for additional detail. Briefly, however, it means that more than one file can be included in the creation of a report.It is in this field that the user identifies whether this report is for a single file, or for a collection of files.	Either a valid file name or the name of a group of files.	Yes
Library	The library in which the file being reported resides. Leave this value blank if a group is being used	Valid library name	Yes if a single file is being defined
Output type	P=Print, F=File	P,F	Yes
Output queue	A valid output queue	Must exist on the system	Yes if output is to be printed
Library	The library in which the output queue has been defined	Must be valid for the output queue	Yes if being printed

Field	Description	Valid Entries	Needed?
Output to file	If the output is to be sent to a file, enter the name of the file in this field. Database Monitor will not delete a file. If the file already exists you will need to delete it prior to running the report	Up to a ten character file name which should not already exist.	Yes if the output is to go to a file.
File library	The name of the library in which the output files should be created.	A currently existing AS/400 library	Yes if the output is going to a file.
Include signature information?	There is associated signature information for each change that is captured. If you would like to see this information on your report or in the output file make this value equal to Y	"Y", " ", "N"	No
Save output?	This variable controls if the printout is saved on the AS/400 after it has been printed.	"Y", " ", "N"	No
Number of copies	Number of copies of the report to be printed.	Will default to 1, but may be increased.	No
Only AFTER image?	Each change captured by Database Monitor has a before image and an after image. If you wish to see only the after image of a change enter a Y. in this field.	"Y", " ", "N"	No
Hold on output queue?	The system will determine the owner based on the user profile of the person creating the report.	System assigned	Yes
Owner	If you wish to hold your output on the out queue then manually release it when you are ready, change this value to Y.	"Y", " ", "N"	No

Report definition detail

Option 11 from the report definition panel brings the user to this maintenance program where they can define the fields that should be included in the report. All the available fields are displayed on the panel. The user can choose to include or exclude data elements from being printed. Additionally, each of the fields can be further modified to identify them to Database Monitor as date fields, or to define only a portion of the fields to be included in the report. The fields in white are those that have been included in the report. The excluded fields are displayed in red.

It is important to note, that the reporting module of Database Monitor allows more than one file to be merged into one report. This is achieved by generating a report for a group, as opposed to a single file. In this case, fields for the multiple files will be displayed in the screen below.

Field level entries - IDT108 - 01

Report Definition Detail Maintenance

Field	Description	Valid Entries	Needed?
Option	Enter the desired option to perform for the selected field.	"1", "3", "4"	Yes if further action is required
Sequence	Change the sequence numbers as desired to position the fields horizontally in the report.Those fields that are not being included on the report will get a sequence of all nines and will be displayed in red.	Any valid number	Yes
Field	The name of the field as defined on the database file being used for the report. Those fields that start with the * are Database Monitor specific fields which are captured at time of change.	Display only	No
File	The file which is being used for the purpose of this report.	Display only	No
Library	Library of the file being reported.	Display only	No
Heading	Information about the field available for reporting on this document.	Display only, can be modified by using option 2	No

Action entries - IDT108-01

Report Definition Detail Maintenance

Action Number	Short Description	Description
1	Included	Initially, all fields that are available for reporting are included in the report. If fields have previously been excluded from a report, use option 1 to now include them.
2	Edit	This option allows for additional editing features for each field. See the next screen, below for greater detail.
4	Exclude	Use this option to identify the fields that should not be included in the report.

Function keys- IDT108-01

Report Definition Detail Maintenance

Function Key	Short Description	Description
F3	Exit	Returns the previous screen.
F5	Refresh	Reload the screen with the latest information from the configuration database.
F12	Back	Returns to the previous screen.

Field level entries - IDT108 - 01

Report Definition Detail - Fields Window

Field	Description	Valid Entries	Needed?
Heading	Text that will appear on the report header or in the output file.	Any heading that is appropriate for the field. It is recommended that a heading be of equivalent size to the width of the information in the field.	Yes
Sequence	Sequence entered on the previous screen, which can also be changed within this window.	Any number	Yes
Include	Should this field be included on the report?	"Y", "N"	Yes
Date	Fields that are defined as date on this window, will be displayed in the appropriate date format.	"Y", "N"	Yes
Subset	This feature allows the user to select only a portion of the field to be printed, or included in the output file. This is most useful with large fields where only a certain portion of the data is relevant.	Valid from and to sections of the field.	Yes

Reference

The following sections include reference material for Database Monitor.

Database Monitor Setup/Configuration

From here, all of the global system settings and codes may be maintained. In addition, option 11, Database Monitor Configuration, is the primary setup program where you inform Database Monitor about the various files you want it to monitor and the workflows you want to create.

How to get there

From the Master Menu, choose option 1, System Setup and Configuration.

Options

11. Database Monitor Configuration

This is the primary configuration screen for all of Database Monitor. Here, files may be added to Database Monitor for monitoring, specific attributes of tracking may be maintained, and workflow entries may be accessed and edited. See Database Monitor Configuration - Files panel.

12. System Parameters and Settings

This option is used for maintaining all of the basic system-wide settings for Database Monitor. In addition, the data queues used by the system are maintained here. Some examples of system settings including the job queues and descriptions used by the background jobs, wait times between system checks for the Database Monitor Manager, the company name heading at the top of each screen, and the email from address and IFS directory used by the email system. See Powertech System Parameters Maintenance panel and Parameters Overview.

13. Code Types Maintenance

Code Types can be used for assigning a variety of codes on an as needed basis. Programming must exist to recognize and properly work with the codes created through INN101; however unlike parameters maintenance code types can be used to assign multiple values to a Code Type.

Once Code Types are established, valid codes for each type can be maintained. For example, the Code Type 'DEPARTMENT' might include one for PURCHASING, one for QUALITY, one for MARKETING and so on. Database Monitor comes pre-loaded with several Code Types that are described below. See Powertech Code Types Mainthenance panel and Code Types Overview.

14. File Groups Maintenance

File Groups can be created in order to associate a series of files with each other for reporting purposes. For example, the Marketing Department may be interested in records that are in the Customer Master file and in the Customer Order file. It may make reporting against these files easier when viewed together. See Database Monitor File Groups Maintenance panel and File Groups Overview.

15. Criteria Maintenance

Criteria Maintenance can be used to store report criteria for reports that are used routinely. Specifying and saving the criteria through IDT103-01 will make the task of generating standard reports a very easy process. See Database Monitor Report Parameters Maintenance panel and Criteria Overview.

16. User & Security Maintenance

Database Monitor comes pre-loaded with its own security. This security is additive to the user's existing security and the system will always default to machine and primary application security prior to granting access to any Database Monitor functions. Security profiles can be established for individual users or for templates. Template security can then be assigned to groups of users, making the setup more convenient and allowing for consistency within user categories.

17. Database Monitor Manager

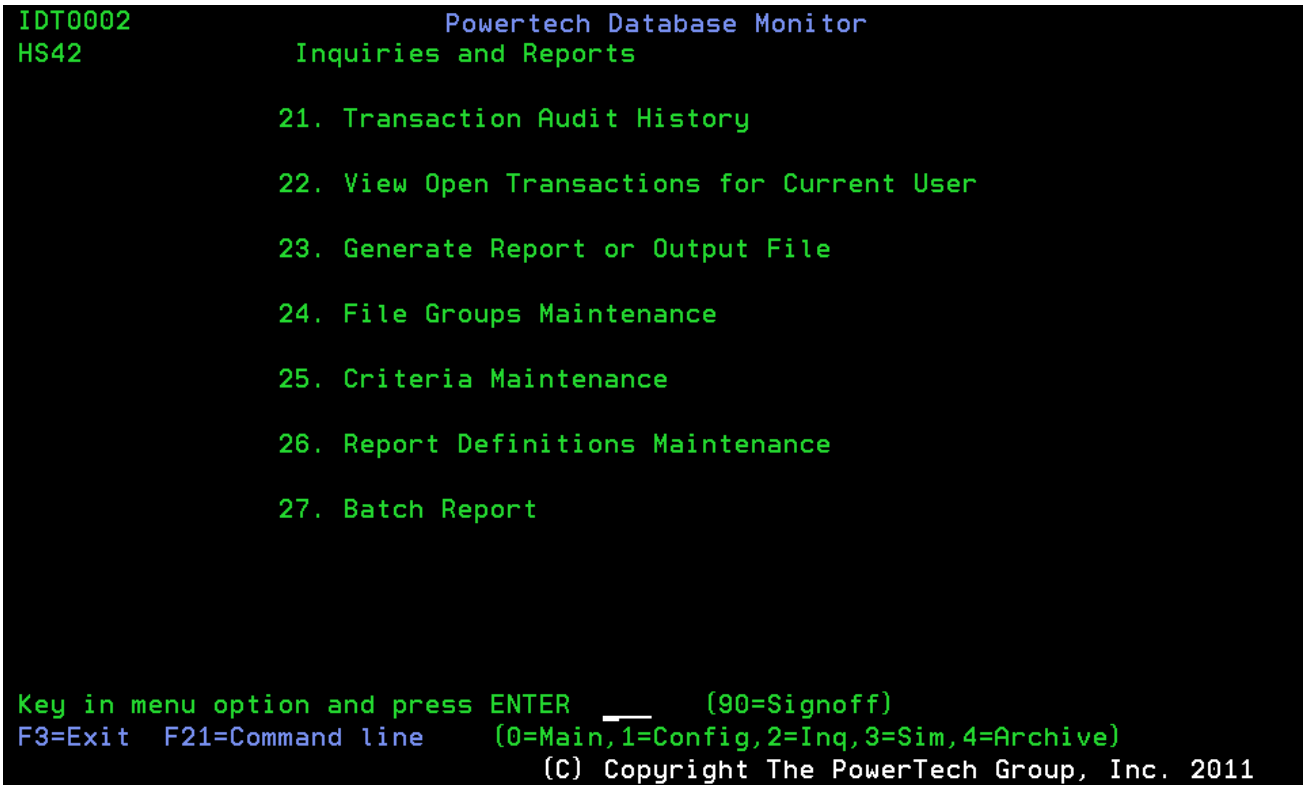
The Database Monitor Manager interface is a status monitoring and application control system. It can be used to monitor the status of Database Monitor, start and end programs in Database Monitor and view its overall status. Programs in this section can also be scheduled to run during routine processing to stop and start file-monitoring and system managing functions.

18. Enter Database Monitor Software License Key

This option is used to maintain your license key for the Database Monitor product. (Contact keys@helpsystems.com if you need to request a new license key.) License keys are available for trial usage of the software and for various options within the system.

Inquiries and Reports menu

This is where the audit trail maintained by Database Monitor may be viewed and reported on. In addition, workflow signatures are accessed here, as are the options for creating custom criteria sets for inquiries and reports.



How to get there

From the Master Menu, choose option 2, Inquiries and Reports.

Options

21. Transaction Audit History

This option provides online inquiry into the audit history of all changes made to files that have been introduced to Database Monitor. Multiple search criteria are provided which include file name, date and time range, actual key of file, user making change, etc. See Database Monitor Transaction Inquiry panel.

22. View Open Transactions for Current User

This option is the same as option 21 above, but defaults to showing the current user transactions which have been logged to Database Monitor and require the users' review. On an ongoing basis, this can be viewed as "checking an inbox" for Database Monitor signature requirements. See Database Monitor Transaction Inquiry panel.

23. Generate Report or Output File

To create a report or an extract file which can be imported into Excel or any other CSV-compatible application, this option may be used. The results of the report may be previewed before the generation step. See Database Monitor Report/File Generation.

24. File Groups Maintenance

File Groups can be created in order to associate a series of files with each other for reporting purposes. For example, the Marketing Department may be interested in records that are in the Customer Master file and in the Customer Order file. It may make reporting against these files easier when viewed together. See Database Monitor File Groups Maintenance.

25. Criteria Maintenance

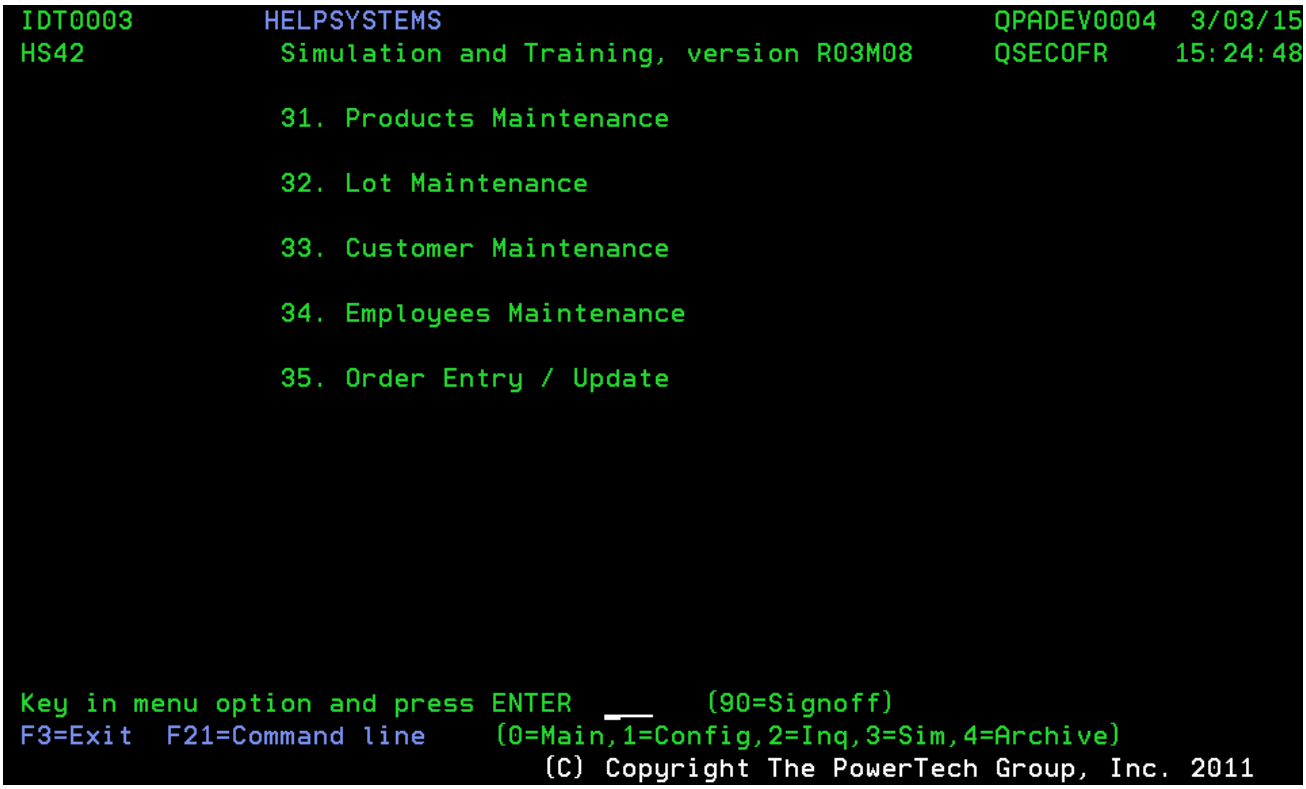
Criteria Maintenance can be used to store report criteria for reports that are used routinely. Specifying and saving the criteria through IDT103-01 will make the task of generating standard reports a very easy process. See Database Monitor Report Parameters Maintenance.

26. Report Definitions Maintenance

This option allows you to maintain report definitions which can be reused for generating reports and CSV files. The fields that are needed, along with their order on the report or file are maintained with this option. See Database Monitor Report Definition Maintenance.

Simulation and Training menu

Here, the five test files that are included with Database Monitor are maintained. The options here are provided simply to facilitate training and testing of Database Monitor concepts and are not required to operate Database Monitor.



How to get there

From the Master Menu, choose option **3**, Simulation and Training Menu.

Options

31. Products Maintenance

This is a simple add, update, and delete option for maintaining the simulation file Product Master (TSTPRD). The simulation options are provided so that tests and other configuration options may be tried out on what appear to be "live" files before they are actually used in production.

32. Lot Maintenance

This is a simple add, update, and delete option for maintaining the simulation file Lot Master (TSTLOT). The simulation options are provided so that tests and other configuration options may be tried out on what appear to be "live" files before they are actually used in production.

33. Customer Maintenance

This is a simple add, update, and delete option for maintaining the simulation file Customer Master (TSTCST). The simulation options are provided so that tests and other configuration options may be tried out on what appear to be "live" files before they are actually used in production.

34. Employees Maintenance

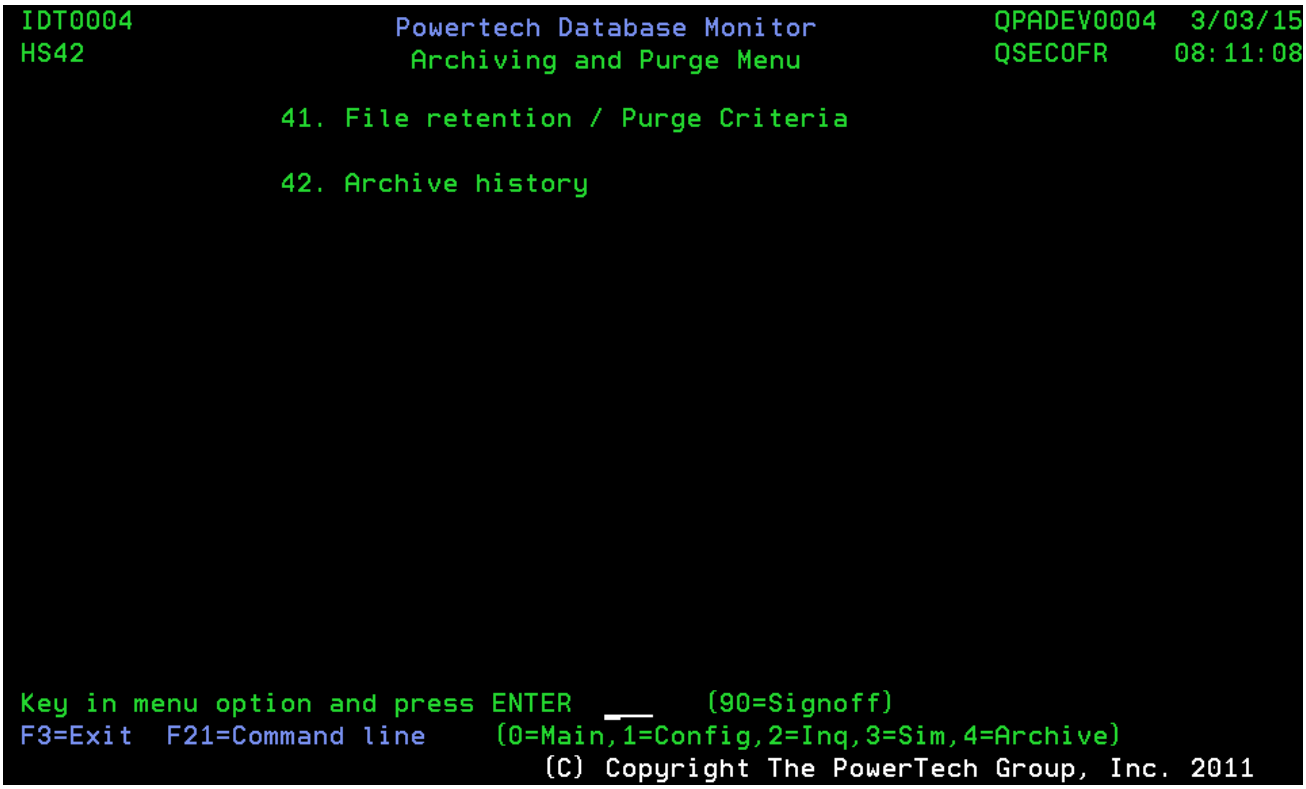
This is a simple add, update, and delete option for maintaining the simulation file Employee Master (TSTEMP). The simulation options are provided so that tests and other configuration options may be tried out on what appear to be "live" files before they are actually used in production.

35. Order Entry / Update

This is a simple add, update, and delete option for maintaining the simulation Order file (TSTORD). The simulation options are provided so that tests and other configuration options may be tried out on what appear to be "live" files before they are actually used in production.

Archiving and Purge Menu

Here is where you maintain the retention settings that are used by the Archive and Purge Engine of Database Monitor, along with accessing a listing of past archive runs and viewing their contents.



How to get there

From the Master Menu, choose option **4**, Archiving and Purge Options.

Options

41. File retention / Purge Criteria

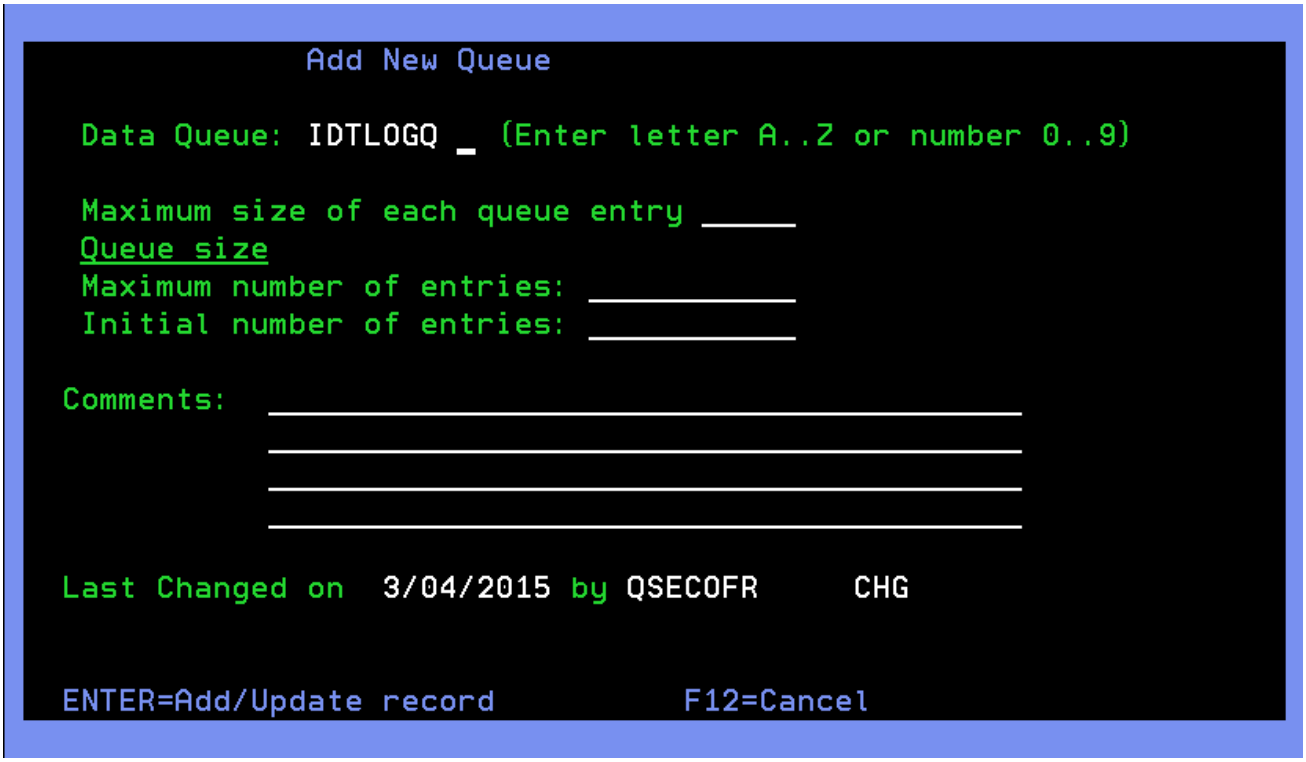
With this option, all of the database files that you have introduced to Database Monitor will be listed and may have their retention periods maintained. The retention period is how long (in months, years, etc.) that records for this file are maintained in the active archive. Once the retention period for records from a file has been reached, subsequent runs of the Purge and Archive Engine which include this file will purge and archive these records. You may also browse historical Purge and Archive runs for files with this option.

42. Archive History

This option will list all Purge and Archive runs which have been performed in Database Monitor. Each time a Purge and Archive run is performed, Database Monitor makes an entry into the Archive history, which makes managing libraries and tapes of archived material easier. From this option, if the archive libraries are still online (or loaded from tape), you may actually view the audit trails for data which has been purged from the main files of Database Monitor.

Panels
Add new queue

Use this panel to add a new queue. Note that this option is for experts only and could have negative impacts on overall system performance if done properly.



How to get there

From any menu panel, select option 12. From the Powertech System Parameters Maintenance panel, press **F18**.

Field level entries – INN100-002

Powertech System Parameters

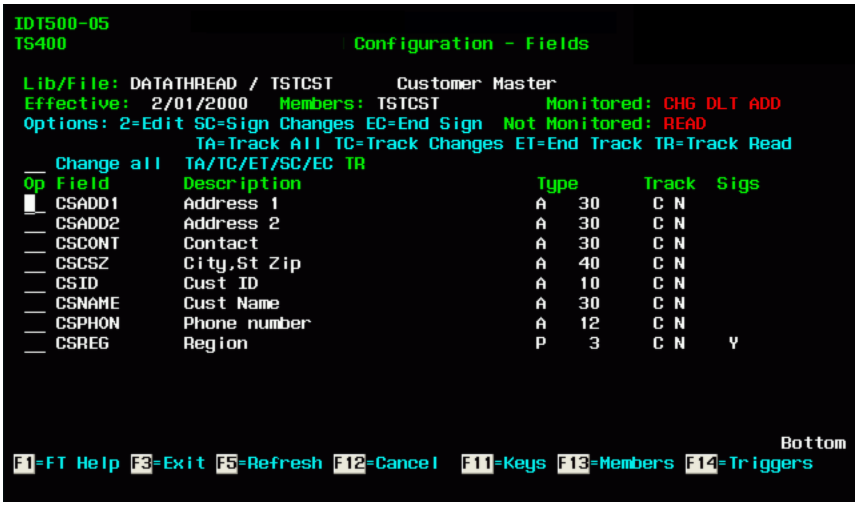
Field	Description	Valid Entries	Needed?
Data Queue	All data queues used for audit trail processing are named in the format "IDTLOGQ" + "x" where "x" is one of the characters A..Z or a number 0..9.	Single character suffix	Yes
Maximum size of each queue entry	This field, in bytes, specifies how large to make each entry of the data queue. Note that one audit trail entry from a trigger or journal is roughly equal to 240 bytes plus (2 x RecordLength of file) If a data queue entry length is too small for several files, it will always be skipped for either larger queues or the overflow file, so this could negatively impact performance.	Size in bytes	Yes
Maximum Entries	This corresponds to the SIZE() parameter on the CRTDTAQ command. A number may be placed here, or one of the special values *MAX16MB or *MAX2GB. Prior to V5R1, 16 Mb was the maximum size of a data queue, so those with V5 or above are recommended to use the *MAX2GB parameter.	Number or special value	Yes
Initial number of entries	Equivalent to second sub-parameter to the SIZE() parameter. See the help associated with CRTDTAQ for a detailed explanation	Initial entries to create room for	Yes
Comments	Up to 260 characters can be used to describe this entry in more detail.	Any narrative alphanumeric explanation	No, but recommended

See Also:

Parameters Overview

Appendix A: Configuration - Fields

This panel displays a list of all fields in the file, including their attributes such as the name, description, field size and type. Additionally, the Database Monitor configuration is shown.



Database Monitor is capable of capturing and displaying Open and Graphic data types. (Note there may be some workstation setup required to display Graphic data types correctly.)

Three sets of decisions are made for each field:

Tracking

By default, Database Monitor assumes that you want to track changes to all fields. Since Database Monitor only captures the before and after image of changed fields, when a field is not changed as part of an update, Database Monitor will not keep the values in order to conserve disk space.

Because of the default, the first time a file is added to Database Monitor, the value in the field tracking is “C”.

If you want to store the value of a field whenever a change takes place to any field in the file (for an additional description or a unique access code, for example), the tracking setup for the field which contains this information could be changed to “A.”

Conversely, there are fields that may change all the time, but have no significance for tracking purposes. These fields can be set to “N” so they are not tracked. "In Use" flags are perfect examples of this situation. Application programs may read a record, update the record with the "In Use" flag to lock the record, perform their specified task, read the record again and release the "In Use" flag. This is legitimately two changes to the database. However, if Database Monitor is

configured to *not track* the "In Use" flag (with N), the audit database will not be cluttered with these unnecessary events.

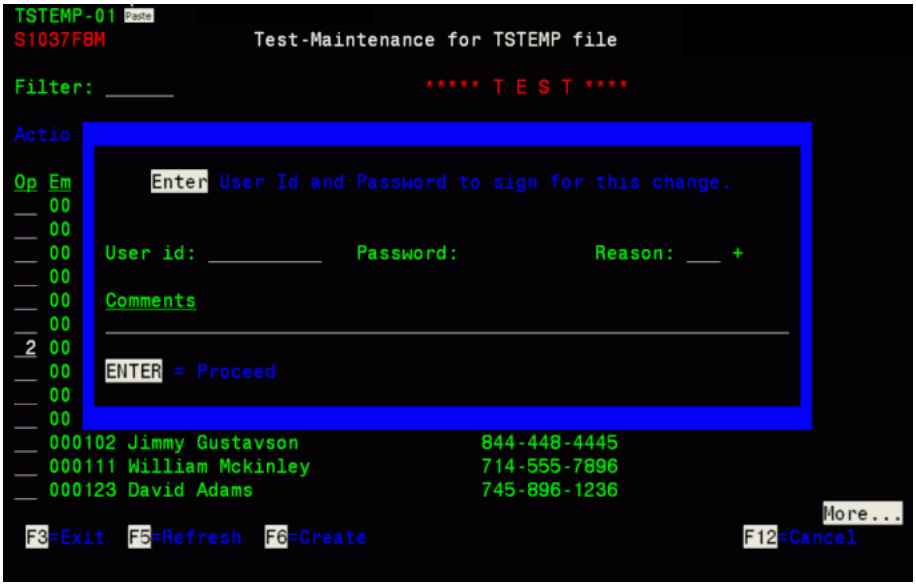
Note that when a record is added to or deleted from the file, all the fields' values are stored. Similarly, the first time a given record is encountered by Database Monitor, even if the record existed before it was ever added to Database Monitor and is only being changed (not added), all field values will be captured so that the first occurrence of any file's audit record in Database Monitor will have the values of all fields at the time the action was taken.

Capturing field data on read

Database Monitor is able to capture the READ of a database record. If READ monitoring is activated, a decision needs to be made about the data that is retained at the time of the read. If you have READ monitoring active, you can set the value of Track Read to "Y" and capture the data in the field when the record is read.

Signature required on change

This configuration setting controls the presentation of a contemporaneous (pop up) window at the moment that the data in a particular field is changed. For example, if you want to capture an electronic signature at the moment that a user changes the Sales Region on the Customer Master, you would change the signature required flag on the Sales Region field to “Y” by entering SC for the field. (Database Monitor knows not to require signatures for batch jobs.) The following panel will be displayed when a change is made to a field which is configured to have a contemporaneous signature. This setting needs to be set to 'Y' for *CONTEMP workflows.



This panel will also be displayed for *CONTEMP workflow configurations - See Workflow setup for additional information.

For those systems which are set up to require up to 128 position passwords, the password for this panel will be broken up into three lines of entry

Fast track processing

In our example, the Customer Master file has only 8 fields. It is not too cumbersome to select option 2 and individually change the tracking and signature requirements of each field.

Now assume we are in the real world and files have hundreds of fields. To support more efficient configuration, Database Monitor has Fast Track Processing.

Fast Track values can be entered at the individual field level, or in the Change All location.

If, for example, we wanted to track changes to only 3 fields in a file with 200 fields; Database Monitor would have defaulted all fields to track change. We would use the option “ET” in the Change All entry point and end tracking for all fields. We would then use the “TC” option to track changes for the 3 fields that are important to us.

Pressing F1 on this panel will present a window with all of the Fast Track options:

Tracking:

TA=Show this field when this field or another tracked field is changed

TC=Show this field when it changes

ET=End Tracking of this field

TR=Show this field when tracking reads

Signatures:

SC=Sign for only changes to this field

EC=End sign for only changes to this field

Function key (Fkey) entries – IDT500-05

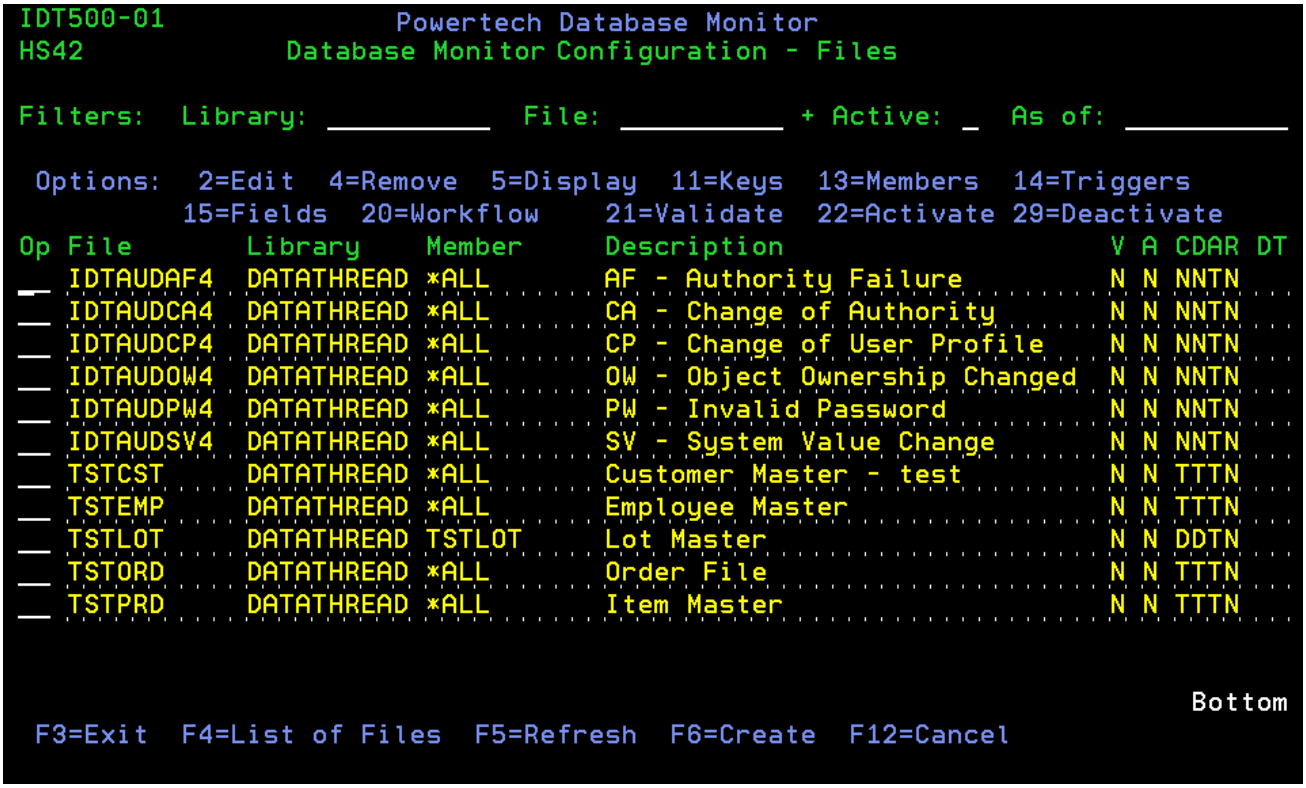
Database Monitor Configuration - Fields

Function Key	Short Description	Description
F1	FT Help	Fast Track Help.
F3	Exit	Exit the program.
F5	Refresh	Refresh screen with any external changes.
F11	Keys	Advances to the Database Monitor Configuration - Keys Selection Screen - IDT500-04.
F12	Cancel	Press F12 to close the window and return to the file list.

Function Key	Short Description	Description
F13	Members	Advances to the Database Monitor Configuration - Member Maintenance Screen - IDT500-02
F14	Fields	Advances to the Database Monitor Configuration - Triggers Maintenance Screen - IDT500-03

Database Monitor Configuration - Files

This panel allows you to view and manage the files monitored by Database Monitor.



How to get there

From the Database Monitor Setup/Configuration Menu, choose option **11**, Database Monitor Configuration.

Options

Action Number	Short Description	Description
2	Edit	Use this option to edit the primary attributes of the file's setup within Database Monitor, including effective dates for the file being active. See Database Monitor Configuration - Files Maintenance panel.
4	Remove	This option will remove a file from Database Monitor, but only allows the removal of a file if NO audit records exist for the file. See Database Monitor Configuration - Files Maintenance panel.
5	Display	Allows the display of Database Monitor Configuration file data. See Database Monitor Configuration - Files Maintenance panel.
11	Keys	Advances to Database Monitor Configuration - Keys Selection Screen - IDT500-04.
13	Members	Advances to the Database Monitor Configuration - Members panel - IDT500-02.
14	Triggers	Advances to the Database Monitor Configuration - Trigger Maintenance panel - IDT500-03.
15	Fields	Advances to the Database Monitor Configuration - Fields Maintenance panel - IDT500-05.
20	Workflow	Advances to the Database Monitor Workflow Maintenance Function.
21	Validate	Validates all of the Database Monitor Configuration data and displays any errors.

Action Number	Short Description	Description
22	Activate	Validates all of the Database Monitor Configuration data - Activates the file if NO errors exist.
29	Deactivate	Deactivates the file - Stops Database Monitor tracking of file data changes.

Column descriptions

To the right of the description of each file, a number of codes can be seen. These provide a quick overview of the status of the file. The column heading is identified by the literals "V A CDAR DT."

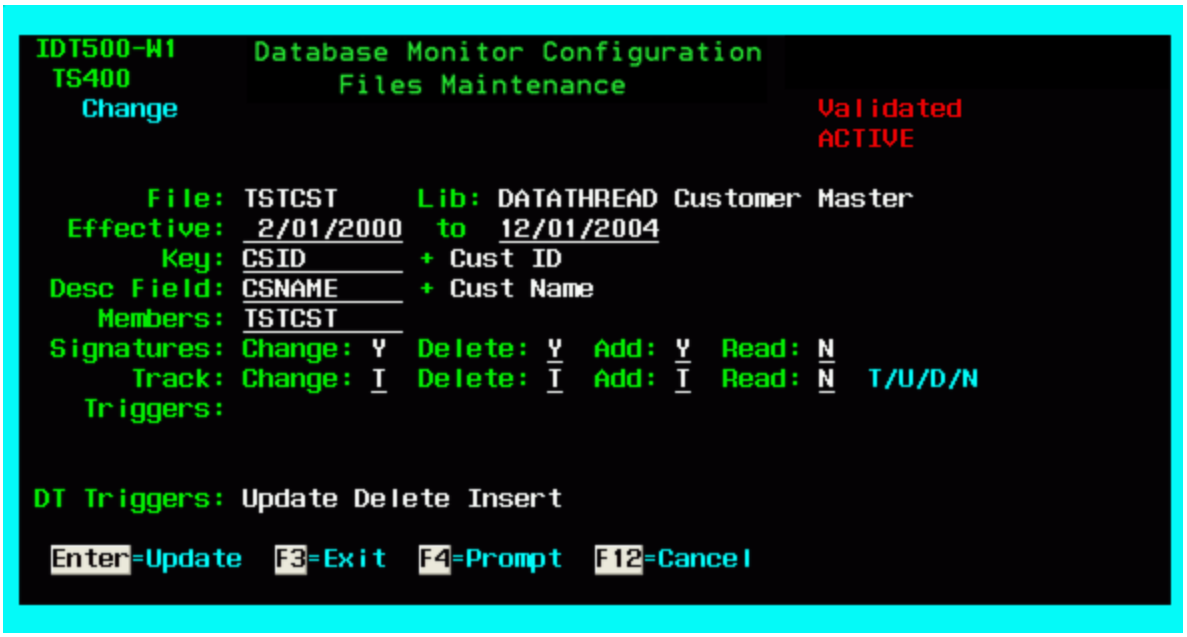
Heading	Short Description	Values
V	Validated	Y = Yes N = No
A	Activated	Y = Yes N = No
C	Change Tracking	T = Trigger D = Database Monitor Journal U = User Journal N = Not Tracked
D	Delete Tracking	T = Trigger D = Database Monitor Journal U = User Journal N = Not Tracked
A	Add Tracking	T = Trigger D = Database Monitor Journal U = User Journal N = Not Tracked
R	Read Tracking	T = Trigger D = Database Monitor Journal U = User Journal N = Not Tracked
DT	Trigger Program	NS = No SignatureFunction keys

Function keys

Function Key	Short Description	Description
F3	Exit	Exits the program, returning to the Database Monitor Menu.
F4	File List	Enter a library in the selection criteria and press F4. A list of files will be displayed. Selection of those files not tracked by Database Monitor will be allowed.
F5	Refresh	Redisplay the current panel with updates from any external sources.
F6	Add	Use this option to add a file to Database Monitor. Add will take you through the required setup panels, including the main add window, key selection, and field tracking.
F12	Cancel	Exits to the prior panel.

Appendix C: Configuration - Files

The Files Maintenance Screen allows you to add, change, delete, or Display any of the files setup within Database Monitor.



Field level entries – IDT500-W1

Field	Description	Valid Entries	Needed?
Effective Dates	Specify the date on which to begin tracking this file in Database Monitor, along with the date to cease tracking. Audit records and signatures will only be captured if the activity is performed within these dates, inclusive.	Shortcuts for dates are allowed. For example, entering '415' will cause '04/15/xxxx' to be entered, with xxxx being the current year.	Yes
Key field	This field should contain the name of the database field (or list of fields) that uniquely identify the records in the file. This key is used by Database Monitor to group changes for inquiry and reporting purposes. For example, a Product File will probably have the Item number as the key. A customer order line item file's key will probably consist of the order number field along with the order line number field. If more than one field is required here, press F4 when the cursor is on the field and a list of the fields from which to choose will be shown. If multiple fields are entered, enter them in the correct priority sequence (e.g. order number first, then line number). If you do not know the key initially, you may go into the Keys configuration option (action 11 from the list of files) and then press F4 for a list of the logical files (also called access paths) already in place for the file. Often one of the access paths will represent a unique key for the file.	Any single field name from the file or the special value *LIST if more than one key field is used.	Yes

Field	Description	Valid Entries	Needed?
Desc	The Description field should have the name of the field in the file that most closely identifies which record is being shown. For example, in a customer master file, the customer number may be the "key" field, but when a user is browsing the list it is more useful to see the customer name because it is easier to recognize by the user. For such a file, the customer name field should be entered here.	Any single field name from the file.	Yes
Members	Most often, only the first (or main) member of a file is tracked, as additional members of the file are often used only as temporary work members. In such a case, the name of the first member should be entered here. (By default, most files have the first member with the same name as the file itself). To track all members, enter *ALL in this field. Or, you may go to the members action from action 13 of the main file listing and select a list of the members you wish to track.	A member name, or *LIST, or *ALL.	Yes

There are no actions for this function. Simply enter a value next to the field or fields you wish to define as the unique key to this file. If more than one field make up the key, use a sequence of numbers, lowest to highest, to select and sequence the key fields.

Function key (Fkey) entries – IDT500-04

Function Key	Short Description	Description
F3	Exit	Exit the program
F4	Available Keys	Pressing F4 will ask Database Monitor to review this file and all of it's dependents to show a list of key combinations which can be selected and used to define the unique key for this file

Function Key	Short Description	Description
F5	Prompt	Refresh panel with any external changes
F12	Cancel	Press F12 to close the window and return to the file list.
F13	Members	Advances to the Database Monitor Configuration - Members Selection Screen - IDT500-02
F14	Triggers	Advances to the Database Monitor Configuration - Trigger Maintenance Screen - IDT500-03
F15	Fields	Advances to the Database Monitor Configuration - Fields Maintenance Screen - IDT500-05

Database Monitor Configuration - Keys

This function defines the uniqueness of each file tracked by Database Monitor. It is important that each file that is setup in Database Monitor has its unique key defined. This is used to track data changes. The initial record change will load the entire record into Database Monitor. From that point on the key will define if a record has been tracked previously. If the record has been tracked, Database Monitor will only keep the fields that change. If the key defined to Database Monitor is not unique, Database Monitor may track an initial change to a record as a subsequent change, therefore not recording the entire record for the initial change.

There are no actions for this function. Simply enter a value next to the field or fields you wish to define as the unique key to this file. If more than one field make up the key, use a sequence of numbers, lowest to highest, to select and sequence the key fields.

Function key (Fkey) entries – IDT500-04

Function Key	Short Description	Description
F3	Exit	Exit the program
F4	Available Keys	Pressing F4 will ask Database Monitor to review this file and all of it's dependents to show a list of key combinations which can be selected and used to define the unique key for this file
F5	Prompt	Refresh screen with any external changes
F12	Cancel	Press F12 to close the window and return to the file list.

Function Key	Short Description	Description
F13	Members	Advances to the Database Monitor Configuration - Members panel - IDT500-02
F14	Triggers	Advances to the Database Monitor Configuration - Trigger Maintenance panel - IDT500-03
F15	Fields	Advances to the Database Monitor Configuration - Fields Maintenance panel - IDT500-05

Configuration - Members

Member Maintenance is used to define to Database Monitor specific members of a file to be tracked. *ALL is the default entry.

Function key (Fkey) entries – IDT500-02

Database Monitor Configuration - Members

Function Key	Short Description	Description
F3	Exit	Exit the program
F5	Refresh	Refresh screen with any external changes.
F6	Add	Will display a list of available members for this file. Selection of any of the available members will limit Database Monitor tracking to those members
F12	Cancel	Press F12 to cancel.
F14	Triggers	Advances to the Database Monitor Configuration - Trigger Maintenance Screen - IDT500-03
F15	Fields	Advances to the Database Monitor Configuration - Fields Maintenance Screen - IDT500-05

Program actions – IDT500-02

Database Monitor Configuration - Members

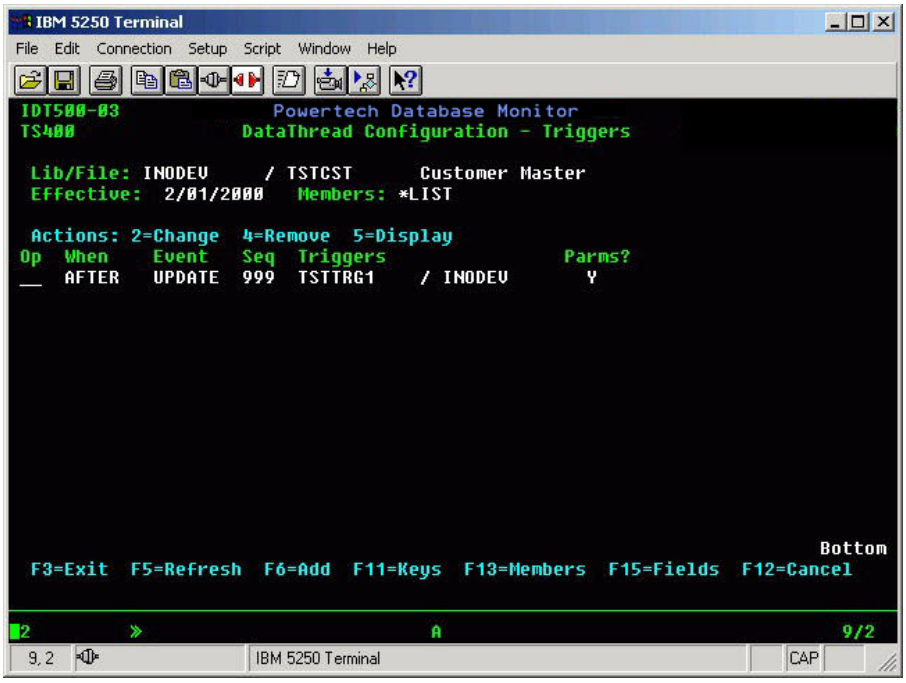
Action number	Short Description	Description
4	Remove	This action will remove the member from Database Monitor tracking.

Configuration - Triggers

NOTE: This section applies only to OS/400 versions prior to V5R1. In V5R1 and above, the operating system allows for multiple triggers per event and so separate trigger maintenance is not required.

Trigger Maintenance is a trigger management function. Using this option will allow multiple programs to be called when a file addition, update and/or delete is recorded. Since Database Monitor uses *AFTER Triggers only, Database Monitor manages the calls to these additional programs for *AFTER times only. *BEFORE times need to be handled through the existing AS/400 functions.

NOTE: The triggers defined in Trigger Maintenance will not be called if journals are used instead of triggers for the event.



Function key (Fkey) entries – IDT500-03

Database Monitor Configuration - Triggers

Function Key	Short Description	Description
F3	Exit	Exits the program.
F5	Refresh	Refresh the screen with any external changes.
F6	Add	Will display IDT500W3 to add additional program calls when data changes, adds and/or deletes for this file.
F11	Keys	Advances to the Database Monitor Configuration - Keys Selection Screen - IDT500-04
F12	Cancel	Press F12 to close the window and return to the file list.
F13	Members	Advances to the Database Monitor Configuration - Member Maintenance Screen - IDT500-02
F15	Fields	Advances to the Database Monitor Configuration - Fields Maintenance Screen - IDT500-05

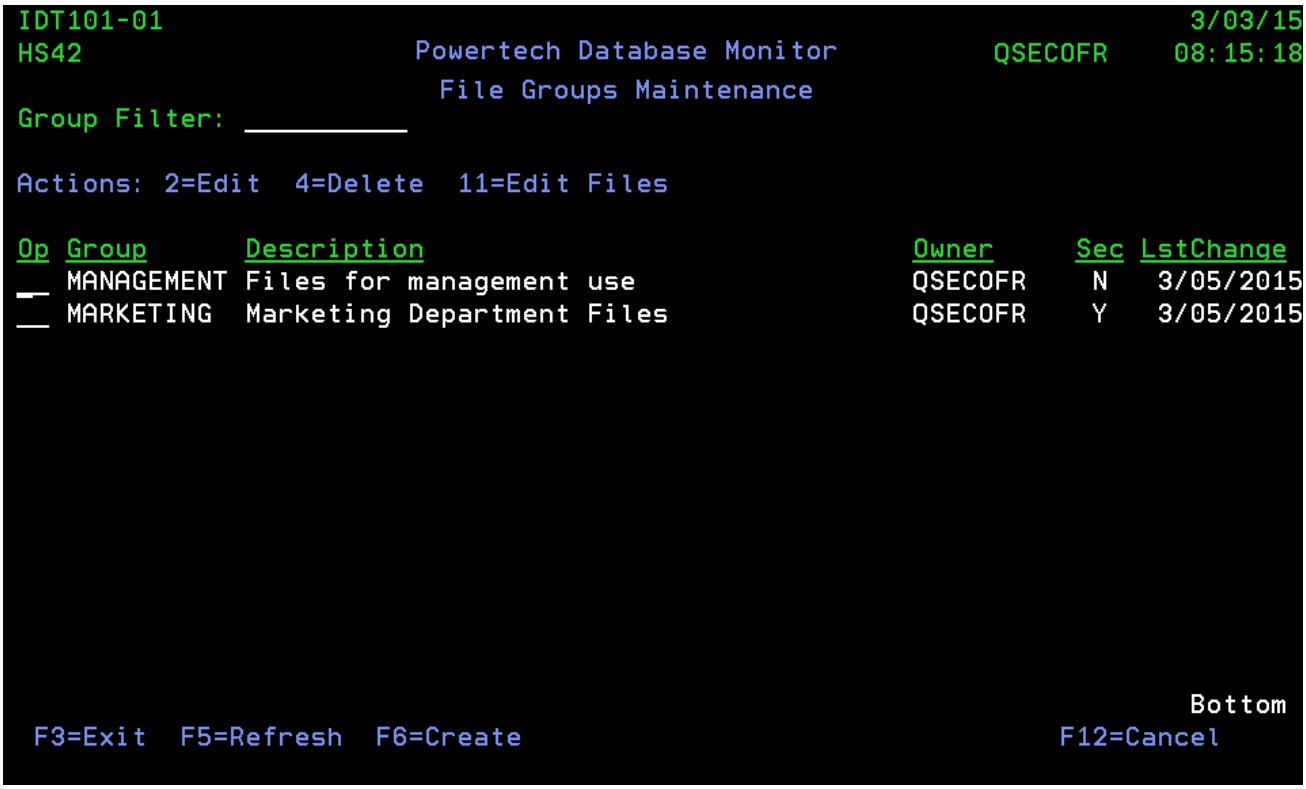
Program actions – IDT500-03

Database Monitor Configuration - Triggers

Function Key	Short Description	Description
2	Change	Will display an existing file trigger and allow changes to its Database Monitor definition.
4	Remove	Will delete an existing trigger program call from Database Monitor.
5	Display	Will display an existing trigger program call for view only.

Database Monitor File Groups Maintenance

The File Groups Maintenance panel is used to work with files associated with each other for reporting purposes. See File Groups Overview.



How to get there

Enter option **14** or option **24** from any Database Monitor menu.

Action entries – IDT101-01

Action Number	Short Description	Description
2	Edit	Placing a 2 in the Op field beside any Group and pressing enter will display a Change Record window for the selection. Here, you can update the description and or whether the Group is secured.

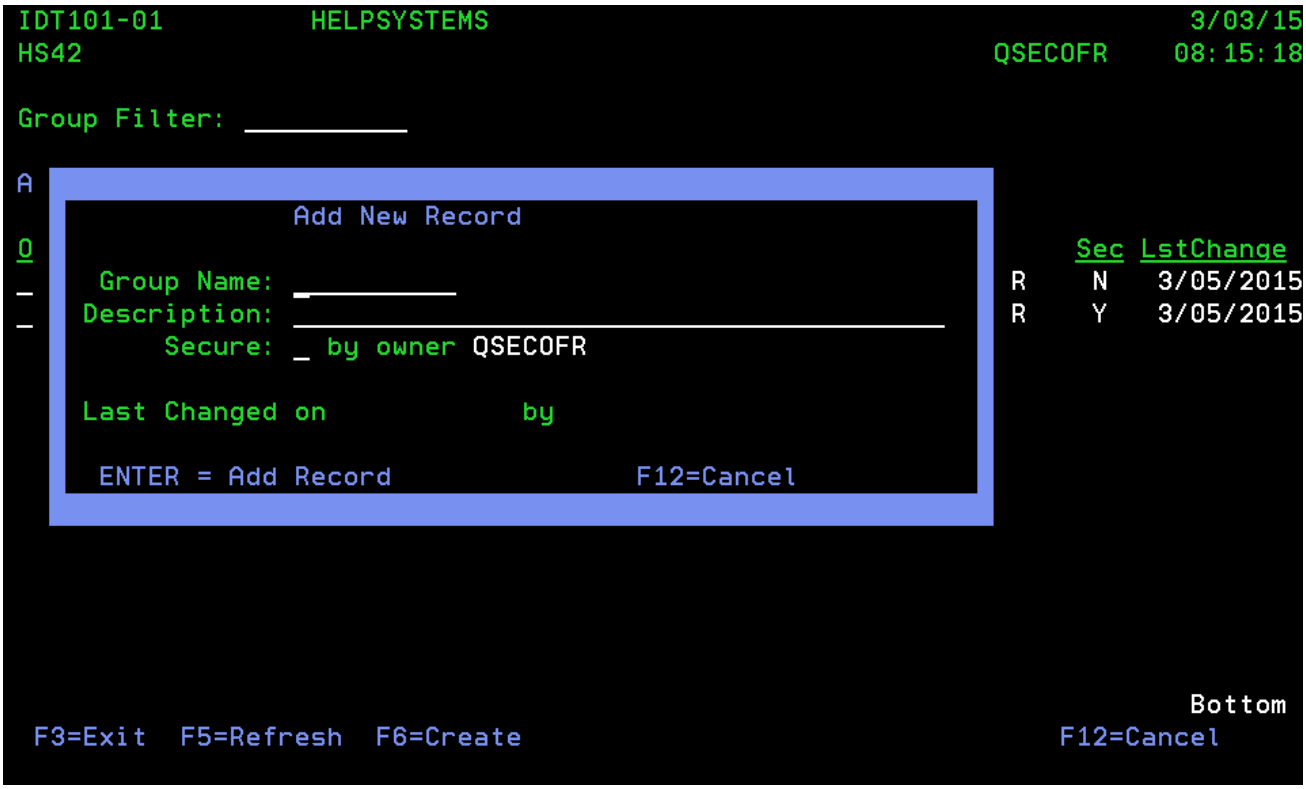
Action Number	Short Description	Description
4	Delete	Entering a 4 in the Op field beside any Group and pressing enter will display a DELETE THIS RECORD window for the selection. By pressing enter, the selected Group will be removed from the list of valid Groups. Should you decide not to remove the record, press F3 to exit to IDT0002 or F12 to cancel the action and return to IDT101-01.
11	Edit Files	Typing 11 in the Op field beside any Group and pressing enter will display IDT102-01 File Maintenance for File Groups. From this panel you can maintain Files under the Group Name.

Function keys– IDT101-01

Function Key	Short Description	Description
F3	Exit	Returns the previous menu panel- IDT0001 Database Monitor - System Setup and Configuration or IDT0002 Inquiries and Reports.
F5	Refresh	The F5 key will refresh the panel showing any new applicable information, if any.
F6	Create	If the F6 key is pressed, an Add New Record panel will be displayed. Use this to create a new Database Monitor File Group.
F12	Cancel	Press F12 to close the window and return to IDT0001 Database Monitor - System Setup and Configuration or IDT0002 Inquiries and Reports.

Add New Record

Press **F6** to open this panel. You can add a file group in order to establish the name or category for the files that you would like to treat as a related set of files for reporting purposes. This is done through IDT101-01.



Field level entries – IDT101-001

Field	Description	Valid Entries	Needed?
Group Name	Specify a 10-character alphanumeric name to the file group.	Any set of characters up to a maximum of 10.	Yes
Description	Enter up to a 40-character alphanumeric description for the file group.	Any set of characters up to a maximum of 40.	Yes
Secure	Enter a Y if this is not to be changed by other than the assigned owner or N if it is open to change by any user with authority to IDT101-01.	Y or N	Yes

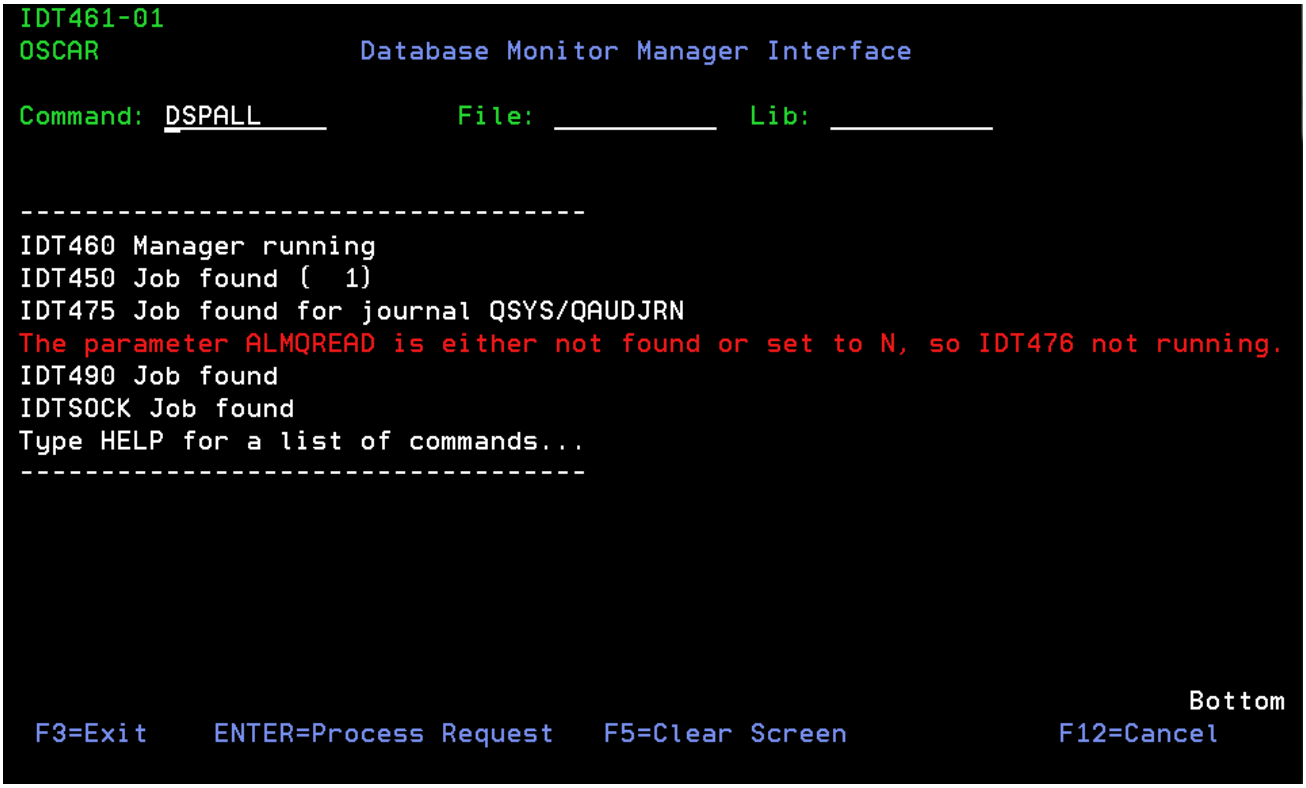
See Also:

File Groups Overview

File Maintenance for File Groups panel

Appendix B: Database Monitor Manager Interface

The Database Monitor Manager interface is a status monitoring and application control system. It can be used to monitor the status of Database Monitor, start and end programs in Database Monitor and view its overall status. Programs in this section can also be scheduled to run during routine processing to stop and start file-monitoring and system managing functions.



How to get there

From any Database Monitor menu screen, enter option **17**Database Monitor Manager and press enter. This will result in the screen IDT461-01 being displayed. This program is a command-driven interface, so to get started, you may type HELP in the Command field to see a list of the valid commands.

Function keys for IDT461-01

Function Key	Short Description	Description
F3	Exit	Returns the menu screen IDT0001 Database Monitor - System Setup and Configuration. If you wish to accept the entries made, when done press Enter.
F5	Clear Display	Pressing F5 will clear the display area of the screen and leaving the field level entries unchanged. This is useful to prevent having to scroll down over and over again to see the results of the command.
ENTER	Enter	Process the entered command.
F12	Cancel	Press F12 to close the window and returns the menu screen IDT0001 Database Monitor - System Setup and Configuration.If you wish to accept the entries made, when done press Enter. Field level entries

Field level entries – IDT461-001

Database Monitor Manager Interface

Field	Description	Valid Entries	Needed?
Command	One of several commands can be entered here. Typing HELP in the command field will display a list of the valid commands.	CHKNOW DSPALL DSPJRM DSPMGR DSPMON DSPSTS DSPWIM ENDALL ENDJRM ENDMGR ENDMON ENDWIM FIXQUE FIXQUQ HELP RCLQUE RCLQUQ REFJRM REFMON STRJRM STRMON STRWIM	Yes

Field	Description	Valid Entries	Needed?
File	If a file filter is needed, enter the file name here. Any valid filename up to 10 characters may be entered.	Valid File name up to 10 characters.	No
Library	If a library filter is needed, enter the library name here. Any valid filename up to 10 characters may be entered.	Valid Library name up to 10 characters.	No

Note on operation of the manager:

The Database Monitor manager is designed so that only one instance will ever be active at once. This is achieved by the program exclusively placing a lock on a particular control member upon starting up. If this member is already locked, the newer job will simply end. There may be times, however, when a WRKACTJOB will show multiple managers, if multiple have been submitted. For example, each of the trigger jobs attempts to start the manager if it isn't already running, so a sudden flurry of activity from multiple jobs can cause there to appear to be multiple managers running all at once. In reality, only one of the manager jobs seen will actually continue to run. As soon as the others can clean up and end, they will do so.

Command listing for IDT461 - Database Monitor Manager Interface

CHKNOW

Normally, IDT460 will do a system check periodically, every x minutes. This is specified in the system parameter WAIT-460. This check of the system verifies that all of the triggers and journals are correctly on the files and fixes any problems it finds. If an immediate check is needed of the system, including fixing triggers, the CHKNOW command will do this. Note that IDT460 does a CHKNOW each time upon initial entry (when ENDMGR is run followed by STRMGR, for instance).

DSPALL

This command displays the current status of IDT450, IDT460, IDT470, and WIM (IDTSOCK and IDT490) jobs.

DSPJRM

This command displays the current status of the IDT470 (Journal Manager) jobs. Each journal in use by Database Monitor will result in a single instance of IDT470, which will be named as "D_" + 1st eight characters of journal name. For instance, if the Database Monitor journal, DTJOURNAL and one user journal, say USERJOURN are being used, doing DSPJRM will show two jobs running, one called D_DTJOURNA and D_USERJOUR. DSPJRM will also show, in red, which journal jobs are not currently running.

DSPMGR

This command displays the current status of IDT460, the Database Monitor manager. If the Database Monitor manager is not running, none of the other commands will yield a response, since it is the manager, itself, which responds to commands on the IDT461 screen. Choose STRMGR to start the manager if it is not already running. Note that STRMGR will begin not only the manager, but all other jobs that are not currently running, since this is the first action the manager takes upon invocation.

DSPMON

This command displays the current status of any IDT450 jobs, also called Database Monitor monitors. These programs are the ones which write all of the audit log entries as well as kicking off any workflows which have qualified.

DSPSTS

This command returns with a list of libraries and files and the types of changes to those files being monitored by Database Monitor. If the list is very long it can be filtered using the Library and or File filters at the top of the screen. DSPSTS will show which files have which triggers and/or journals attached, along with which ones do not have these but should.

DSPWIM

This command displays the current status of the two WIM jobs, IDTSOCK, and IDT490. These jobs are the ones which respond to signatures that originate from the form presented in email. WIM = Web Interface Manager.

ENDALL

Running this command will request the manager to end, along with all of the other currently running Database Monitor jobs. (Note that the request for the other jobs to end always comes from the manager, so if the manager, itself, is not running, none of the other jobs will end on this command.) Equivalent to calling the program, STR460.

ENDJRM

Running this command shuts down all IDT470 programs. (Note that the request for the other jobs to end always comes from the manager, so if the manager, itself, is not running, none of the other jobs will end on this command.)

ENDMGR

Running this command shuts down the IDT460 program. No other commands may then be executed until STRMGR (start manager) is run. ENDMGR only ends IDT460, whereas ENDALL will tell IDT460 to end all of the other jobs as well.

ENDMON

When this command is entered, all of the Database Monitor monitor IDT450 programs are shut down. Records will continue to be monitored by Database Monitor but all notifications and signature requirements are held in a queue until after IDT450 is re-started.

ENDWIM

This will end the WIM jobs (IDTSOCK and IDT490)

FIXQUE

The FIXQUE (fix data queue) command will attempt to resolve any pending problems with a data queue. The queue name and library should be specified in the file and library fields, respectively. If a data queue is pending deletion, it will be deleted. If a data queue has a size that is different from that specified in the parameter file it will be deleted and recreated with the correct size. Note: The deletion of existing data queues is a coordinated process that cannot always be performed, especially if the system is especially busy. It is safe to attempt it at any time, however.

FIXQUQ

This command is identical to FIXQUE but runs in "quiet mode" with no replies sent back. It is useful for other programs which want to send this command to IDT460 via the manager's data queue.

HELP

This simply lists all of the available commands, which are the ones described in this section.

RCLQUE

The RCLQUE (reclaim space for data queue) command will delete and recreate a data queue, thus freeing up the space that has accumulated for it. The queue name and library should be specified in the file and library fields, respectively. Note: The deletion of existing data queues is a coordinated process that cannot always be performed, especially if the system is especially busy. It is safe to attempt it at any time, however.

RCLQUQ

This command is identical to RCLQUE but runs in "quiet mode" with no replies sent back. It is useful for other programs which want to send this command to IDT460 via the manager's data queue.

REFJRM

The Journal Manager function stores critical configuration values in active memory. This enables for more efficient processing. These values are built when the Journal Manager initiates, or immediately by using the REFJRM command on this screen. If a user journal is added to a file after the file has been setup with a U in the tracking field, the REFJRM command will need to be performed in order to tell the Journal Manager to begin auditing changes to the file.

REFMON

The Database Monitor Monitor function stores critical configuration values in active memory. This enables for more efficient processing. These values are refreshed periodically by the program, or immediately by using the REFMON command on this screen.

STRJRM

This command re-starts the Journal Manager programs (IDT470) if they are not already running. One job per journal will be submitted.

STRMGR

This command re-starts the Database Monitor Manager program IDT460 if it is not already running.

STRMON

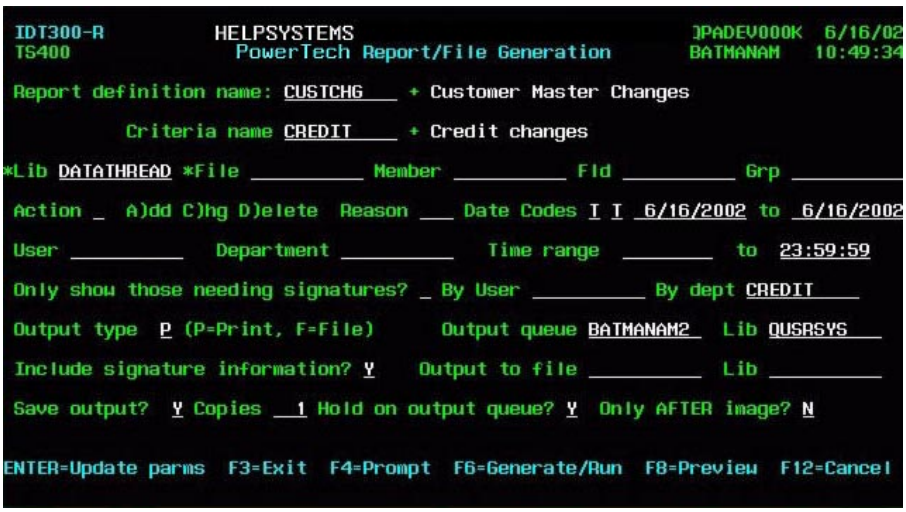
This command re-starts the Database Monitor Monitor program IDT450 if it is not already running. Each time STRMON is called, an additional copy of IDT450 will be launched to assist with performance, up to the maximum number of monitor jobs allowed (see the MAX-450 parameter for controlling this).

STRWIM

This command re-starts the Database Monitor Web Interface Manager (WIM) jobs, IDTSOCK and IDT490..

Database Monitor report/file generation

The same processes and tools generate output for printed reports and downloadable files. Each output format is given a name, much like queries on the AS/400. Please refer to the section on Report Definitions Maintenance for greater detail on report setup.



To generate output, minimally the report definition name must be specified. This identifies to the program, the format of the output, data elements to be included, and the location to which the output should be sent.

Once the format has been identified, the user needs to enter filters to limit the change history that is included. This can be achieved by entering a criteria name to retrieve pre-defined values. It is also an option to simply enter one-time selection criteria.

Field level entries – IDT300-R

Report / File Generation

Field	Description	Valid Entries	Needed?
Report Definition Name	Specify an alphanumeric name for the Report definition to be retrieved.	Must be an existing report definition	Yes
Criteria Name	Specify an alphanumeric name for the search criteria to be retrieved	Must be an existing criteria definition	No
Library	Enter the valid Library name for the library containing the file that will be used as the basis for the report.	A valid library name up to 10 characters	No
File	Enter the File name whose changes will be used as the basis for the report. Note: include only if a Group name has not been or will not be specified.	A valid file name up to 10 characters	No
Member	If a member is specified, only changes made to that member will be included in the report.	A valid file member name up to 10 characters	No
Fld	If the field name is specified, only changes that impacted this field will be included. If other changes were made at the same time as this field change, those will also be included in the report.	A valid field name up to 10 characters	No
Group	Enter a valid Group name for the Group containing the information that will be used as the basis for the report. Note: include only if a file name has not been or will not be specified.	A valid group name up to 10 characters	No
Action Type:	Enter an 'A' for Add, 'C' for Change, or 'D' for Delete. This will only select records that meet the specified add, change, or delete criteria.	'A', 'C', or 'D'	No

Field	Description	Valid Entries	Needed?
Reason:	Any valid 3-character reason code as set up in Code Types maintenance. If this value is entered, only changes that were assigned with this particular reason code will be included. One could for example, choose to see only when a particular lot was rejected.	Valid 3-character code type.	No
From: Code	Enter an 'E' for Earliest, 'T' for Today, 'D' for Date, or 'L' for Latest date. The system will use the associated date and complete the 'From' date field appropriately. Note: include E, T, or L only if a date has not been or will not be specified.	An 'E', 'T', 'D', or 'L'	No
To: Code	Enter an 'L' for Latest date or 'T' for Today. The system will use the associated date and complete the 'From' date field appropriately. Note: include T or L only if a date has not been or will not be specified.	An 'L' or 'T' or 'D'	No
From: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
To: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
Changed By User:	For records changed by a specific user, enter the valid userid here. Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No

Field	Description	Valid Entries	Needed?
Changed By Dept:	For records changed by a specific department, enter the valid Department name here. This must be a valid department as set up in Code Types Maintenance. Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No
From Time	Enter a time of Day. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second. Note the From time must be before the To time if the From and To date is the same.	Any valid time.	No
To Time	Enter a time of Day. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second	Any valid time.	No
Need Sign?	This filter controls viewing of changes that have associated signature requirements. "Y" will show only those records that have open signatures. Blank will show changes with both open and closed signature requirements. "N" will show changes that do not have a signature requirement associated. Use this filter together with the "Sign By User" or "Department" to access changes that need signature by particular entities.	"Y", " ", "N"	No

Field	Description	Valid Entries	Needed?
Sign by User	For records that require or did require signature by a specific user, you may enter the valid userid here. Note: You may only specify either a user or a department or neither but not both.	A valid userid up to 10 characters.	No
Department	For records that require or did require signature by a specific department, you may enter the valid department here. Note: You may only specify either a user or a department or neither but not both.	A valid department up to 10 characters.	No
Output type	P=Print, F=File	P,F	Yes
Output queue	A valid output queue	Must exist on the system	Yes if output is to be printed
Library	The library in which the output queue has been defined	Must be valid for the output queue	Yes if being printed
Include signature information?	There is associated signature information for each change that is captured. If you would like to see this information on your report or in the output file make this value equal to Y.	"Y", " ", "N"	No
Output to file	If the output is to be sent to a file, enter the name of the file in this field. Database Monitor will not delete or clear a file. If the file already exists you will need to delete it prior to running the report.	Up to a ten character file name which should not already exist.	Yes if the output is to go to a file.
File library	The name of the library in which the output files should be created.	A currently existing AS/400 library	Yes if the output is going to a file.

Field	Description	Valid Entries	Needed?
Save output?	This variable controls if the printout is saved on the AS/400 after it has been printed.	"Y", " ", "N"	No
Number of copies	Number of copies of the report to be printed.	Will default to one but may be increased.	No
Hold on output queue?	If you wish to hold your output on the out queue and then manually release it when you are ready, change this value to Y.	"Y", " ", "N"	No
Library	Each change captured by Database Monitor has a before image and an after image. If you wish to see only the after image of a change enter a Y. in this field.	"Y", " ", "N"	No

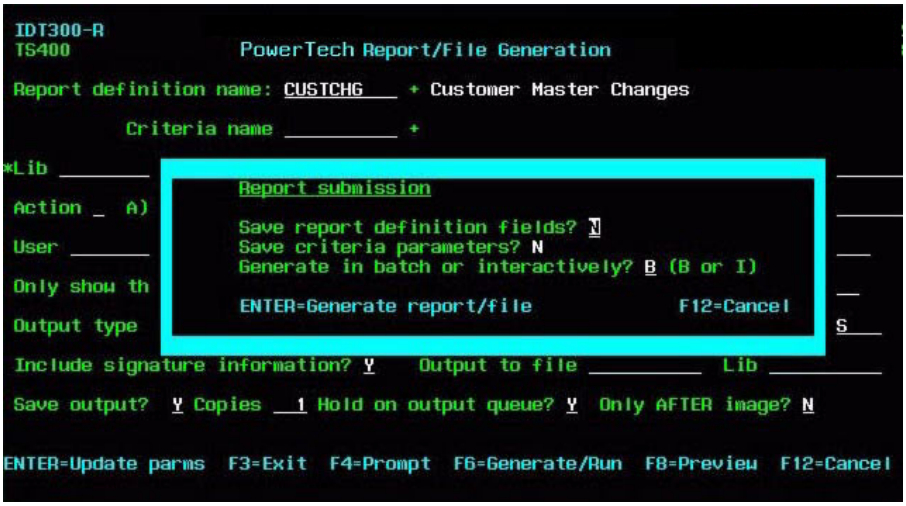
Function keys- IDT300-R

Report / File Generation

Function Key	Short Description	Description
F3	Exit	Returns the previous screen
F4	Prompt	There are two promptable fields in this screen. The first is the name of the report; the second is the name of the selection criteria which have been pre-defined.
F6	Generate/Run	Once all of the criteria have been entered to generate the report or output file, F6 is used to start the program. A window will be displayed to give you additional choices for processing.

Function Key	Short Description	Description
F8	Preview	The reporting module works in conjunction with the transaction inquiry program. Once your selection criteria have been entered, you have the option of pressing F8 and seeing the actual records that will be included in your report or output. It is also by the use of F8 that you can enter a key value to limit your report or file output. For example you can request only records for lot number 123456.
F12	Back	Returns to the previous screen.

Once F6 is pressed, it is here that additional choices are given for the processing of the report or file output. The changes to the report parameters can be saved. And the process can be performed interactively, or it can be submitted to batch. For larger reports it is recommended that the report be submitted for batch processing.



Field level entries – submission window

Report / File Generation

Field	Description	Valid Entries	Needed?
Save report definition fields	If definition fields which were retrieved at the beginning of this process where changed on the screen, a user is given the option of updating those into the saved definition of the report.	"Y", "N"	Yes
Save criteria parameters	This entry is protected on this window and cannot be changed.	"N"	No
Generated in batch or interactively	The user has the choice of running the report or file output using an interactive session, or they can submit it for a batch process. It is strongly recommended that processing occur in batch when there is a potential for large reports.	"B", "I"	Yes

Report definitions maintenance

Let us first review some of the concepts around the Database Monitor and the challenges that it presents in generating formatted output or coma separated files.

The software has been designed to function irrespective of the database over which it has been implemented. Consequently, all of the reporting and file output has to be dynamically formatted based on the file which is being reported. To achieve this, Database Monitor has a completely soft coded report generation module.

The next few panels provide the ability to configure reports or file output by selecting a series of choices, and sequencing the fields which should be included in the report.

Below, you will find the Database Monitor report definition maintenance panel.

One record is displayed for each report that has been defined. There are two filter capabilities on the panel. The report filter can be used with a partial entry. For example, if the letters "AR" are entered, then reports with names starting with AR will appear in the list. The list can also be limited to those reports generated by a particular user, who is the owner of the report.

Field level entries - IDT107-01

Report Definition Maintenance

Field	Description	Valid Entries	Needed?
Report	The report filter can be used with a partial entry. For example, if the letters "AR" are entered, then reports with names starting with AR will appear in the list.	Anything	No
Owner	The list can also be limited to those reports generated by a particular user, who is the owner of the report.	Anything	No

Action entries - IDT107-01

Report Definition Maintenance

Field	Short Description	Description
2	Edit	Modify header level entries for the report. These are the variables that control the behavior of the report.
3	Copy	On occasions when a new report needs to be defined and is very similar to an existing report, option 3 can be used to copy the existing report. Then option 2 and option 11 can be used to modify the new report.
4	Delete	This option is used to delete an existing report
5	Display	Shows the definition of the report's controlling features.
11	Define fields	Once the controlling information about a report has been identified, it is necessary to associate fields from the file to be printed on the report or to be outputted to a downloadable file.

Function keys- IDT107-01

Report Definition Maintenance

Function Key	Short Description	Description
F3	Exit	Returns the previous screen

Function Key	Short Description	Description
F5	Refresh	Refreshes the screen by, again, retrieving the data from the database.
F6	Create	This function key is used to access the report definition creation screen.
F12	Back	Returns to the previous screen.

The window below is displayed whenever a report definition record is added, changed or displayed.

Field level entries - IDT107- window

Report Definition

Field	Description	Valid Entries	Needed?
Report name	Specify a 10-character alphanumeric name for the new report definition.	Any set of characters up to a maximum of 10.	Yes
Description	A description that identifies the report to the user	Any set of characters up to a maximum of 40.	Yes
Owner	The system will determine the owner based on the user profile of the person creating the report.	System assigned	Yes
Secure	It is the choice of the owner whether a report definition is secured or not. A report can be defined and secured by the owner, but it can be used by others to generate output. A secure report can also be copied to a new report which will then be owned by the new owner and can be modified. This feature can be utilized to generate standardized reports which are then run by operational personnel.	"Y', "N"	Yes

Field	Description	Valid Entries	Needed?
File/Group	Throughout Database Monitor, the concept of file groups is supported. Please refer to that section for additional detail. Briefly, however, it means that more than one file can be included in the creation of a report.It is in this field that the user identifies whether this report is for a single file, or for a collection of files.	Either a valid file name or the name of a group of files.	Yes
Library	The library in which the file being reported resides. Leave this value blank if a group is being used	Valid library name	Yes if a single file is being defined
Output type	P=Print, F=File	P,F	Yes
Output queue	A valid output queue	Must exist on the system	Yes if output is to be printed
Library	The library in which the output queue has been defined	Must be valid for the output queue	Yes if being printed
Output to file	If the output is to be sent to a file, enter the name of the file in this field. Database Monitor will not delete a file. If the file already exists you will need to delete it prior to running the report	Up to a ten character file name which should not already exist.	Yes if the output is to go to a file.
File library	The name of the library in which the output files should be created.	A currently existing AS/400 library	Yes if the output is going to a file.
Include signature information?	There is associated signature information for each change that is captured. If you would like to see this information on your report or in the output file make this value equal to Y	"Y", " ", "N"	No

Field	Description	Valid Entries	Needed?
Save output?	This variable controls if the printout is saved on the AS/400 after it has been printed.	"Y", " ", "N"	No
Number of copies	Number of copies of the report to be printed.	Will default to 1, but may be increased.	No
Only AFTER image?	Each change captured by Database Monitor has a before image and an after image. If you wish to see only the after image of a change enter a Y. in this field.	"Y", " ", "N"	No
Hold on output queue?	The system will determine the owner based on the user profile of the person creating the report.	System assigned	Yes
Owner	If you wish to hold your output on the out queue then manually release it when you are ready, change this value to Y.	"Y", " ", "N"	No

Report definition detail

Option 11 from the report definition panel brings the user to this maintenance program where they can define the fields that should be included in the report. All the available fields are displayed on the panel. The user can choose to include or exclude data elements from being printed. Additionally, each of the fields can be further modified to identify them to Database Monitor as date fields, or to define only a portion of the fields to be included in the report. The fields in white are those that have been included in the report. The excluded fields are displayed in red.

It is important to note, that the reporting module of Database Monitor allows more than one file to be merged into one report. This is achieved by generating a report for a group, as opposed to a single file. In this case, fields for the multiple files will be displayed in the screen below.

Field level entries - IDT108 - 01

Report Definition Detail Maintenance

Field	Description	Valid Entries	Needed?
Option	Enter the desired option to perform for the selected field.	"1", "3", "4"	Yes if further action is required
Sequence	Change the sequence numbers as desired to position the fields horizontally in the report.Those fields that are not being included on the report will get a sequence of all nines and will be displayed in red.	Any valid number	Yes
Field	The name of the field as defined on the database file being used for the report. Those fields that start with the * are Database Monitor specific fields which are captured at time of change.	Display only	No
File	The file which is being used for the purpose of this report.	Display only	No
Library	Library of the file being reported.	Display only	No
Heading	Information about the field available for reporting on this document.	Display only, can be modified by using option 2	No

Action entries - IDT108-01

Report Definition Detail Maintenance

Action Number	Short Description	Description
1	Included	Initially, all fields that are available for reporting are included in the report. If fields have previously been excluded from a report, use option 1 to now include them.
2	Edit	This option allows for additional editing features for each field. See the next screen, below for greater detail.
4	Exclude	Use this option to identify the fields that should not be included in the report.

Function keys- IDT108-01

Report Definition Detail Maintenance

Function Key	Short Description	Description
F3	Exit	Returns the previous screen.
F5	Refresh	Reload the screen with the latest information from the configuration database.
F12	Back	Returns to the previous screen.

Field level entries - IDT108 - 01

Report Definition Detail - Fields Window

Field	Description	Valid Entries	Needed?
Heading	Text that will appear on the report header or in the output file.	Any heading that is appropriate for the field. It is recommended that a heading be of equivalent size to the width of the information in the field.	Yes
Sequence	Sequence entered on the previous screen, which can also be changed within this window.	Any number	Yes
Include	Should this field be included on the report?	"Y", "N"	Yes
Date	Fields that are defined as date on this window, will be displayed in the appropriate date format.	"Y", "N"	Yes

Field	Description	Valid Entries	Needed?
Subset	This feature allows the user to select only a portion of the field to be printed, or included in the output file. This is most useful with large fields where only a certain portion of the data is relevant.	Valid from and to sections of the field.	Yes

Database Monitor Report Parameters Maintenance

Criteria Maintenance can be used to store report criteria for reports that are used routinely. Specifying and saving the criteria through IDT103-01 will make the task of generating standard reports a very easy process.

How to get there

From any Database Monitor menu select option **15** or **25**.

Action entries – IDT103-01

Action Number	Short Description	Description
2	Edit	Placing a 2 in the Op field beside any Parm and pressing enter will display a Change Record window for the selection. Here, you can update all fields for the parameter. These are described in greater detail below in the section Changing a Report Parameter.
3	Copy	Database Monitor provides a copy function for this process to more easily create reports where information about the parameters is similar.

Action Number	Short Description	Description
4	Delete	Entering a 4 in the Op field beside any Parm and pressing enter will display a DELETE THIS RECORD window for the selection. By pressing enter, the selected Group will be removed from the list of valid Groups. Should you decide not to remove the record, press F12 to cancel the action and return to IDT103-01.
5	Display	Typing 5 in the Op field beside any Parm returns a popup window displaying the current values for the Report Parameter.

Function keys– IDT103-01

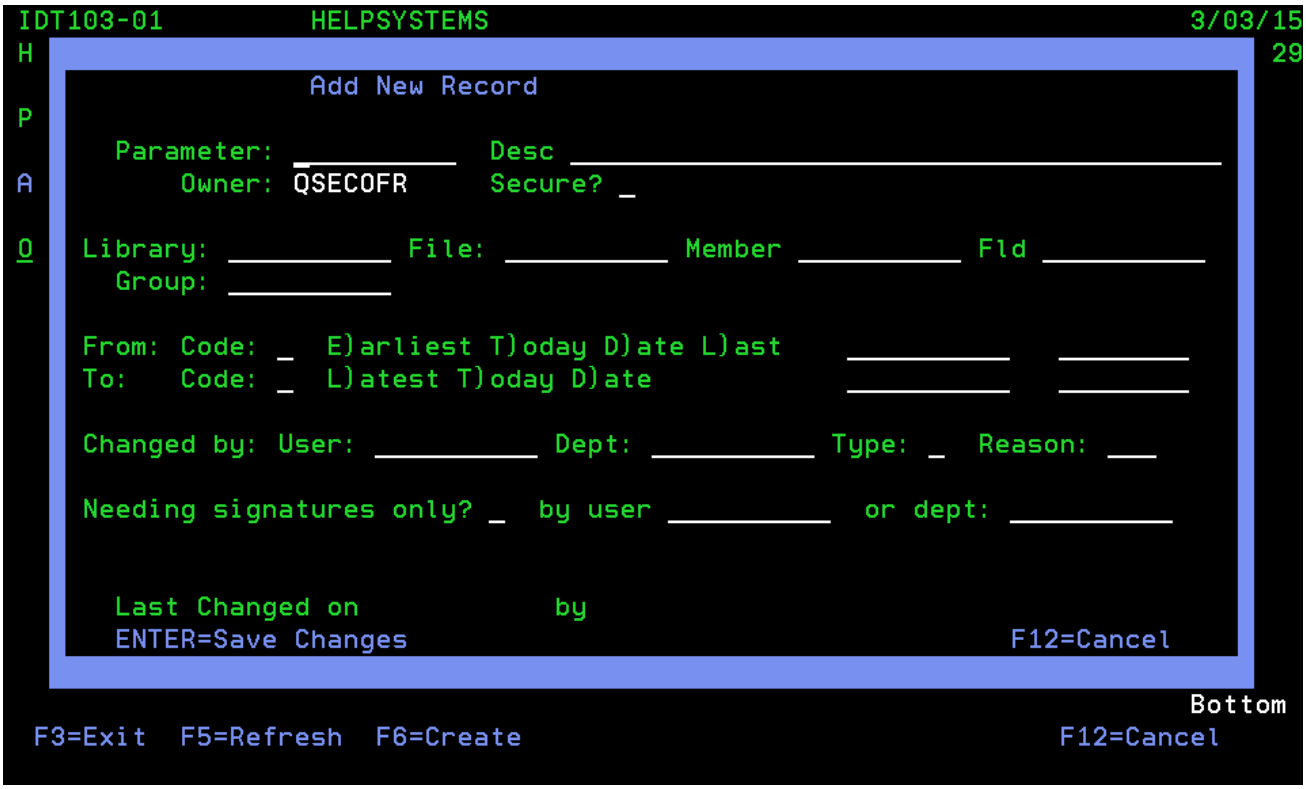
Function Key	Short Description	Description
F3	Exit	Returns the previous menu screen- IDT0001 Database Monitor - System Setup and Configuration or IDT0002 Inquiries and Reports.
F5	Refresh	The F5 key will refresh the screen showing any new applicable information, if any.
F6	Create	If the F6 key is pressed, an Add New Record screen will be displayed. Use this to create a new Database Monitor Report Parameter.
F12	Cancel	Press F12 to close the window and return to IDT0001 Database Monitor - System Setup and Configuration or IDT0002 Inquiries and Reports.

Field level entries – INN100-002

Field	Description	Valid Entries	Needed?
Parm filter	You can display an abbreviated list of available Criteria sets based on the Parm name by entering any string of alphanumeric characters. The result will be a list of criteria beginning with those characters.	Any set of characters up to a maximum of 10.	No
Owner	You can display an abbreviated list of available Criteria based on the owner's userid by entering any string of alphanumeric characters. The result will be a list of criteria beginning with those characters.	Any set of characters up to a maximum of 10.	No

Add New Record

Press **F6** to add a new record.



Field level entries – IDT103-01

Field	Description	Valid Entries	Needed?
Parameter	Specify a 10-character alphanumeric name for the new Parameter.	Any set of characters up to a maximum of 10.	Yes
Description	Enter up to a 40-character alphanumeric description for the Parameter.	Any set of characters up to a maximum of 40.	Yes
Secure?	Enter a Y if this is not to be changed by other than the assigned owner or N if it is open to change by any user with authority to IDT103-01.	Y or N	Yes
Library	Enter the valid Library name for the library containing the file that will be used as the basis for the report.	A valid library name up to 10 characters	No

Field	Description	Valid Entries	Needed?
File	Enter the File name for the file containing the records that will be used as the basis for the report.Note: include only if a Group name has been or will not be specified.	A valid file name up to 10 characters	No
Member	Enter the File Member name for the file member containing the records that will be used as the basis for the report.	A valid file member name up to 10 characters	No
Fld	Enter a valid field name for the field containing the information that will be used as the basis for the report.	A valid field name up to 10 characters	No
Group	Enter a valid Group name for the Group containing the information that will be used as the basis for the report.Note: include only if a file name has not been or will not be specified.	A valid group name up to 10 characters	No
From: Code	Enter an 'E' for Earliest, 'T' for Today, 'D' for Date, or 'L' for Latest date. The system will use the associated date and complete the 'From' date field appropriately.Note: include E, T, or L only if a date has not been or will not be specified.	An 'E', 'T', 'D', or 'L'	No
From: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes

Field	Description	Valid Entries	Needed?
From Time	Enter a time of Day. The field is not labeled. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second.Note the From time must be before the to time if the from and to date is the same.	Any valid time.	No
To: Code	Enter an 'L' for Latest date or 'T' for Today,. The system will use the associated date and complete the 'From' date field appropriately.Note: include T or L only if a date has not been or will not be specified.	An 'L' or 'T' or 'D'	No
To: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
To Time	Enter a time of Day. The field is not labeled. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second	Any valid time.	No
Changed By: User:	For records changed by a specific user, enter the valid userid here.Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No
Changed By:Dept:	For records changed by a specific department, enter the valid Department name here. This must be as valid department as set up in Code Types Maintenance.Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No

Field	Description	Valid Entries	Needed?
Type:	Enter an 'A' for Add, 'C' for Change, or 'D' for Delete. This will only select records that meet the specified add, change, or delete criteria.	'A', 'C', or 'D'	No
Reason:	Any valid 3-character reason code as set up in Code Types maintenance.	Valid 3-character code type.	No
Needing signatures only?:	If the report is designed to show only records requiring a signature that has not been processed enter a 'Y', if not enter an 'N'	'Y' or 'N'	Yes
By user:	For records that require or did require signature by a specific user, you may enter the valid userid here.Note: You may only specify either a user or a department or neither but not both.	A valid userid up to 10 characters.	No
Or dept:	For records that require or did require signature by a specific department, you may enter the valid department here.Note: You may only specify either a user or a department or neither but not both.	A valid department up to 10 characters.	No

See Also

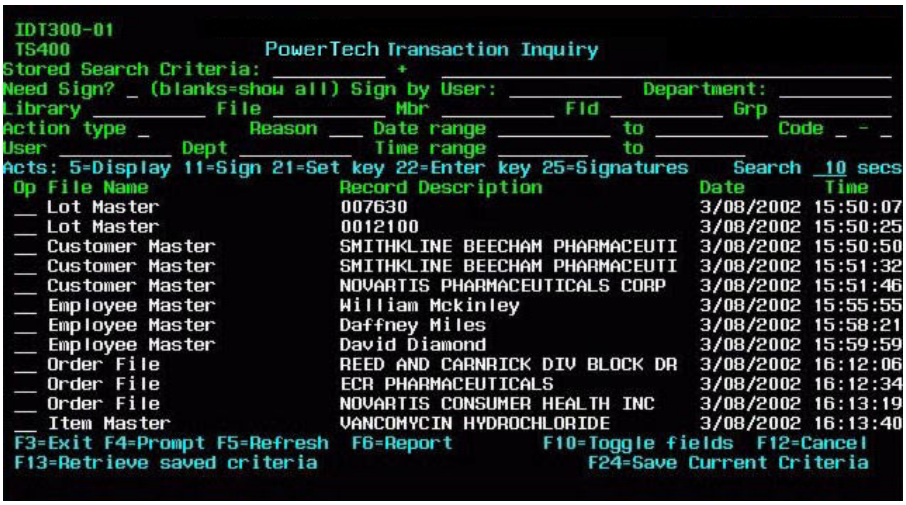
Criteria Overview

Database Monitor Transaction Inquiry

This central, and probably most utilized, user function in Database Monitor serves two main purposes:

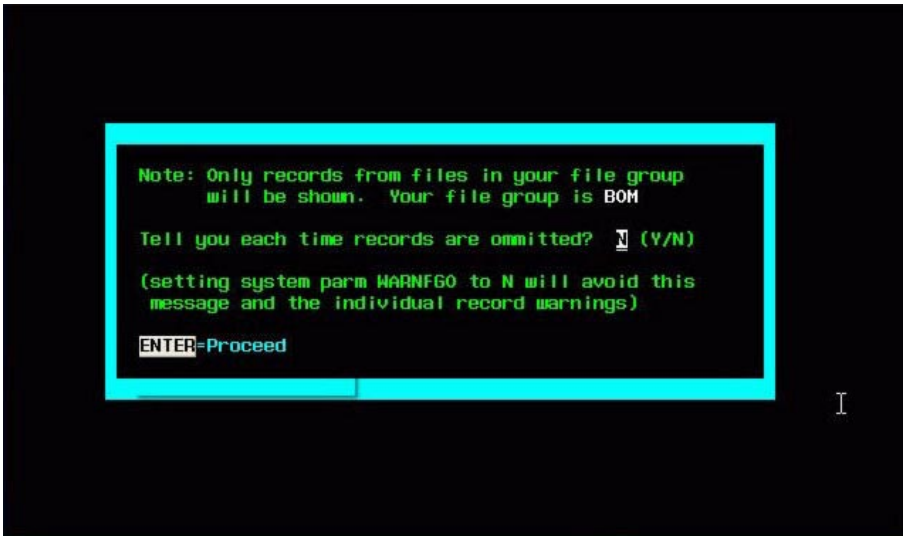
- To gain access to history of changes made to files that have been "DataThreaded"
- To review and react to open signatures. See Workflow - Cascading Signatures for greater detail on the concept

All of the selection criteria work together to refine your search. A record must satisfy all of the limits before it is displayed.



A Note on File Group Security

If a user has been set with limited access to a group of files, and the system parameter has been set to warn users, the following panel will be displayed at the begriming of each inquiry session. This function allows a system administrator to segregate users' data access to their appropriate functional area.



Field level entries – IDT300-01

Transaction Inquiry

Field	Description	Valid Entries	Needed?
Stored Search Criteria	This is the name of a previously defined set of search criteria. By entering a value here and pressing the enter key, the panel is loaded with the appropriate search information. F4 can be pressed to show the user a list of available pre-defined search criteria	Any set of characters up to a maximum of 10.	No
Description	40 characters of description, which help the user, identify in picking the correct pre-defined search criteria.	Any set of characters up to a maximum of 40.	No
Need Sign?	This filter controls viewing of changes that have associated signature requirements. "Y" will show only those records that have open signatures. Blank will show changes with both open and closed signature requirements. "N" will show changes that do not have a signature requirement associated. Use this filter together with the "Sign By User" or "Department" to access changes that need signature by particular entities.	"Y", " ", "N"	No
Sign by User	For records that require or did require signature by a specific user, you may enter the valid userid here. Note: You may only specify either a user or a department or neither but not both.	A valid userid up to 10 characters.	No

Field	Description	Valid Entries	Needed?
Department	For records that require or did require signature by a specific department, you may enter the valid department here. Note: You may only specify either a user or a department or neither but not both.	Any set of characters up to a maximum of 10.	Yes
Library	Enter the valid Library name for the library containing the file that will be used as the basis for the report.	A valid library name up to 10 characters	No
File	Enter the File name for the file containing the records that will be used as the basis for the report. Note: include only if a Group name has not been or will not be specified.	A valid file name up to 10 characters	No
Member	Enter the File Member name for the file member containing the records that will be used as the basis for the report.	A valid file member name up to 10 characters	No
Field	By entering a field name in this location, you will limit your report or inquiry to only those changes that affected this field. For example, you may select to see record changes only when the lot number was modified	A valid field name up to 10 characters	No
Group	Enter a valid Group name for the Group containing the information that will be used as the basis for the report. Note: include only if a file name has not been or will not be specified.	A valid group name up to 10 characters	No

Field	Description	Valid Entries	Needed?
Action Type:	Enter an 'A' for Add, 'C' for Change, or 'D' for Delete. This will only select records that meet the specified add, change, or delete criteria.	'A', 'C', or 'D'	No
Reason:	Any valid 3-character reason code as set up in Code Types maintenance. This will limit your search to only those changes where the selected reason code was assigned. For example show me all changes to the Lot file where a reason code of REJ was used	Valid 3-character code type.	No
From: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
To: Date	Enter a valid date in the system date format. Note: From Date must be less than to date.	Any valid date.	Yes
From: Code	Enter an 'E' for Earliest, 'T' for Today, 'D' for Date, or 'L' for Latest date. The system will use the associated date and complete the 'From' date field appropriately. Note: include E, T, or L only if a date has not been or will not be specified.	An 'E', 'T', 'D', or 'L'	No
To: Code	Enter an 'L' for Latest date or 'T' for Today. The system will use the associated date and complete the 'From' date field appropriately. Note: include T or L only if a date has not been or will not be specified.	An 'L' or 'T' or 'D'	No

Field	Description	Valid Entries	Needed?
Changed By User:	For records changed by a specific user, enter the valid userid here. Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No
Changed By Dept:	For records changed by a specific department, enter the valid Department name here. This must be a valid department as set up in Code Types Maintenance. Note: Use only if the Changed By Dept field is blank.	Up to 10 character valid userid	No
From Time	Enter a time of Day. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second. Note the From time must be before the to time if the from and to date is the same.	Any valid time.	No
To Time	Enter a time of Day. Use a time in standard military format as AABBCC, where AA = hour, BB= minute, and CC= second	Any valid time.	No
Search _ Seconds	Given the volume of data that may need to be searched prior to presenting the information, you may limit the search time.	Up to 999 seconds	No

Action entries - IDT300-01

Transaction Inquiry

Action Number	Short Description	Description
5	Display	Shows detail of the change

Action Number	Short Description	Description
11	Sign	Allows user to sign for changes
21	Set Key	Once option 21 is used, only records with a key that matches this record are displayed
22	Enter Key	Allow for manual entry of key values to limit the search.
25	Signatures	Shows all signatures for this record

Function keys- IDT300-01

Transaction Inquiry

Function Key	Short Description	Description
F3	Exit	Returns the previous menu screen IDT0002 Inquiries and Reports.
F4	Prompt	Allows the viewing and selection of choices for fields designated with the "+" sign.
F5	Refresh	The F5 key will refresh the screen showing any new applicable information, if any.
F6	Report	Allows for the printing of the report for the records that would be displayed on the screen.
F10	Toggle Fields	*Switches between the three different views of the data.*
F12	Cancel	Press F12 to close the window and return to IDT0002 Inquiries and Reports.
F13	Retrieve saved criteria	Loads the filter fields with the values saved in a search criteria
F24	Save Current Criteria	Saves, for future recall, the criteria entered on the screen

Transaction detail inquiry

Option 5 from Transaction Inquiry shows the detail of each transaction. A unique number is assigned to every transaction and information about the event is shown. If a contemporaneous signature was captured at the time of change, that information is also displayed.

For the detail of each change, two types of data are displayed. The values in white are informational and allow for easy identification of the record. The red values are the actual changes. Normally, only key fields and changed values are captured. However, the very first time that Database Monitor becomes aware of a record, all of the fields are captured. The same applies when a record is deleted.

Action entries - IDT301-01

Transaction Detail Inquiry

Action Number	Short Description	Description
5	Display	Shows detail of the change where field sizes exceed what can be shown on this screen

Function keys- IDT301-01

Transaction Inquiry

Function Key	Short Description	Description
F3	Exit	Returns the previous menu screen IDT0002 Inquiries and Reports.

Function Key	Short Description	Description
F10	Toggle Fields	Allows the user to toggle the Field column between the actual field name and field description.
F11	Signatures	Shows history of signatures and allows the user to sign their own outstanding records
F19	Prior	This function allows the user to step back through all of the changes for this particular record. In our example order number 116. On the first captured change the F19 key not shown
F20	Next	This function allows the user to step forward through all of the changes for this particular record. In our example order number 116. On the last captured change F20 key not shown
F12	Back	Returns to the previous screen

Keyed access to data - Who made changes to lot# 12345

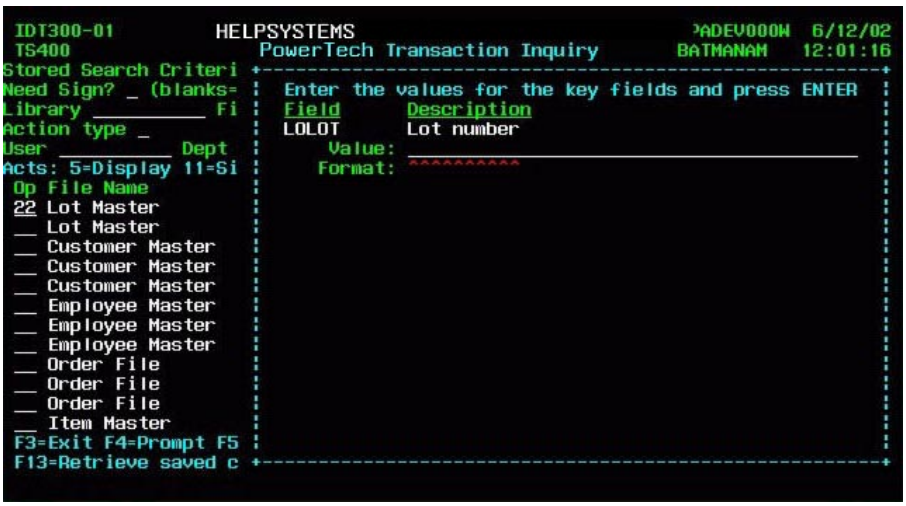
One of the unique features of Database Monitor is the ability to see changes specific to a particular record. You can, for example, see the progression of changes to lot number 12345. This can be achieved in one of two ways.

On the Transaction Inquiry panel, option 21 will automatically set the key for the search. It will use the key of the selected record. From that point on, only records matching the selected key and the selection criteria will be displayed.

The red literals **Key Set** indicate that changes matching a particular record are being displayed. Function key 17 will remove the key limit.

Option 22 will perform a similar function, but allows the user to actually enter the required key values.

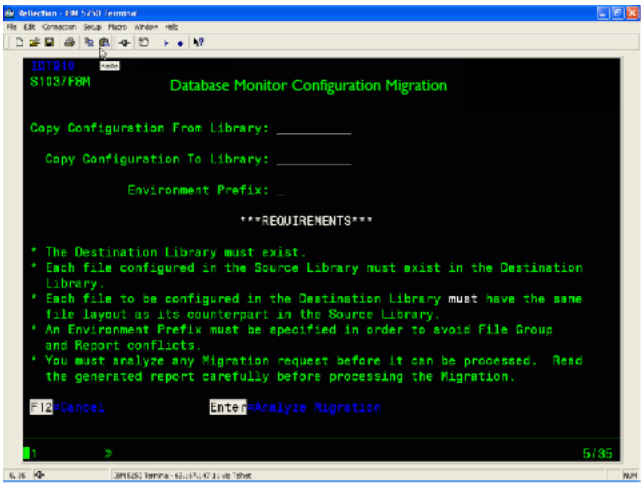
As can be seen below, Database Monitor is aware of the keys associated with each file, and displays the format and size of each key field.



File propagation

There may come a time when you will need to copy an existing Database Monitor environment, and place it in a new environment.

A program exists that will help in the migration of one environment to another. By calling IDT910 from a command line the following panel will be displayed:



Entering the From Library – The library which currently contains the configuration you wish to copy.

And the To Library – the library you wish to create and the Environment Prefix will enable the system to perform an analysis of the migration. The following is checked during the analysis:

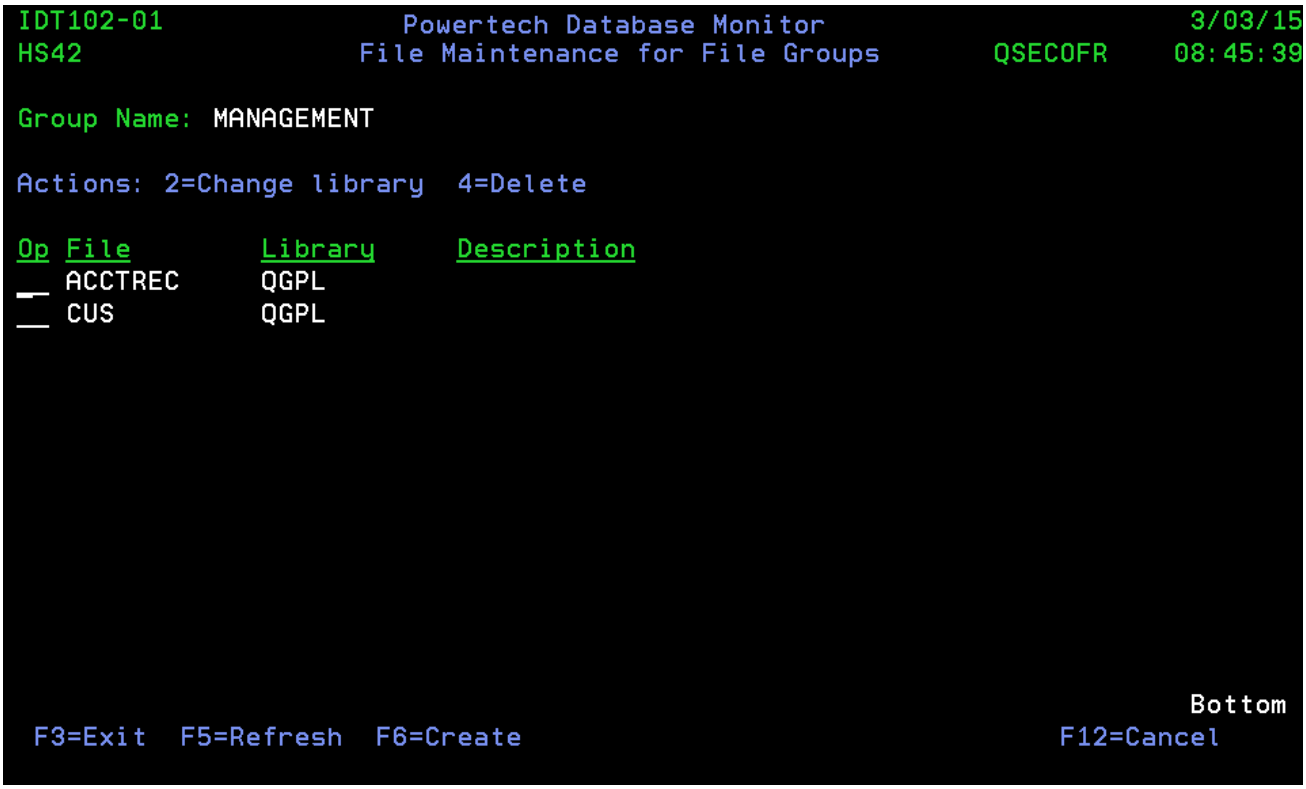
- The file does not already exist in the To Library
- Existing configurations in the To Library
- Complete file group records exist and can be copied
- Existing Workflow configurations in the To Library

The Environment Prefix will be used to copy and rename all file groups within the copied environment. This is done to avoid duplication within the file groups

Once all reports have been checked, and there are no existing issues, the migration can be processed. All file/field information will be duplicated within Database Monitor for the selected library.

File Maintenance for File Groups

Once a file group has been created you can use this panel to add files to the group so that they are tied together for reporting purposes.



How to get there

From any Database Monitor menu enter option **14** or **24** to open the Database Monitor File Groups Maintenance panel. Enter **11** for a group.

Action entries – IDT102-01

File Group - Files Maintenance

Action Number	Short Description	Description
2	Change Library	Placing a 2 in the Op field beside any File and pressing enter will display a Change Record window for the selection. Here, you can change the Library from where the file is located.
4	Delete	Entering a 4 in the Op field beside any File and pressing enter will display a DELETE THIS RECORD window for the selection. By pressing enter, the selected File will be removed from the Group. Should you decide not to remove the file, press F3 or F12 to cancel the action and return to IDT102-01.

Function keys– IDT102-01

File Group - Files Maintenance

Function Key	Short Description	Description
F3	Exit	Returns the previous screen- IDT101-01 Database Monitor File Groups Maintenance.
F5	Refresh	The F5 key will refresh the screen showing any new applicable information, if any.
F6	Create	If the F6 key is pressed, an Add New Record window will be displayed. Use this to add a new file to the Group.
F12	Cancel	Press F12 to close the window and return to the previous screen- IDT101-01 Database Monitor File Groups Maintenance.

Add New Record

Press **F6** to open this panel. You can add a file to a file group through IDT102-01.

Field level entries – IDT102-001

File Groups - Files Maintenance

Field	Description	Valid Entries	Needed?
File	Specify a valid file name of up to 10 characters alphanumeric.	Any valid name up to a maximum of 10 characters.	Yes
Library	Enter a valid Library for the file.	Any valid name up to a maximum of 10 characters.	Yes

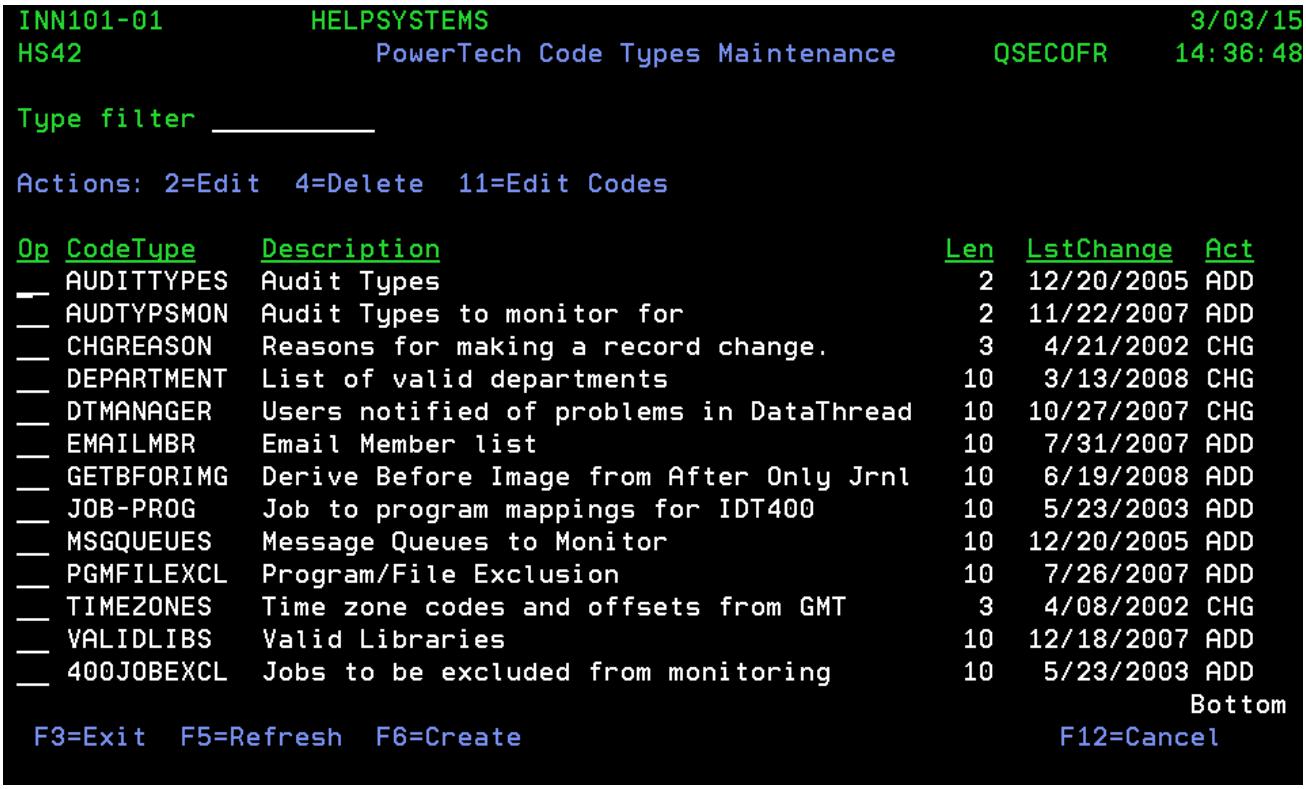
See Also:

File Groups Overview

Database Monitor File Groups Maintenance panel

Powertech Code Types Maintenance

Codes can be maintained under a code type after a code type has been created. Codes can be added changed and deleted within the system based on need. An example of codes is a list of valid Departments under the Code Type DEPARTMENT. Each company using Database Monitor will likely create their own list of departments and perhaps even groups within departments depending on how they will use Database Monitor.



How to get there

From any menu select option **13**.

Action entries – INN101-01

Code Type - Codes Maintenance

Action Number	Short Description	Description
2	Edit	Placing a 2 in the Op field beside any Code and pressing enter will display a Change Record window for the selection. Here, you can update the description for the Code.

Action Number	Short Description	Description
4	Delete	Entering a 4 in the Op field beside any Code and pressing enter will display a DELETE THIS RECORD window for the selection. By pressing enter, the selected Code will be removed from the list of valid Database Monitor codes. Should you decide not to remove the record, press F3 (exit) or F12 (cancel) to return to INN102-01 without deleting the record.
11	Edit Codes	Typing 11 in the Op field beside any CodeType and pressing enter will display the Powertech Codes Maintenance panel. From this panel you can maintain valid codes under the code type.

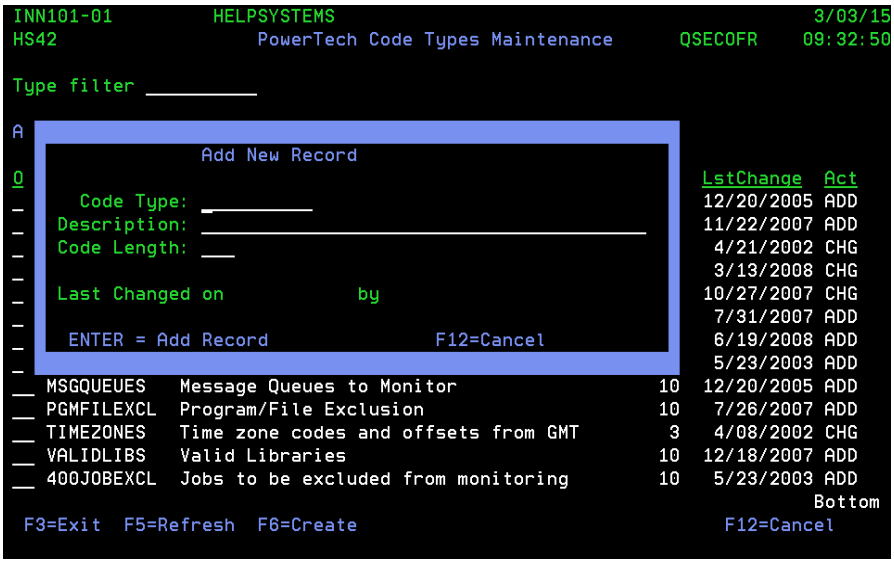
Function keys– INN101-01

Code Type - Codes Maintenance

Function Key	Short Description	Description
F3	Exit	Pressing the F3 key returns you to the Powertech Code Types Maintenance panel.
F5	Refresh	The F5 key will refresh the screen showing any new applicable information, if any.
F6	Create	If the F6 key is pressed, an Add New Record panel window will be displayed. Use this to create a new Database Monitor Code.
F12	Cancel	Press F12 to close INN102-01 and return to the Powertech Code Types Maintenance panel.

Add New Record

Press **F6** to open this panel, which allows you to create a new code type.



Code Types Maintenance

Field	Description	Valid Entries	Needed?
Code Type	Establishes the field name of the code type. This field is the one that will be referenced within programs that are designed to manage code types and their codes.`	Any set of alphanumeric characters up to a maximum of 10.	Yes
Description	Any description to provide more complete identification detail.	Any set of characters up to a maximum of 40.	No, but recommended
Code Length	Enter the number of valid characters to include in the field length for the code.	1 to 40.	Yes

See Also

Code Types Overview

Powertech Codes Maintenance panel

Powertech Security - Matrix

Use this screen to maintained users' authority – to allow or disallow their access to certain transactions, processes and actions. See Security - Authorities.

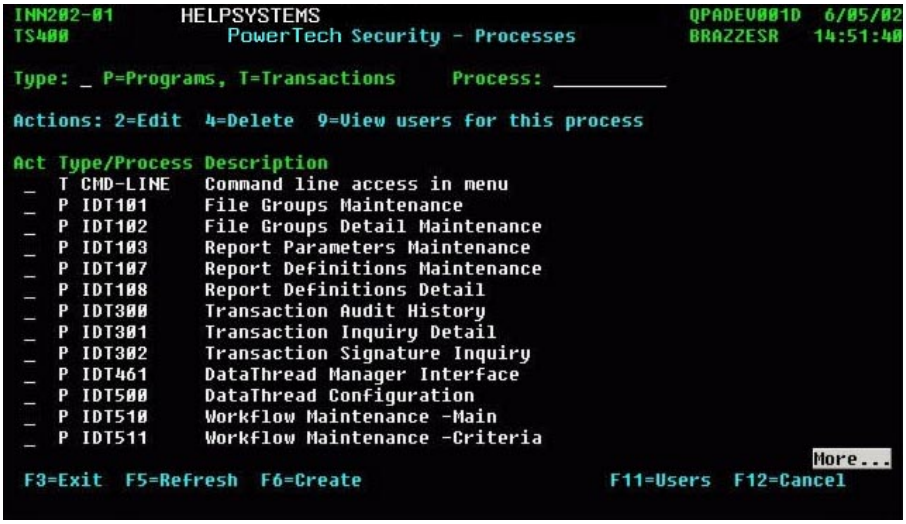
How to get there

From any Database Monitor menu select option **16**. In the Act field beside any template or for any user not tied to a template, type a **9** and press enter.

Or, from any Database Monitor menu select option **16**. Press **F11**. In the Op field beside the desired Type/Process, enter 9.

Powertech Security - Processes

Use this screen to maintain the processes used by the system. See Security - Processes.



How to get there

From any Database Monitor menu, choose option **16**.

Action entries – INN202-01

Powertech Security - Processes

Action Number	Short Description	Description
2	Edit	Placing a 2 in the 'ACT' field beside any 'Type/Process' and pressing enter will display a Change Record window for the selection. Here, you can update the Description field.
4	Delete	Entering a 4 in the 'ACT' field beside any 'Type/Process' and pressing enter will display a 'Deleting this record' window for the selection. By pressing enter, the selected process will be removed from the list of valid Database Monitor processes. Should you decide not to remove the record, press F12 to cancel the action and return to INN202-01.
9	View Users for process	Entering a 9 in the 'ACT' field beside any 'Type/Process' and pressing enter will bring up INN203-01 Powertech Security - Matrix. This panel is used to maintain authority for the selected process by user. This panel is discussed in greater detail below.

Function keys – INN201-01

Powertech Security - Processes

Function Key	Short Description	Description
F3	Exit	Pressing the F3 key returns the menu screen IDT0001- Database Monitor - System Setup and Configuration
F5	Refresh	The F5 key will refresh the INN202-01 screen showing any new applicable information, if any.

Function Key	Short Description	Description
F6	Create	If the F6 key is pressed, an Add New Record panel will be displayed. Use this to add a new program or transaction for access by Database Monitor.
F11	Processes	Use the F11 key to navigate from INN202-01 to INN201-01, Powertech Security - Users.
F12	Cancel	Press F12 to close INN202-01 and return to the menu Database Monitor - System Setup and Configuration IDT0001.

Field level entries – INN201-01

Powertech Security - Users

Field	Description	Valid Entries	Description
Type	Use this field to filter for Transactions (T) or Programs (P).	T or P	Yes
Process	Enter a value to filter for the program. For example entering an 'I' in this field will return a list of programs beginning with the letter 'I'.	Any set of characters up to a maximum of 10.	Yes

Add new record

If a new program is added that will be used by Database Monitor, it must exist be registered within the Database Monitor Security program.

How to get there

From any Database Monitor menu select option **16**. Press **F11**, then press **F6**.

Function keys – INN202-01

Powertech Security - Adding a new Process

Function Key	Short Description	Description
F3	Exit	Press F3 to close the window and return to INN201-01 without accepting any changes entered.If you wish to accept the entries made, when done press Enter.
F12	Cancel	Press F12 to close the window and return to INN202-01 without accepting any changes entered.If you wish to accept the entries made, when done press Enter.

Field level entries – INN201-01

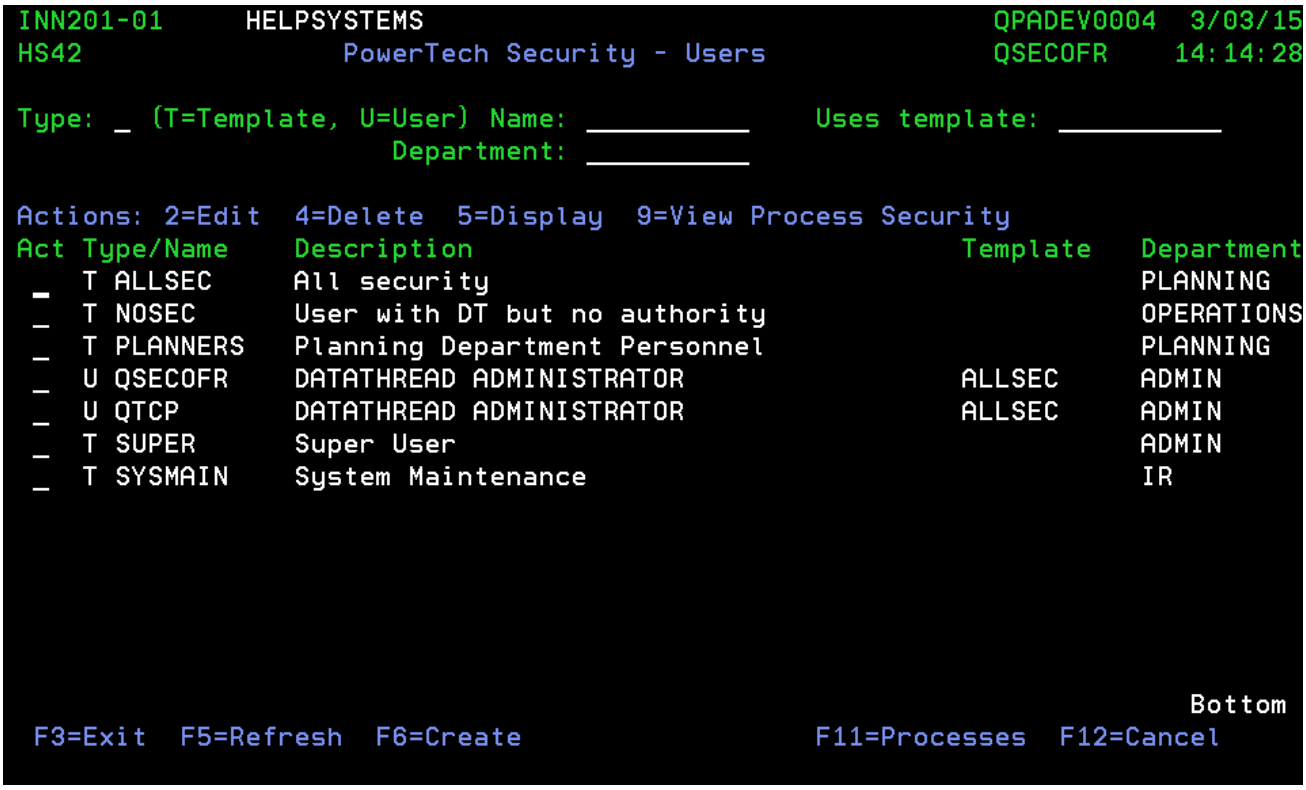
Powertech Security - Adding a new Process

Field	Description	Valid Entries	Description
Record Type	Enter a 'P' if the new item is a program or a 'T' if it is a new transaction.	T or P	Yes

Field	Description	Valid Entries	Description
Process Name	Enter the name of the process. This must be entered exactly and using correct syntax or the process will not be recognized when the call is made.	Up to a 10-character name	Yes
Description	Enter a brief description for the new process that generally describes its function(s).	Up to 30 alphanumeric characters	No (but, recommended)

Powertech Security - Users

Use this screen to grant users access to screens and functions in Database Monitor. See Security - Users.



How to get there

From any Database Monitor menu, choose option **16**.

Action entries – INN201-01

Action Number	Short Description	Description
2	Edit	Placing a 2 in the 'ACT' field beside any 'Type/Name' and pressing enter will display a Change Record window for the selection. Here, you can update the template, description, Department, Time Zone, Email address, and notification methods. You can also copy from security from another user.
4	Delete	Entering a 4 in the 'ACT' field beside any 'Type/Name' and pressing enter will display a 'Deleting this record' window for the selection. By pressing enter, the selected profile will be removed from the list of valid Database Monitor profiles. Should you decide not to remove the record, press F12 to cancel the action and return to INN201-01.
5	Display	Typing a 5 in the 'ACT' field beside any 'Type/Name' and pressing enter will display a 'View Record' window for the selection. Here you can see the detail of the profile setup.
9	View Process Security	Entering a 9 in the 'ACT' field beside any 'Type/Name' and pressing enter will bring up INN203-01. This is the maintenance screen used to set security for the screens and functions within Database Monitor for the selected profile. If the profile is a 'U' with an assigned template, that profile will be based on the template and you may only view the security by selecting the template with which it is associated.

Function keys – INN201-01

Function Key	Short Description	Description
F3	Exit	Pressing the F3 key returns the menu screen IDT0001- Database Monitor - System Setup and Configuration

Function Key	Short Description	Description
F5	Refresh	The F5 key will refresh the screen showing any new applicable information, if any.
F6	Create	If the F6 key is pressed, an Add New Record screen will be displayed. Use this to create a new Database Monitor security profile.
F11	Processes	Use the F11 key to navigate from INN201-01 to INN202-01, Powertech Security - Processes. From here you can maintain Transactions and Processes used within the Database Monitor application.
F12	Cancel	Press F12 to close INN201-01 and return to the menu Database Monitor - System Setup and Configuration IDT0001.

Field level entries – INN201-01

Field	Description	Valid Entries	Description
Type	This field is used to filter the profile type. There are 2 types- T for template and U for user. A valid entry here will result in a list of the requested profile type. Type filter can be used in combination with other filters.	T or U	No
Name	The Name field filters the list by the selection entered. It can be used, for example, to find all profiles beginning with the letter 'A' or you may enter as many characters as needed to obtain the desired list.	Any set of characters up to a maximum of 10.	No

Field	Description	Valid Entries	Description
Uses Template	This field filters the list by the selection entered for valid Templates. It can be used, for example, to find all 'U' profiles using template(s) beginning with the letter 'A' or you may enter as many characters as needed to obtain the desired list.	Any set of characters up to a maximum of 10.	No
Department	This field can filter the list by the selection entered for valid Departments. It can be used, for example, to find all profiles assigned to valid departments beginning with the letter 'P' or you may enter as many characters as needed to obtain the desired list.	Any set of characters up to a maximum of 10.	No

Function keys – INN201-01

Powertech Security - Adding a new User

Function Key	Short Description	Valid Entries
F3	Exit	Pressing the F3 key returns the menu screen IDT0001- Database Monitor - System Setup and Configuration
F12	Cancel	Pressing F12 cancels the add of the user and returns you to the list of current users.

Field level entries – INN201-01

Powertech Security - Adding a new User

Field	Description	Valid Entries	Description
Record Type	Specify if the new profile is assigned to a user or to a template.	T or U	Yes

Field	Description	Valid Entries	Description
User/Name	Enter the userid name assigned to this profile. If the profile belongs to an existing AS/400 user, the same profile must be used here. If the profile is for a template, you may assign any name you wish.	Any set of characters up to a maximum of 10.	Yes
Use Template	If the Record Type is 'U' you may assign the security from an existing template. If the record type is 'T', you must leave this field blank.	Any set of characters up to a maximum of 10.	No
Description	Any description to provide more complete identification detail.	Any set of characters up to a maximum of 30.	No (but, recommended)
Department	If the profile is associated with a department, you may choose to assign the Department name. Database Monitor will send notifications to Departments if the correct setup is performed through Workflow Signatures and Notifications using IDT512-01.Departments must be setup through INN101-01 Code Types Maintenance.	Any valid department name.	No
Time Zone	You may specify the time zone from where the user is working. You may, for example, have the machine and some users working on it under Eastern Standard Time (EDT) and yet others who may be physically located on the West Coast using Pacific Standard Time (PST).	Any valid time zone.	No

Field	Description	Valid Entries	Description
Email Address	The email address that will be used by the system when sending notifications.	Email address	No
Notifications	Specify how notifications will be sent to this profile. Place a Y if desired or N if not for each of the options.	Y or N	Yes
File Group	A file group can be assigned to particular users. Inquiry and reporting programs will not permit this user to see data from files that are not in the associated group. Leave blank if the user can see all file data.	A valid file group	No

Function keys – INN201-01

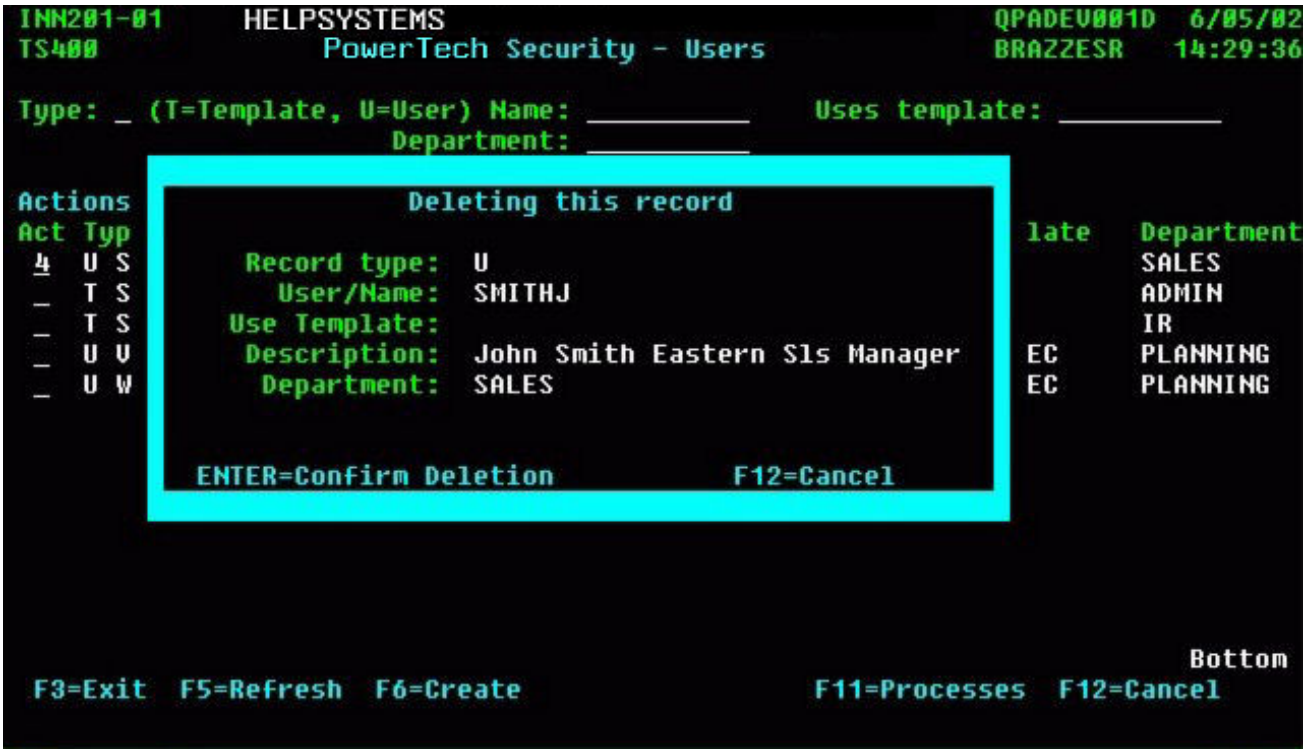
Powertech Security - Editing a User

Function Key	Short Description	Valid Entries
F3	Exit	Pressing the F3 key returns the menu screen IDT0001- Database Monitor - System Setup and Configuration
F12	Cancel	Pressing F12 cancels the edit.

Field Level entries - See table in Adding Users section.

Delete this record

Choose **4** for a record to open this screen. An existing user profile may be deleted from the Database Monitor Security file from the INN201-01 Deleting this record window. Caution: Once deleted, should the record need to be re-added later it must be done as if it were a brand new record. It may not be 'reactivated'.



Function keys – INN201-01

Powertech Security - Deleting a User

Function Key	Short Description	Description
ENTER	Confirm	Confirms the deletion and removes the user from the security files.
F3	Exit	Pressing the F3 key returns the menu screen IDT0001- Database Monitor - System Setup and Configuration
F12	Cancel	Pressing F12 cancels the delete.

See Also

Security - Users Overview

Parameters listing

See Appendix L: Option 12 parameters.

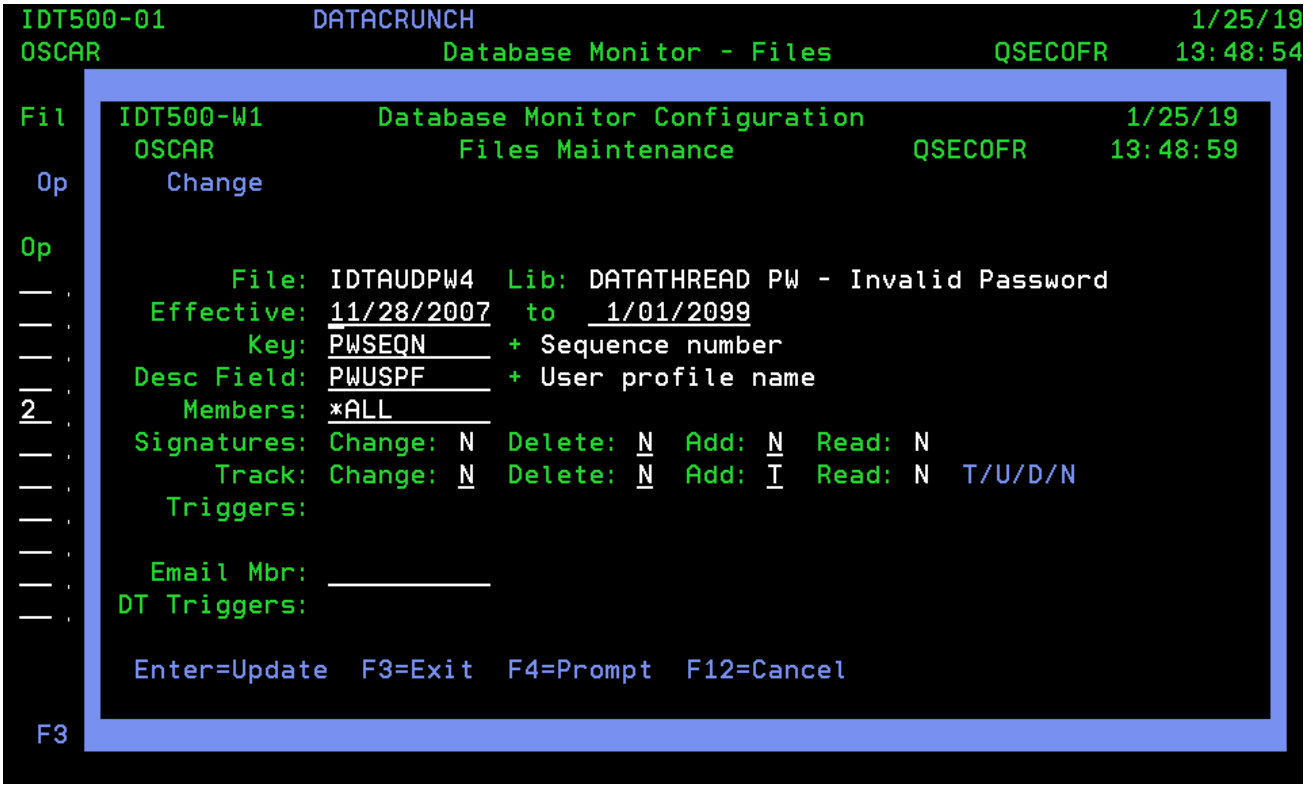
System Audit Journal Monitoring Activate Database Monitor Monitoring

To activate system audit journal processing in Database Monitor, the Administrator will set system value ALSYSJRM (Allow System Journal Manager) to 'Y'. This entry will cause program IDT475 to be activated each time the Database Monitor manager is run. When an entry is written to the system audit journal, IDT475 will pick up that entry and write it to the corresponding IDTAUDxxx file.

To track system audit journal events, activate the IDTAUDxxx file in the Database Monitor library that corresponds to the event you want to monitor. For example, to monitor for invalid passwords, track IDTAUDPW4 (or IDTAUDPW5). Only track adds to those files, never updates or deletes (as updates will never happen and deletes are cleared hourly). The IDTAUDxxx files are installed with Database Monitor so that the system audit journal reader (IDT475) can deposit event entries into them. Entries written to the IDTAUDxxx files cause the Database Monitor trigger to fire, which is how transactions enter the system.

Configurable Audit Logic

The configuration for IDTAUDxxx looks like the following:



System administrators may choose to track certain events and not track others based on the audit type entry kept in the AUENTTYP field. If system administrators wish, they may write their own exit program for an entry type to do event-field specific processing.

Workflow Setup

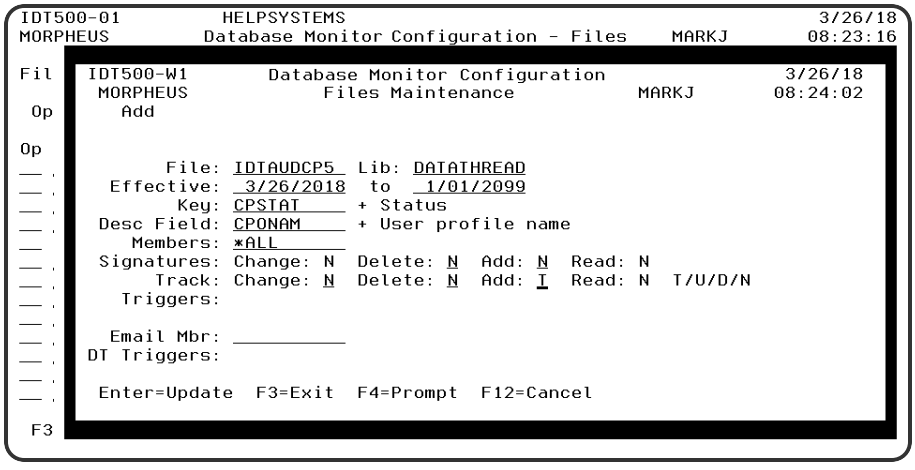
The following example describes how to configure Database Monitor to monitor user profiles in order to identify those whose status has changed from *DISABLED to *ENABLED.

First, create a new file to monitor.

1. From the Database Monitor Master Menu, choose option **11** to open the Database Monitor Configuration - Files panel.
2. Press **F6** to open the Database Monitor Configuration Files Maintenance panel. To monitor for profile changes, use the file IDTAUDCP5.

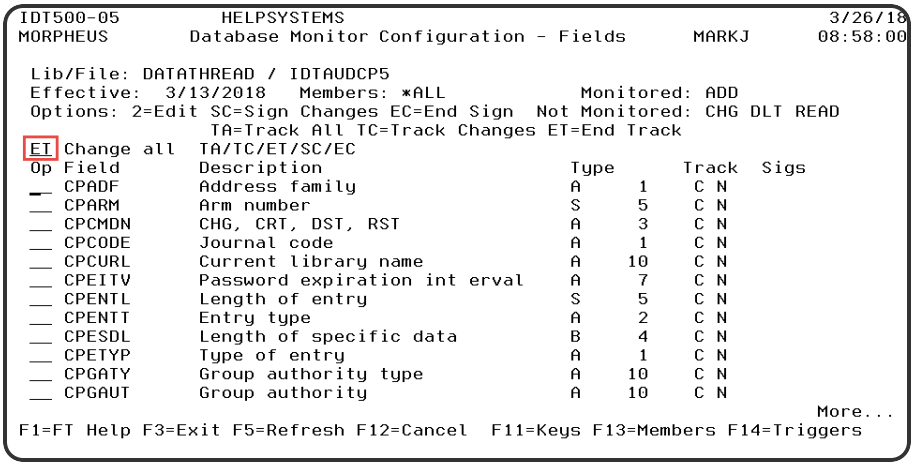
   > **NOTE:** The "CP" in IDTAUD**CP**5 stands for "Change Profile". Refer to the Database Monitor Configuration Files panel to reference the file used to monitor different types of data (e.g. IDTAUD**AF**5 for Authority Failures, IDTAUD**CA**5 for Change of Authority). The files included by default end with "4" (instead of "5") and are used the same way.

3. Make the following changes:
   a. For File, enter 'IDTAUDCP5'.
   b. For Library, enter 'DATATHREAD'.
   c. For Key, prompt by pressing **F4** and select CPSTAT. This is the field that shows the status of *ENABLED or *DISABLED for the user profile status.
   d. For Desc Field, prompt by pressing **F4** and select CPONAM. This is the name of the profile.
   e. Edit tracking for this monitored file. When you use the IDTAUDXXX files to monitor changes, the only Tracking required is 'Add'. Set Add to 'T' and Change, Delete, and Read to 'N'.



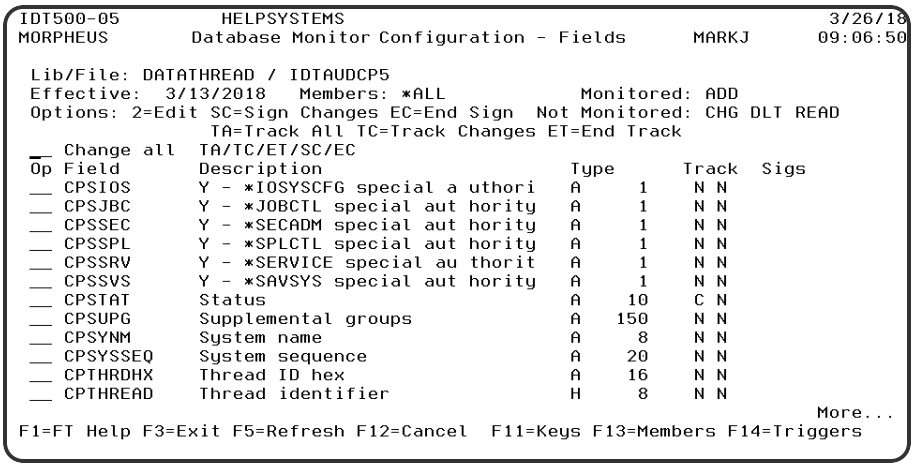
Next, configure monitoring for this file. For this example, we only want to be notified of the change itself and the name of the profile. To specify that only those fields of the report should be visible, do the following:

1. Press **F12** to return to the previous screen.
2. For IDTAUDCP5, enter '15' and press Enter. Under Track, notice all of the fields are set to 'C' (left column). This means every field is set to Track which is the default setting.
3. Enter 'ET' for Change All and press Enter.



The Track column indicates all fields are set to not track (N). Next, enable tracking on the CPSTAT and CPONAM fields.

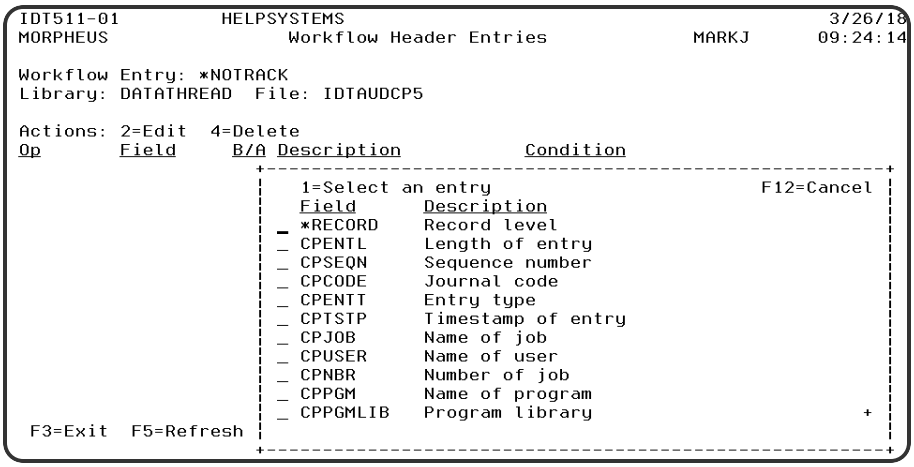
4. Page down and enter 'TC' for the CPSTAT and CPONAM fields. You should see a 'C' for these fields under the Track column.



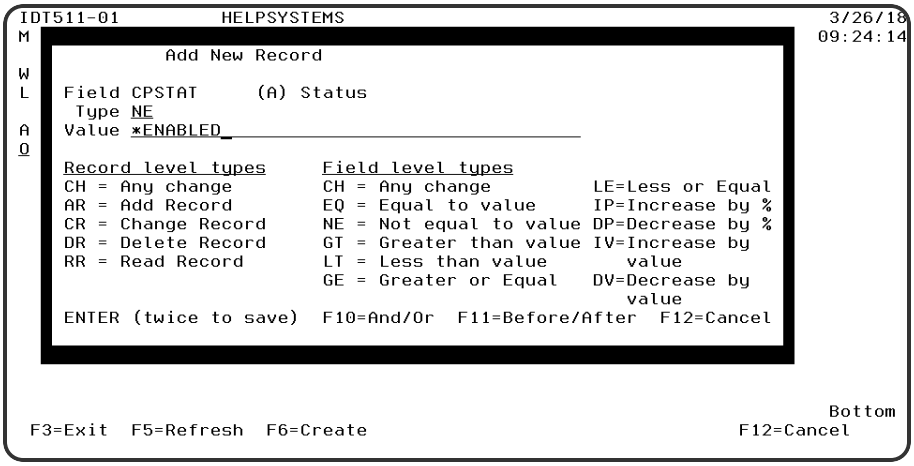
5. Press Enter to return to the Configuration - Files panel.

Next, configure a 'Workflow' that includes a *NOTRACK filter that only tracks changes to the CPSTAT field and sends a notification by email when this field is changed.

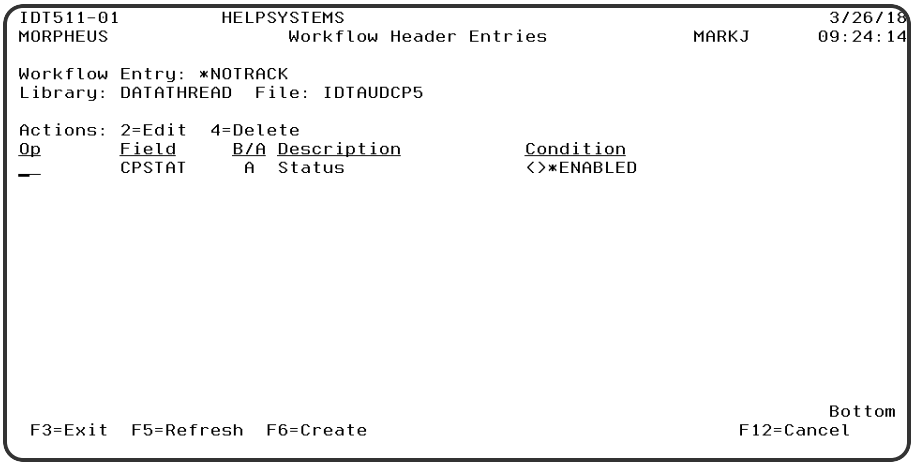
1. Choose option '20' for IDTAUDCP5. The Workflow Header Entries panel appears.
2. Press **F6** to create a new workflow entry.
3. In the Add New Record panel, for Description, enter (in all caps) *NOTRACK, and press Enter. You return to the previous screen with the *NOTRACK entry added.
4. Enter '10' next to the new *NOTRACK entry and press Enter.
5. Press **F6** to create a criteria. The following information is displayed:



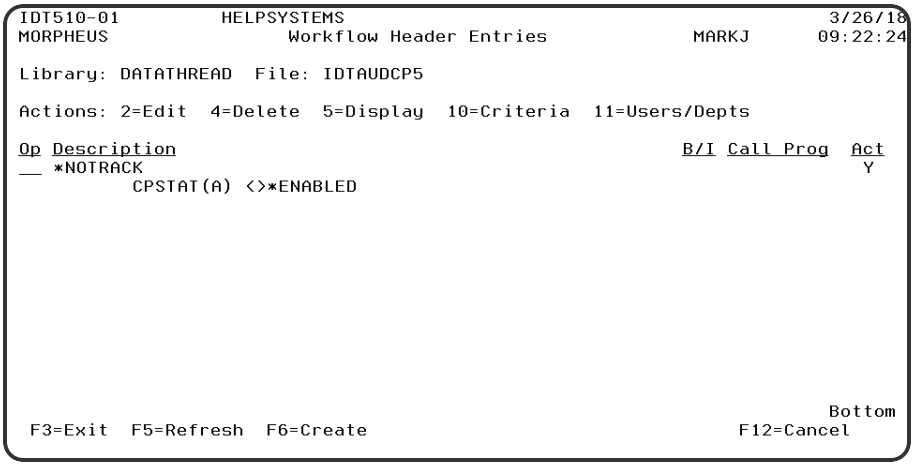
6. Scroll down and enter a '1' next to CPSTAT.
7. Press Enter. The Add New Record screen appears.
8. For Type, enter 'NE' and press Enter to display the Value field.
9. For Value, enter '*ENABLED'.



10. Press Enter twice. Your screen should look like this:

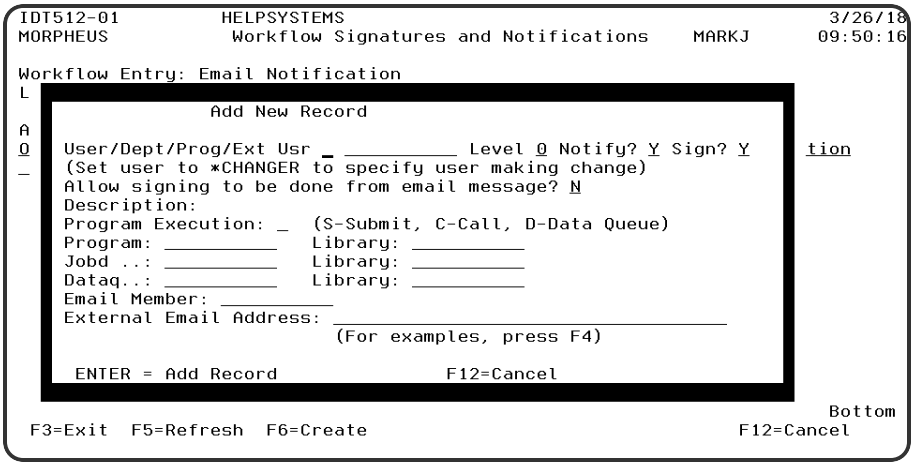


11. Press Enter again to return to the Workflow Header Entries panel.

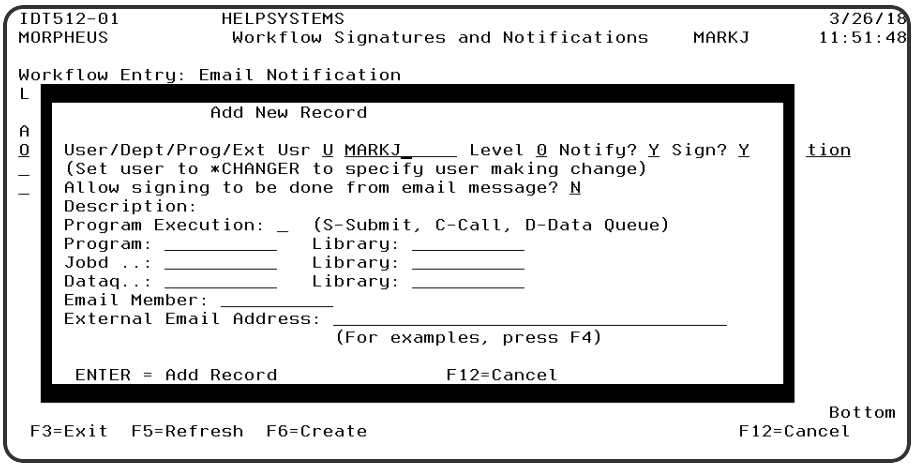


Next, configure this workflow to send a notification when a change does occur.

1. From the above screen, press **F6**. The Add New Record panel appears.
2. In the Description field, type 'Email Notification' and press Enter. You return to the Workflow Header Entries panel with the Email Notification record added.
3. Enter '11' for the new Email Notification record. The Workflow Signatures and Notifications panel appears.
4. Press **F6**. The following screen appears.



5. Put a ‘U’ next to Usr and type the IBM i profile name of the person you want to send a notification to:



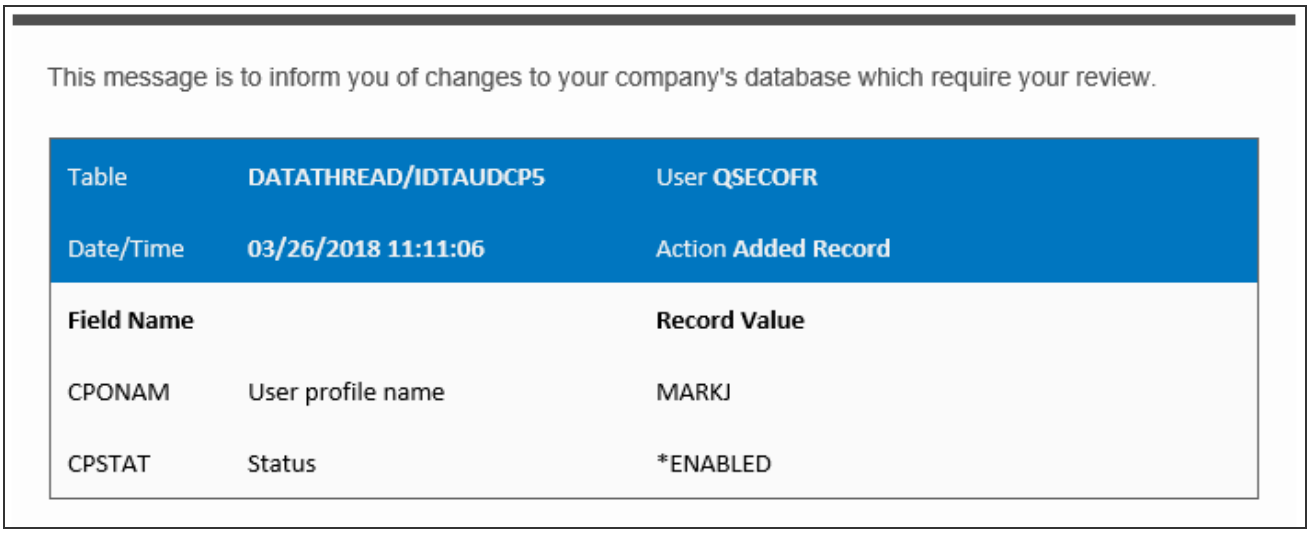
6. Press Enter twice to return to the Workflow Header Entries panel.

> **NOTE:** Please make sure the profile you are sending the notification to has a valid email address under their name in Option 16 from the Database Monitor Main Menu.

Finally, 'Activate' monitoring for that file in Option 11. From the panel above, press Enter to return to the Database Monitor Configuration panel.

1. Enter '22' for IDTAUCP5 and press Enter.
2. Press Enter again to confirm. The file will turn white, indicating it has been activated.

In this example, we have created a *NOTRACK workflow, monitoring only the CPSTAT field (which holds the current status of *ENABLED or *DISABLED) of that IDTAUDCP5 file. Database Monitor will only track the status of this field when changed from *DISABLED to *ENABLED. If the change is detected, an email is sent showing the change and the profile that was changed.



This message is to inform you of changes to your company's database which require your review.

Table	**DATATHREAD/IDTAUDCP5**	User **QSECOFR**
Date/Time	**03/26/2018 11:11:06**	Action **Added Record**
Field Name		**Record Value**
CPONAM	User profile name	MARKJ
CPSTAT	Status	*ENABLED

Processing Efficiency

Database Monitor will keep track of the journal sequence number for the system audit journal in the same way that it keeps track of user journal sequence numbers. The IDTJRN file will be constantly updated with the last journal sequence processed. In the event that processing on the system audit journal is suspended, this will allow Database Monitor to pick back up where it left off when processing is restarted.

Additional enhancement for Database Monitor V3R1M1

With Database Monitor V2R1 the variable content of audit data kept in field **AUEVTDTA** will not be automatically broken down into individual fields. The data can be seen in inquiries or if needed exit programs can be executed to electronically access the data.

In the V3R1 release of Database Monitor, we allow for user defined file formats. This new functionality allows for the handling of multi-format physical files. Within Database Monitor, IDTAUD is considered to be a multi-format physical file. The formats file in Database Monitor will contain a format record for each of the 72 different types of system events that can be audited. (A list of formats for the AUEVTDTA block for each of the 72 types of system events can be found in IBM Document SC41-5302-05, the iSeries Security Reference, in Appendix F.) Since Database Monitor will determine which format to use based on the value of the Entry Type field, this will allow Database Monitor to break down the AUEVTDTA block into the correct fields for each event type. Doing this allows system administrators to configure workflows using fields which are unique to each event type.

System audit journal event types

Entry Type	Description
AD	Auditing Changes
AF	Authority Failure
AP	Obtaining Adopted Authority
CA	Authority Changes
CD	Command String Audit
CO	Create Object
CP	User Profile Changed, Created or Restored
CQ	Change of *CRQD Object

Entry Type	Description
CU	Cluster Operations
CV	Connection Verification
CY	Cryptographic Configuration
DI	Directory Services
DO	Delete Object
DS	DST Security Password Reset
EV	System Environment Variables
GR	Generic Record
GS	Socket Description was given to another job
IP	Interprocess Communication
IR	IP Rules Action
IS	Internet Security Management
JD	Change to User Parameter of a Job Description
JS	Actions that Affect Jobs
KF	Key Ring File
LD	Link, Unlink or look up directory entry
ML	Office Services Mail Actions
NA	Network Attribute Changed
ND	APPN Directory Search Filter Violation
NE	APPN End Point Filter Violation
OM	Object Move or Rename
OR	Object Restore
OW	Object Ownership Changed
O1	(Optical Access) Single File or Directory
O2	(Optical Access) Dual File or Directory
O3	(Optical Access) Volume
PA	Program Changed to Adopt Authority
PG	Change of an Object's Primary Group

Entry Type	Description
PO	Printed Output
PS	Profile Swap
PW	Invalid Password
RA	Authority Changed during Restore
RJ	Restoring Job Description with User Profile Specified
RO	Change of Object Owner during Restore
RP	Restoring Adopted Authority Program
RQ	Restoring a *CRQD Object
RU	Restoring User Profile Authority
RZ	Changing a Primary Group during Restore
SD	Changes to System Distribution Directory
SE	Subsystem Routing Entry Changed
SF	Actions to Spooled Files
SG	Asychronous Signals
SK	Secure Sockets Connections
SM	System Management Changes
SO	Server Security User Information Actions
ST	Use of Service Tools
SV	System Value Changed
VA	Changing an Access Control List
VC	Starting or Ending a Connection
VF	Closing Server Files
VL	Account Limit Exceeded
VN	Logging on and off the network
VO	Validation List Actions
VP	Network Password Error
VR	Network Resource Access
VS	Starting or Ending a Server Session

Entry Type	Description
VU	Changing a Network Profile
VV	Changing Service Status
X0	Network Authentication
YC DLO	Object Accessed (Change)
YR DLO	Object Accessed (Read)
ZC	Object Accessed (Change)
ZM SOM	Method Access
ZR	Object Accessed (Read)

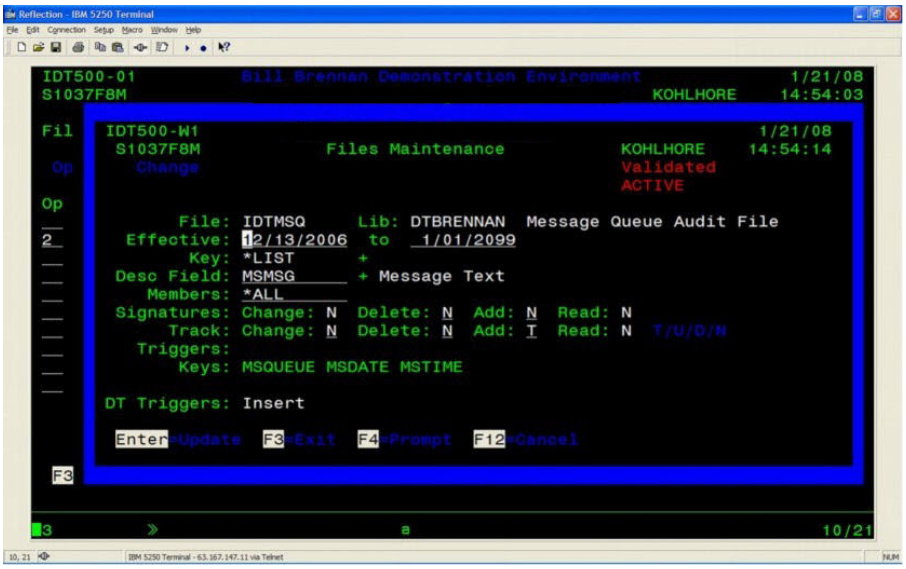
Using message queue monitoring

To activate system Message Queue processing in Database Monitor, the Administrator will set system value ALMQREAD (Allow Message Queue Reader) to 'Y'. This entry will cause program IDT476 to be activated each time the Database Monitor manager is run. When a message is sent to a monitored message queue, IDT476 will pick up that entry and write it to the IDTMSQ file.

Database Monitor, by virtue of monitoring IDTMSQ, will pick up the addition of the record. Database Monitor will then write the audit record to the Database Monitor Audit files and execute any workflows configured for that record type.

Configurable audit logic

The configuration for IDTMSQ will look like the following:

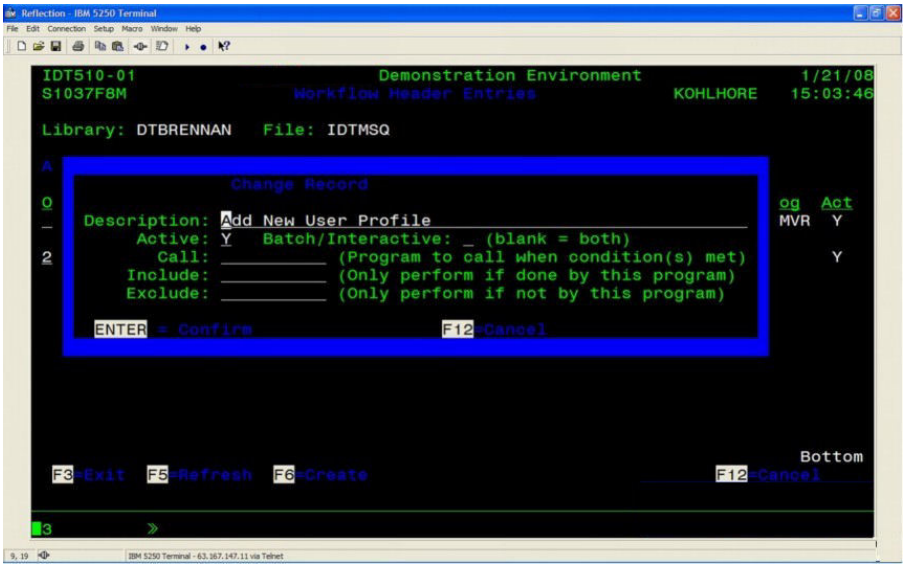


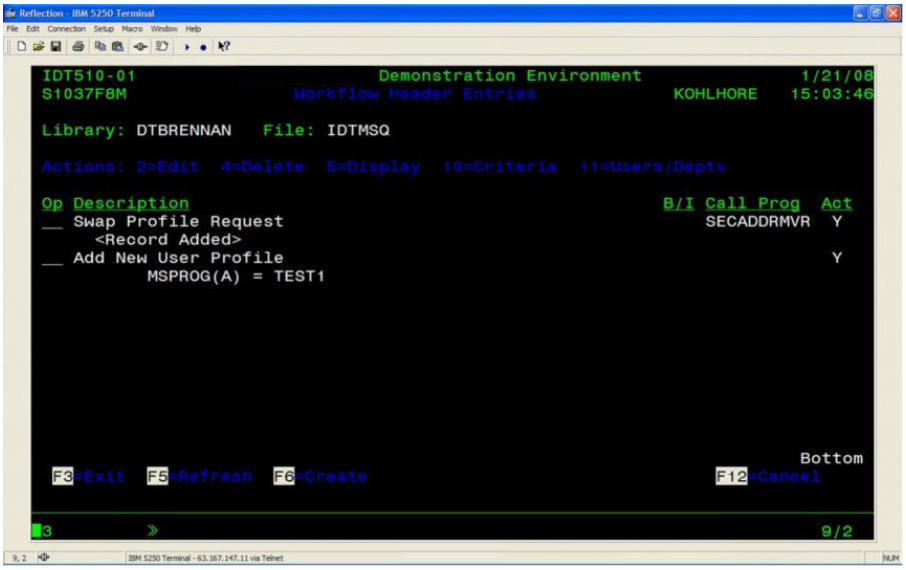
System administrators may choose to track certain events and not track others based on the entries within the severity, message type, User, Program, and/or Message description.

Workflow setup

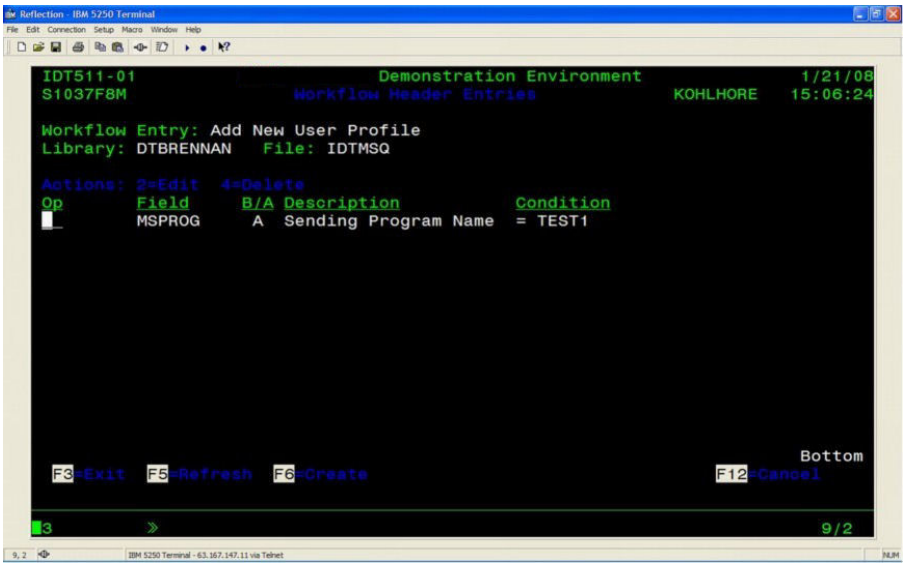
An example of a workflow setup would be when a user profile is changed, we wish to send an email to the system administrator. Our workflow would be set up as follows:

First, we define our workflow:

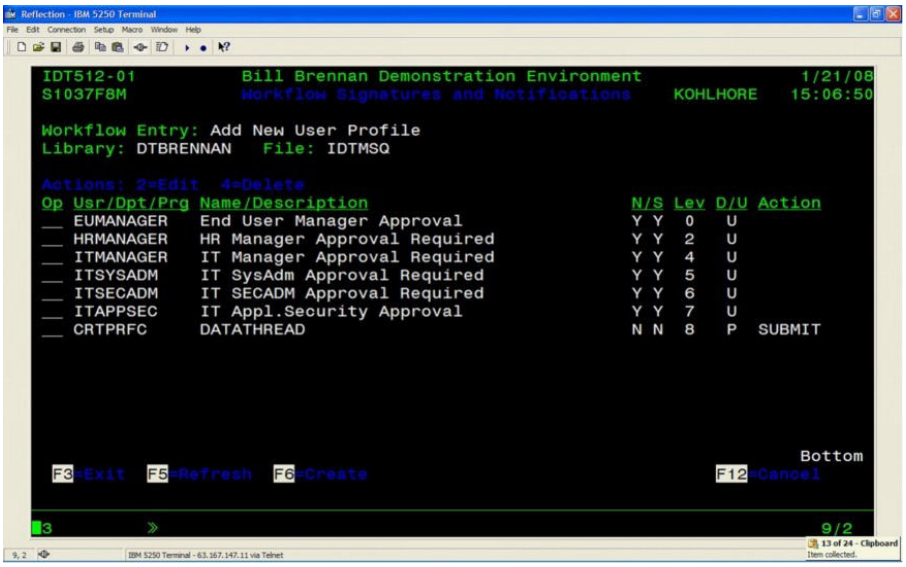




Now that we have added our workflow, we must define the criteria to be used.



Now, we will define the action to take when the workflow fires:



At this point, we have set up a workflow that will monitor for any addition of a user to the system using program TEST1

- Several people can be notified, all at once or in sequence
- Appropriate personnel can respond to the iSeries directly from the email, using Database Monitor's innovative socket connectivity
- Based on reason codes and responses to the notification, Database Monitor can execute appropriate programs to instantly create the profile, inactivate the profile, or any action deemed necessary

Custom email
Custom email member processing

Database Monitor allows for the creation of custom email templates for each file, as well as overriding custom email templates for each workflow and each user with in the workflow. Database Monitor also allows for the generation of emails with custom reason codes, as well as allowing for a more custom method of including field-level data within the email template.

To create a custom E-Mail template Both IDTHTM and IDTPLA allow multiple members. This allows the creation of multiple email templates within each file. Each new template will need to be created in IDTHTM and IDTPLA using the same member name in each file. In other words, there needs to be an HTML and a plain-text version of each new template. If a custom template has been created for the HTML email, but not for the plain-text email, Database Monitor will revert to the default template when attempting to send an email for a user set up to receive plain-text emails.

Creation of the custom email template

Template Structure

Database Monitor email templates have a structure that should be understood. The template is modular, enabling you to place sections of the email in any order you wish.

The Database Monitor email template will always start with header information. The header section contains the basic HTML beginnings, such as the <HTML> and <HEAD></HEAD> tags.

Following the header section, you may place any of the following sections in any order:

Body – This is the body section of the email.
AllFields – This section will loop through all tracked fields and output them.
Footer – This is a footer section.
PriorSigs – This section will look back to the signature history for the transaction and output the prior signatures for this transaction. This way, you can let the recipient see what the prior signatures for this transaction were.

You may also use any of these sections more than once in a single template. The only section that has an ending tag is the PriorSigs section. All other sections are ended by the beginning of a new section.

To specify a new section, you will insert a tag into the HTML. Tags for each section are:

Body: <A NAME=”&Body”></A>
AllFields: <A NAME=”&AllFields”></A>
Footer: <A NAME=”&Footer”></A>
PriorSigs: <A NAME=”&PriorSigs”></A>
Closing PriorSigs Section: <A NAME=”&EndPriorSigs”></A>

Again, PriorSigs is the only section that requires a closing tag. This is because the entire section must be loaded into memory and processed repeatedly for each signature.

For sample sections, see the example template at the end of this document.

REPLACEMENT VALUES

Note: All of the replacement values are case-sensitive. For instance, FIELDDATA and FieldData are not the same. If you use FieldData instead of FIELDDATA when trying to specifically place a field's value, the replacement will not take place.

Specifying Reason Code List to Use

We allow for the specifying of the reason code list to use from within the HTML. To insert a reason code list, you must have started a selection box. The one Option for the select box will have a value of “&reason”.

Example:

```
<select name="reason" size="1">
  <option value="&reason">APP</option>
</select>
```

In the above example, the <option></option> tags will be repeated for each entry in the CHGREASON code table entry. CHGREASON is the default reason code list. You may add new codes to this list or remove codes you do not need.

You may specify a custom reason code list using very similar syntax. To insert a custom reason code list, you will use the syntax “&reasons/RSNCDELIST”, where RSNCDELIST is the name of the code table where your custom reason codes are configured.

Example:

```
<select name="reason" size="1">
  <option value="&reasons/PMRSN">APP</option>
</select>
```

In the above example, Database Monitor will repeat the <option></option> tags, replacing the values with the individual codes found in the PMRSN code table entry.

Specifically Placing Field Values

There may be cases where the user may want to create a template that will allow for the specific placing of field data at certain places in the email. For instance:

> Dear ***Frank***,
>
> Our records show that your credit limit has been increased from ***$10,000*** to ***$20,000***.
>
> Regards,
>
> ABC Inc. Accounting Department

Database Monitor allows for placement of data using the following syntax:

```
@@FIELDDATA:FLDNAME[B](1:10):J@@
```

The keyword @@FIELDDATA will denote that we are placing field data at this location. The trailing @@ denotes the end of the replacement value.

The keyword FLDNAME specifies the field name to look to for data. If the field name is followed by [B] DataThead will use the before image of the field. If the field name is followed by [A] or no square brackets, Database Monitor will use the after image. The specifications in parentheses allows for substringing of the field data, in this instance, start at position 1 for 10 characters. The final keyword allows us to specify a formatting variable. If FLDNAME were a numeric field, it would be formatted with the J format type.

Using this syntax, the template for the above email would look like this:

> Dear @@FIELDDATA:CSNAME@@ ,
>
> Our records show that your credit limit has been increased from @@FIELDDATA:CSCRLMT[B]:J@@ to @@FIELDDATA:CSCRLMT[A]:J@@ .
>
> Regards,
>
> ABC Inc. Accounting Department

Conditional Inclusion of Field

There may be cases where you may want to tailor the content based on the value of a field or fields. To facilitate this, Database Monitor allows for conditional expressions (IF statement blocks) in the HTML template.

Syntax for the IF statements is:

```
&IF:FLDNAME:B=VALUE
```

Where:

> FLDNAME = Field Name
> B = B or A, Before or After
> VALUE = Comparison Value

The end of the IF block is denoted by:

> &ENDIF

If the value requested for the field denoted by FLDNAME is equal to the value defined by VALUE, everything between the &IF and &ENDIF statements will be included. If the values do not match, nothing between the &IF and &ENDIF statements will be included.

Nested IF statements are not supported.

DISPLAYING PRIOR SIGNATURES

There may be cases where the addressee needs knowledge of prior signatures on the transaction. Database Monitor allows for inclusion of the prior signatures as follows:

```
<Table>
  <TR>
    <TD>Sig User</TD>
    <TD>Sig Reason</TD>
```

```
    <TD>Sig Comment</TD>
    <TD>Sig Date</TD>
    <TD>Sig Time</TD>
  </TR>
  &PRIORSIGS
  <TR>
    <TD>&SIGUSR</TD>
    <TD>&SIGRSN</TD>
    <TD>&SIGCMNT</TD>
    <TD>&SIGDT</TD>
    <TD>&SIGTIM</TD>
  </TR>
  &ENDPRIORSIGS
  </Table>
```

A block of template code will be defined between the tags &PRIORSIGS and &ENDPRIORSIGS that will be repeated for each signature. In the example above, a table is created, headings are written, then the detail rows are generated for each of the prior signatures. The replacement variables needed to output a prior signature are:

&SIGUSR - The user that signed
&SIGRSN - The reason that the user gave
&SIGCMNT - The comment that the user left
&SIGDT - The date the user signed
&SIGTIM - The time the user signed

All of the above replacement variables are voluntary, and they may be placed between the PriorSigs tags in whatever order you wish.

Calling a Program to Insert Data

You may wish to call a program to find some data to insert into the template. Database Monitor allows for this by using the &CallPgm tag. The requirements are:

The program must reside in the DATATHREAD library.

The program must accept two parameters:

Transaction ID (15,0 packed)

Return Data (1024 character)

The data in the Return Data field will be inserted into the email.

Example:

```
&CallPgm:MYPGM
```

The called program can return any value up to 1024 characters and that data will be inserted into the email.

Inserting File Name

You may insert the name of the file associated with the change using the following syntax:

```
&TableName
```

Inserting &TableName anywhere in the template will cause Database Monitor to insert the name of the file in that location.

Inserting User Name

You may insert the name of the user who made the change using the following syntax:

```
&User
```

Inserting &User anywhere in the template will cause Database Monitor to insert the name of the user in that location.

Inserting Date and Time

You may insert the date and time of the change using the following syntax:

```
&DateTime
```

Inserting &DateTime anywhere in the template will cause Database Monitor to insert the date and time of the change in that location.

Inserting Change Action

You may insert the change action (Add, Change, Update, Delete) using the following syntax:

```
&Action
```

Inserting &Action anywhere in the template will cause Database Monitor to insert the change action that location.

Examples

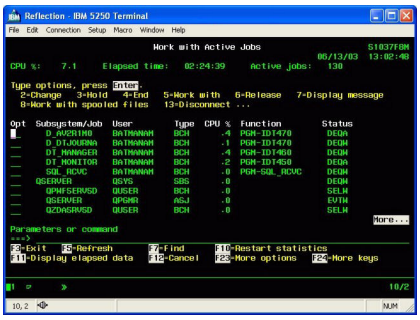
HTML Examples can be found in DATATHREAD/HTMSRC

Appendix
Appendix A: Job control and system performance

Out of the box, Database Monitor can handle most production environments without too much tweaking. As more functions are transferred to Database Monitor and complexity of requirements increase, several advanced features can be activated to handle the workload and improve throughput.

This appendix is dedicated to functionality which is available for more granular control of Database Monitor.

The screen below represents some of the jobs which may run to support Database Monitor.



Two jobs starting with "D_" are indicators that Database Monitor is monitoring two separate journals. Each monitored journal will have its own job. Several files may be attached to a single journal.

DT_MANAGER is the main "Traffic Cop" for Database Monitor. At all times, only one of these jobs should run for each instance of Database Monitor. Since each monitoring job (triggers) makes sure that the manager is running, there may be occasions that more than one manager is seen as running. The second and subsequent instances will simply end, however, when they realize the first instance is already running.

DT_MONITOR is the process which has all the necessary intelligence to process a change, and perform configured activity. Based on entries in the system parameters, one or more monitor jobs may execute at the same time.

There may be other jobs that support the email approval functionality. These jobs are DT_WIM_ SCK and

DT_WIM_490. See here for more information.

Startup

The Manager is the program which starts and ends all activity. It is the program which is submitted by the initialization of all trigger programs. Since only one instance of the Manager runs, the other submissions end immediately. It is often a good idea to kick off the Manager upon start of a day or after nightly saves have been completed. This job can be scheduled and assuming that the library of Database Monitor is called DATATHREAD the Manager can be initiated by the following command

CALL DATATHREAD/STR460

Upon startup, the Manager will check the Database Monitor setup for integrity. Files that may have been locked when they were set up for monitoring will probably be free and triggers can be activated. The Manager will then activate all the other jobs.

Shut down

It's important that the Database Monitor jobs be ended using the normal means within the software. Doing an ENDJOB command is not recommended, as the current transaction being processed could be incomplete.

CALL DATATHREAD/END460

This command will notify Database Monitor that it must shut down. First all of the secondary jobs will be ended and finally the Manager itself will close down. It is important to note that the Monitor may be in the midst of processing changed records when a shut down is requested. The remaining and unprocessed entries will be handled as soon as the Monitor is brought back up. No data is lost, however, when the Monitor is ended this way.

Keep in mind that any activity on a file being tracked by Database Monitor will cause the Manager to start up. So, it is quite possible that the END460 is executed and within seconds the Manager is back up. To avoid this, Database Monitor can be given its own job queue and the queue should be held for the duration of saves.

Subsystems and job queues

If you have not already done so, it is recommended that Database Monitor be given its own specific job queue. For our examples we will use JOBQ QUSRSYS/DATATHREAD. This job queue should allow at least 10 active jobs. The queue can be attached to an existing subsystem, or a specific subsystem can be created for Database Monitor. In either case, you should take into account the possibility that, including workflow jobs, 10 or so Database Monitor jobs can be running at one time.

If you do create a Database Monitor subsystem, it is critical that it be started as part of the system startup.

Sample job control for saves

HLDJOBQ DATATHREAD

CALL DATATHREAD/END460

SAVES

CALL DATATHREAD/STR460.

RLSJOBQ DATATHREAD

When ending Database Monitor is not enough

As we have discussed, even when the Manager is down, files being monitored by Database Monitor triggers will continue to capture changes and deposit them into the Database Monitor queues. Through the use of several data queues and an overflow file, Database Monitor ensures that data is not lost. On occasion it may make sense to suspend monitoring of a file. Certainly this can be done through the user interface, however, two methods exist to perform the task as part of a batch process.

Turn off monitoring for a single file

Program IDT550 is used to turn on and off monitoring of a single file. The following are the parameters used for the call:

`Library`
Library name
`File`
File name
`Action`
D = Deactivate, A=Activate
`Leave On`
Y = For OS/400 4.5 and before, Leave secondary called triggers on the file
`Error`
E = Error, D = Deactivated, A = Activated
This function actually removes all monitoring and changes the active flag on Database Monitor configuration to "N".

The process for affecting monitoring of a file from within a batch job would be

ALLOCATE THE FILE EXCLUSIVELY

MONITOR FOR A GOOD ALLOCATION

CALL IDT550 PARM('DATATHREAD' 'TSTLOT' 'D' 'N' '')

MONITOR FOR 'E' IN THE ERROR CODE

DO YOUR PROCESSING

ALLOCATE THE FILE EXCLUSIVELY

MONITOR FOR A GOOD ALLOCATION

CALL IDT550 PARM('DATATHREAD' 'TSTLOT' 'A' 'N')

MONITOR FOR 'E' IN THE ERROR CODE

Turn off monitoring for all files

There are times when it is necessary to turn off monitoring over all files in a library, or even all files being tracked by Database Monitor. Program IDT465 is used for this purpose. The following are the parameters used for the call:

`On Off`
1 = On, 0 = Off
`Library`
Library name, *ALL
`Return Code`
1 = Error Encountered some or all files could not be allocated

The process for affecting monitoring of a file from within a batch job would be

CALL IDT465 PARM('0' 'LIBNAME' ' ')

MONITOR FOR '1' IN THE RETURN CODE

DO YOUR PROCESSING

CALL IDT465 PARM('1' 'LIBNAME' ' ')

MONITOR FOR '1' IN THE RETURN CODE

Unlike the single file activation and deactivation by IDT550, the mass on off function updates the activation flag of the Database Monitor configuration to 'H' (hold). It is possible to run the activation/deactivation multiple times until all files have been changed. Perhaps a loop with a delay could be used to catch all files that could not be allocated the first time through.

System performance - overview

There are many variables that affect the performance of Database Monitor. First and foremost is the workload already being handled by the AS/400. If the resources of the system are already constrained, the impact from implementation of Database Monitor may be more noticeable. However, on a properly sized system, the impact should be negligible.

Beyond the basic configuration with which Database Monitor ships, there are several advanced features which can be utilized to improve throughput and performance. To understand these, let us first review areas of activity. Database Monitor functionality can be categorized into three areas:

- Database monitoring and change awareness
- Background processor and Standard WorkFlow
- Custom WorkFlow Processing

Database monitoring and change awareness

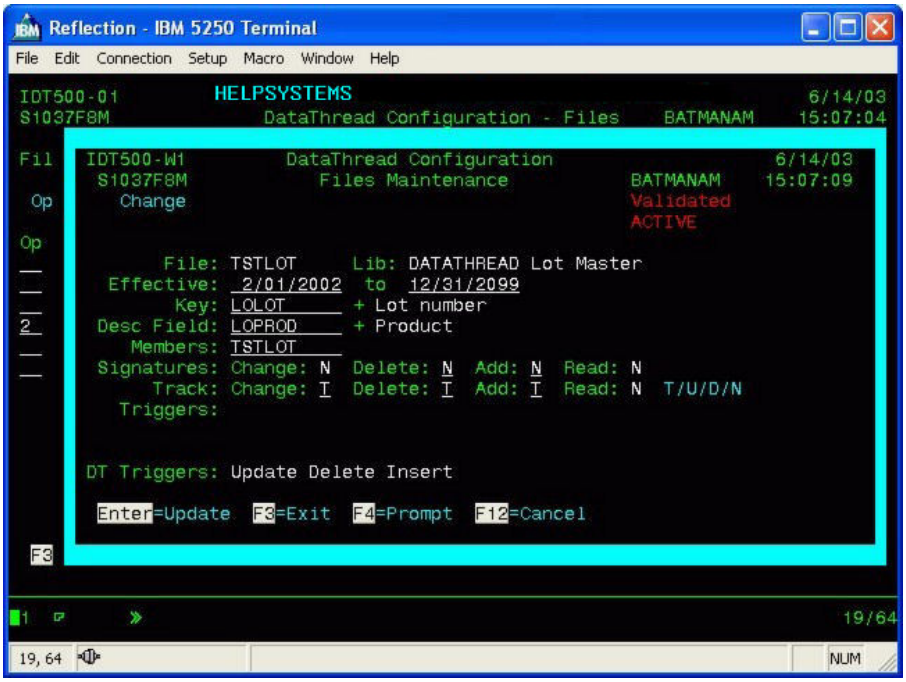
Database Monitor uses two possible techniques to monitor database activity.

- Triggers
- Journals

Triggers

Triggers are inline programs called by the IBM database manager. Each time a record is inserted, changed or deleted the trigger program can be initiated. The program will capture the before and after image of the record and pass the information to the Database Monitor Monitor which is running in batch. There are several features of Database Monitor which can be activated to reduce the impact of trigger processing:

Capture only the event you need



As you can see from the image above, Database Monitor allows for activation of monitoring at the individual event level. If for example, your business process requires you to monitor whenever a record is added, but not when it is changed or deleted, then only activate the add trigger. For regulatory audit purposes, this may not be an option, but for workflow, it may.

Do you really need the program name?

One of the most time expensive actions performed by the trigger program is to identify the name of the program causing the change. Time taken for each database action can be reduced by over 20% if the name of the program is not retrieved. The function is controlled by the JOB-PROG entry on the Powertech Code Types Maintenance panel. If a job has an entry in this table, the trigger functions will simply accept the associated program name without checking. This is most useful for batch jobs with predictable programs.

I do not want to track all the updates from the costing run

There are those jobs, and we all have dealt with them, which perform an immense number of updates to insignificant (from an auditing point of view) fields. For example a costing run from one of the popular ERP systems starts by updating a costing flag in every item master record. It then updates the cost field for some records. Finally it releases every record. These events may have no significance from an auditing or even a workflow point of view. However, since the item master is being monitored for other fields, hundreds of thousands of records will be processed by the trigger program and passed to the monitor, only to be discarded. The system code 400JOBEXCL

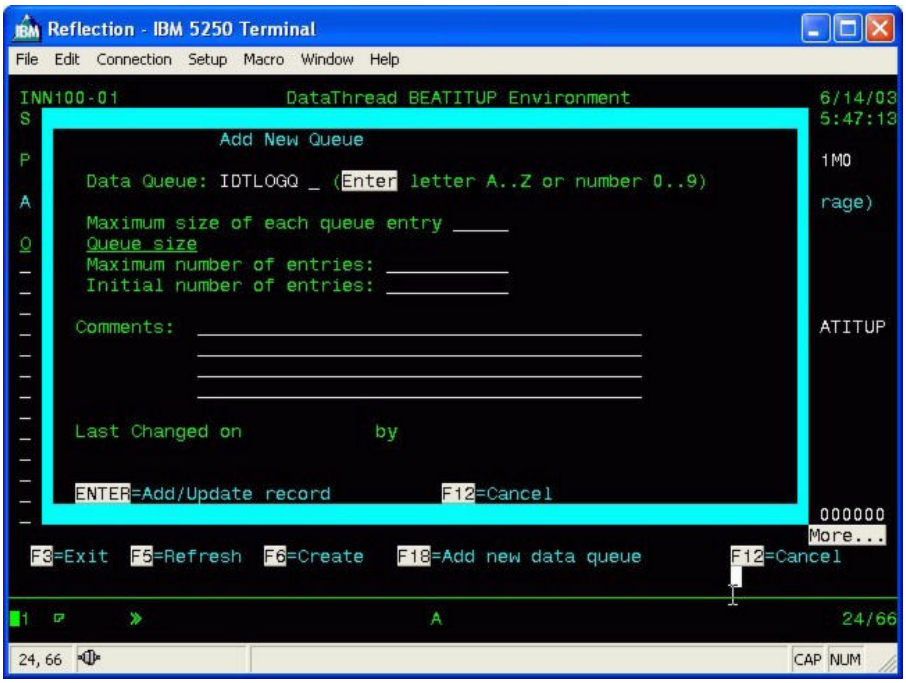
on the Powertech Code Types Maintenance panel allows Database Monitor configurators to exclude jobs from monitoring. The trigger program will still fire, but will immediately return without submitting the data to the data queue.

It is important to note the Database Monitor triggers will become aware of new entries in this table within one minute of the entry. If a job is being significantly affected, an entry can be made while the job is active.

Do you have the right data queues defined?

Database Monitor uses a cascading algorithm to write trigger information to the data queues. If one data queue is filled before the Monitor can start processing the entries, second and subsequent queues are utilized. If all the queues get filled, the data is written to a database file called IDTOVR.

Database Monitor ships with several data queues pre-defined. If you notice data spilling over into IDTOVR, you should create additional data queues. This is done from the system parameter screen, Option 12.



The maximum size of the data queue entry is the combined length of the before and after image of the widest file being monitored, plus two to three hundred characters. If you perform a DSPFD on the TSTLOT file you will see a total record length of 34. The before and after image will take up 68 characters. Adding, say, 300 bytes to this, we see that a data queue with a maximum length of 368 would be able to handle entries for this file.

If most of the files being monitored require a data queue under 1000 characters wide, but one file is much wider and gets a few changes here and there, we would recommend making most of the data queues 1000 characters. You could then define one queue to fit the much larger file. Database Monitor will determine the size appropriateness of a queue before attempting to post to it.

The maximum number of entries defaults to *MAX16MB; for V5R1 and beyond *MAX2GB is the recommended entry.

Journals

If your environment is already using journaling for application integrity or high availability, the decision between using journaling or triggers within Database Monitor is simple. All the information needed by Database Monitor is already being captured.

Database Monitor does not need the file open/close history, but having both the before and after images captured is highly desirable. We can manage with just the after image, but some workflow functionality will be lost.

Since the journaling is entirely handled by the database manager, there is little additional efficiency that can be garnered at the data capture component.

Background processor and Standard WorkFlow

Whether triggers or journals are used for capturing database changes, each change is sent to a series of data queues for asynchronous processing by the Monitor. Standard Database Monitor configuration will activate one DT_MONITOR job as the background processors are brought online.

This job is responsible for:

- Receiving transactions from the data queues
- Determining if the change is significant
- Capturing audit data
- Sending out notifications
- Performing work flows

Because the data queues have a finite amount of space and we want to avoid spilling over into the IDTOVR file, the Monitor program concentrates on receiving the data queue entries.

During times of very heavy transaction processing, it is conceivable that the Monitor will be constantly draining the data queue and not get to the next set of tasks. It will certainly process those tasks once database updates subside.

To better manage these bottle neck times, Database Monitor can be configured to run multiple instances of the Monitor. The system parameter variable MAX-450 in option 12 controls this function. The second and subsequent Monitors will simply process steps 2 and beyond.

Each call to the program STRMON will start a single instance of the Monitor.

The program ENDMON will end one instance of the Monitor. This program can also be called with a parameter of ALL or a number. ALL will end all instances of the monitor. Or if for example it is called with '2' as the parameter it will end two instances.

Procedurally, jobs can be scheduled to handle I/O intensive time periods. For example if a distribution wave is being run, the following sequence might be useful:

CALL STRMON

RUN WAVE

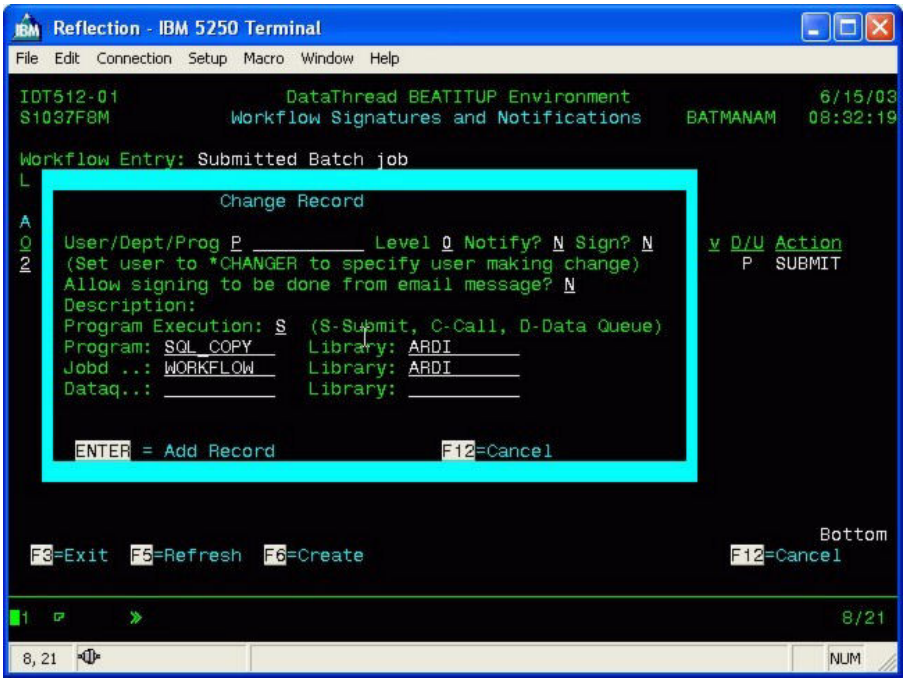
CALL ENDMON

Custom Workflow Processing

Database Monitor standard Workflow processing sends notification of change, when configured values are matched. One of its most powerful features, however, is the ability to initiate other programs. See appendix D for more detailed information

How these programs are accessed, can significantly affect throughput. The choices are:

- Submit the program
- Call it directly
- Send a request to a data queue



Submit the program

Very useful when number of transactions is low. Each submitted job will have its own characteristic based on the configured job description. Individual joblogs will be available and library lists can be established based on each workflow. If, however, a significant number of jobs are to be processed the overhead associated with each job will become expensive. Under this condition, either the direct call or the data queue processing should be considered.

Call it directly

A direct call is the fastest way to perform a WorkFlow transaction; especially if the called program is kept open and ready for multiple calls. There are several disadvantages to the direct call

method and great care should be taken before it is implemented. It is important to remember that the Monitor itself will be affected by any events that affect the called program. Abnormal termination of the called program may hold up the Monitor's processing with serious consequences. Also, the Monitor runs with an environment neutral library list. Changing the library list of the called program will impact the processing of the Monitor.

Send a request to a data queue

Data queue processing seems to provide the best compromise approach. The monitor will send an entry to the specified data queue with the transaction number, name and library of the program that is to be called. There will need to be a program running that will receive this entry and act upon it. In performance testing we have determined that this approach is at least 5 times faster than submitting individual programs.

This is a simple example of a Database Monitor data queue receive program:

```
0001.00 PGM PARM(&DQNAME &DQLIB)
0002.00 DCL VAR(&DQNAME) TYPE(*CHAR) LEN(10)
0003.00 DCL VAR(&DQLIB) TYPE(*CHAR) LEN(10)
0004.00 DCL VAR(&DQLEN) TYPE(*DEC) LEN(5 0) VALUE(35)
0005.00 DCL VAR(&DQDTA) TYPE(*CHAR) LEN(35)
0006.00 DCL VAR(&TR ) TYPE(*CHAR) LEN(15)
0007.00 DCL VAR(&DQWAIT) TYPE(*DEC) LEN(5 0) VALUE(100)
0008.00 DCL VAR(&PROGRAM) TYPE(*CHAR) LEN(10)
0009.00 DCL VAR(&PGMLIB) TYPE(*CHAR) LEN(10)
0010.00 LOOP:
0011.00 CHGVAR &DQDTA ' '
0012.00 CALL PGM(QRCVDTAQ) PARM(&DQNAME &DQLIB &DQLEN +
0013.00 &DQDTA &DQWAIT)
0014.00
0015.00 IF (&DQDTA *NE ' ') DO
0016.00 CHGVAR VAR(&PROGRAM) VALUE(%SST(&DQDTA 1 10))
0017.00 CHGVAR VAR(&PGMLIB) VALUE(%SST(&DQDTA 11 10))
0018.00 CHGVAR VAR(&TR) VALUE(%SST(&dqdta 21 15))
0019.00 CALL PGM(&PGMLIB/&PROGRAM) PARM(&TR)
0020.00 ENDDO
0021.00 GOTO LOOP
0022.00
```

0023.00

0024.00 ENDPGM

Appendix B: Database Monitor license entry

The Database Monitor License Entry panel is used to maintain your license key and to track your license expiration status. This panel also provides the serial number of your software copy. This panel is used only on rare occasions and should not necessarily be included as a visible option to non-information resource personnel.

How to get there

From any Database Monitor menu panel, enter option 18 and press enter. This will result in the panel IDT999-00 Database Monitor License Entry.

Function keys – IDT999-01

Database Monitor License Key Entry

Function Key	Short Description	Description
F3	Exit	Returns the menu screen IDT0001 Database Monitor - System Setup and Configuration. If you wish to accept the entries made, when done press Enter.
F18	Update Key	Press F18 to open the Key field for data entry. After pressing F18, a line under the license key number will be displayed and the field can then be maintained.If you wish to accept the entries made, when done press Enter.

Appendix C: CLRPFM for Database Monitor files

The CLRPFM command on the AS/400 does not delete records individually, but instead clears the whole file member in a single step. Because of this, the function cannot be performed on a file that has a DELETE trigger attached to it. Since Database Monitor inherently needs to track each time a record is deleted from a file, this presents a dilemma. Normally, a file that you would like to

use Database Monitor on would never be cleared, but individual work members might be cleared if they are used for holding temporary records. So, for such files that already have application code that uses the CLRPFM command, a workaround to the problem must be performed.

Option 1: Modify those CL programs which clear the file in question, to utilize the Database Monitor DTCLRPFM command.

This is the preferred approach if you only have a small number of files and occurrences of CLRPFM in your application code. By simply replacing all occurrences of CLRPFM with DTCLRPFM in your application code (only for those files you are adding to Database Monitor), the problem is effectively solved. See below for a description of the DTCLRPFM command, showing exactly what it does. Note that in order to call the DTCLRPFM command and for it to operate properly, either the Database Monitor installation library must be in your library list or the following objects must be duplicated into a standard system library that's always in the list when the command is used: DTCLRPFM (CMD), IDTCLRPFMC (CL), IDTCLRPFM (SQLRPGLE).

Option 2: Rename the standard IBM command, and place the Database Monitor CLRPFM member command in QSYS.

This is the easiest solution in terms of effort required on your part. Database Monitor ships with a command called CLRPFM which duplicates the functionality of CLRPFM but recognizes when a file with a DELETE trigger is being cleared and, for such files only, deletes the records in the file one at a time using an SQL DELETE. This allows the DELETE trigger to remain on the file during the deletion process. After the clear is performed using SQL, the file is then reorganized using RGZPFM, to simulate the state a file is in after a true CLRPFM. For this approach, the following steps must be taken:

- Rename object QSYS/CLRPFM to QSYS/IBMCLRPFM
- Copy the objects CLRPFM (CMD), IDTCLRPFMC (CL), and IDTCLRPFM (SQLRPGLE) into a system library, such as QUSRSYS.

Note that with this approach, care must be taken when upgrading to a new version of the operating system that the new copy of CLRPFM is also renamed after the upgrade.

Option 3: Do not use the Trigger function to capture deletes

Database Monitor can be configured to capture the delete of a record through the use of the journal. For this to work, both before and after image of the record has to be captured. You can simply configure DT to use the DTJOURNAL functionality and the system will take care of the

rest. The only limitation of this solution is that a contemporaneous signature can not be captured for deletes being monitored through journaling.

What the Database Monitor "clear" commands do

The DTCLRPFM and CLRPFM commands shipped with Database Monitor perform the exact same functions, with one minor difference, which is that DTCLRPFM actually invokes the operating system version of CLRPFM first, so that those files without triggers may be cleared as normal. In the case of Database Monitor's CLRPFM, it is assumed that the system version of CLRPFM has been renamed to the name of IBMCLRPFM, so this is the first command attempted when the command runs. The rest of the operation of these two programs is identical. Notice in the flow of the commands, which follows, the program invoking these commands should not have to know that the original IBM-supplied CLRPFM was not called. Any errors that are encountered via the clear are passed back to the calling program just as CLRPFM would have passed them. In fact, for non-triggered files, the actual messages received are simply forwarded back to the calling program just as CLRPFM sent them.

Flow of DTCLRPFM (and Database Monitor's version of CLRPFM)

- Invoke the operating system command CLRPFM to clear the file
- If no errors, simply exit
- If errors other than DELETE trigger preventing the clear, send these messages to the calling program
- If error CPF3157 (DELETE trigger prevented the clear)
    - Use SQL to delete all of the records in the member
    - Reorganize the member using RGZPFM

Appendix D: Custom Interfaces

The workflow module of Database Monitor is highly extensible. With its ability to call or submit custom programs or to write data queue entries at any of the steps of the workflow, actions can be performed that are specific to the underlying application being run. The following panel image shows how this is configured.

To illustrate this point, let us take a hypothetical situation where a lot of a pharmaceutical product is added to the database. Database Monitor can be configured so that the addition of the lot of a product can cause a workflow to be initiated, requiring signatures from one or more supervisory personnel. If one of the steps in this approval process is a quality assurance check, should any impurities be observed Database Monitor can be made to automatically change the status of the lot so that it cannot be used. When signing for the workflow step, the QA person would use a reason code of "REJ" to specify that the lot had been rejected.

A sample custom program TSTLOTWFL which performs the rest of the task is shipped with Database Monitor. The source for the program can be found in SAMPLSRC.

How it works

Database Monitor identifies each captured change to the database using a unique fifteen digit transaction ID; highlighted below. It is this value that is passed by the workflow step to the custom program.

Using the transaction ID, a programmer can get back to the actual record in the database that has been changed. This is achieved using an API that will allow easy access to metadata about the change; and provide the ability to retrieve the key, and before and after images of any change. IDTAPI is a callable program that can be accessed with several different functions and will return appropriate information. Please see later in this section for more technical details on IDTAPI.

The TSTLOTWFL custom program performs the following tasks:

- Using IDTAPI, retrieves the key of the TSTLOT record that was added
- Loops through all of the approval signatures for this workflow
- If any are rejected, accesses the lot record and changes the status to "H"

Source for TSTLOTWFL

IDTAPI - Database Monitor API Program

Database Monitor uses some of the more sophisticated functionality of the AS/400 to capture and store audit data. By creating the IDTAPI program we hope to insulate the programmer from having to delve too much into the structure of our files.

This API can be called with several different functions and will return appropriate data elements. To be able to test the workings of the API and better understand its capabilities we also ship a program that behaves as the front end to the API. This is only an investigative and learning utility and has no real production role. The source for this program is also in **SAMPLSRC**.

IDTAPIT may be called without any parameters and will display the following panel:

In this example, the "K" function is being used to retrieve the key of the record which was added. The transaction number is the only other piece of data that needs to be supplied.

You can see from the return code of 0 that the information was successfully retrieved. The actual value of the key can be seen in the buffer1 field.

This is the equivalent of the following call as used in the **TSTLOTWFL** program, where P15 contains the transaction number and P3 contains the data in buffer1

The P3 and P4 parameters must be defined to be large enough to bring back the data. In this case, the lot number key field is 10 characters. Each parm can be defined as large as 32767. When appropriate, the name of data structures can be used as the parameter, loading all of the subfields upon return.

The following panel shows the retrieval of before and after images of the lot status field; Buffer1 shows the before and Buffer2 the after image.

The information, inset below, is returned within the APIDS data structure.

The following is the breakdown of the fields within APIDS:

Parm	Begin	End	Description
FUNC	1	1	Must be supplied 0=Unload IDTAPI, K=Get key, R=Get Record, F=Get Field
FIELD	2	11	Field name - can only be supplied if function of "F" is used.
RETC	12	12	Return Codes 0 = Success 1 = Non-numeric transaction passed 2 = Transaction not found in transaction log file 3 = Transaction cannot be 4 = Individual fields captured but entire rec requested 5 = Image not found for this transaction 6 = Value not captured for this field on this change 7 = Error retrieving format for this field
EVENT	13	13	A- add, C-change, D-delete, R-read
LIBNM	14	23	Library of the affected file
FILENM	24	33	Name of the affected file
MEMBNM	34	43	Member name
CDATE	44	51	Activity date
CTIME	52	57	Activity time
CPROG	58	67	Program used in activity
CUSER	68	77	User name
CREAS	78	80	Reason code if pop up signature window used
CCOMM	81	140	Comments form pop up window
CSIGN	141	141	Yes/no if signed in pop up window
PTRN	142	156	No longer used by Database Monitor
NTRN	157	171	No longer used by Database Monitor

Complexities of data capture

Given the three retrieval options of, K=Get key, R=Get Record, F=Get Field it is important to understand how Database Monitor retains data.

Most of the time, Database Monitor captures individual fields that are changed. If for example, the expiration date on the lot record is modified, the unmodified lot potency value is not captured to the Database Monitor database. If then, the transaction ID for the expiration date change is used with the field name of LOSTAT the API will return a "6 = Value not captured for this field on this change."

It is an option to configure fields to be captured every time regardless of having been changed or not.

There are two occasions that Database Monitor will capture the entire record; whenever a record is added or it is deleted. In these cases the action of "R" may be used and the entire record buffer is returned.

Retrieving the key

The fields which make up the file's key are those specified in the IDT500 configuration program. These fields' values will be returned to the API in the order they are sequenced in the configuration panels. (Note: Versions prior to V2R1 returned the key fields' values in alphabetical order, instead).

Previous and next transaction numbers

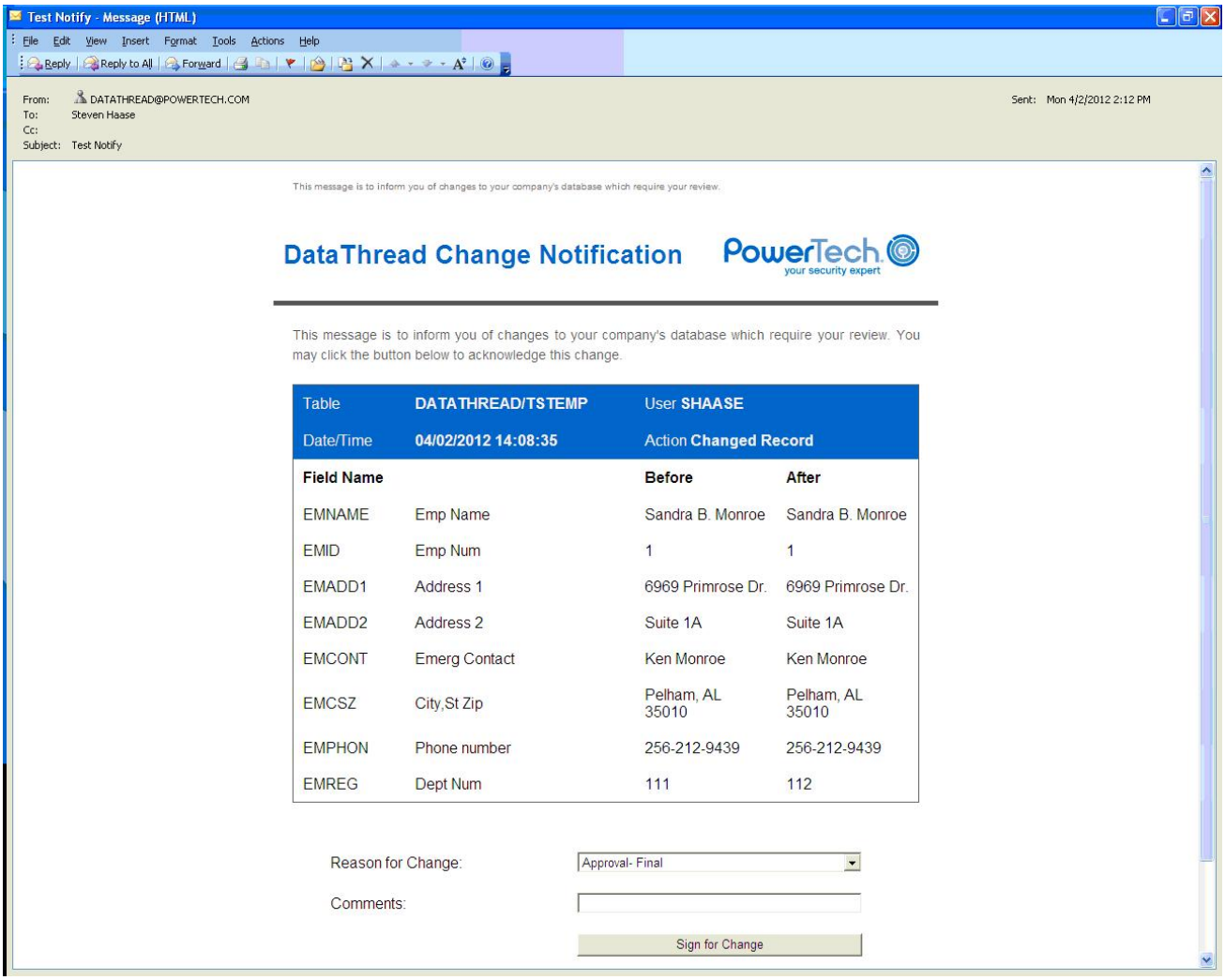
In earlier versions of Database Monitor, the actual transaction numbers for Previous and Next transaction were stored in the IDTLOH file. Due to performance constraints, these were removed, as the application can always use the IDTLOHL01 logical, knowing the transaction number and key and be able to perform the same previous/next function.

Appendix E: Workflow acknowledgment by email

As part of its WorkFlow process Database Monitor creates signature entries which, when signed, capture a reason code and comment. WorkFlow can also be configured to call other programs, and based on the reason code, perform appropriate tasks. A combination of these two features allow for limitless automation of business processes.

For example, a client is currently changing the status of a LOT record to "Q" as soon as it is added to the system. This is done as part of a WorkFlow which calls a custom program. This can then create additional events in the workflow which include two separate QA reviews. If both QA reviews are signed with an approval code, the status of the LOT is automatically changed to "A" for active. If, however, either review results in a rejection, the lot status is changed to "H"

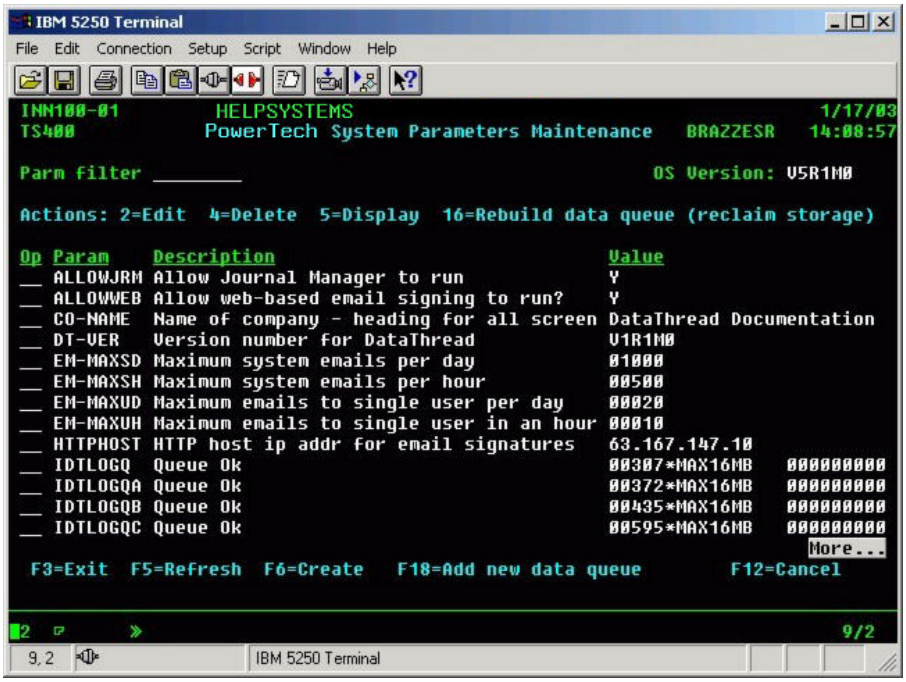
The function of signing for a WorkFlow step can either be performed from the AS/400 screen and requires access to the system; or it can be completed directly by clicking on a button in the email. The image below is a sample of approval by email.



HelpSystems has developed a proprietary socket server which runs on the AS/400 and handles responses delivered by email. There are simple configuration requirements which, once completed, will allow for WorkFlow acknowledgement by email.

Configuration

Navigate to option 12 on the Database Monitor menu.



The following system parameters need to be added or updated to activate email signing.

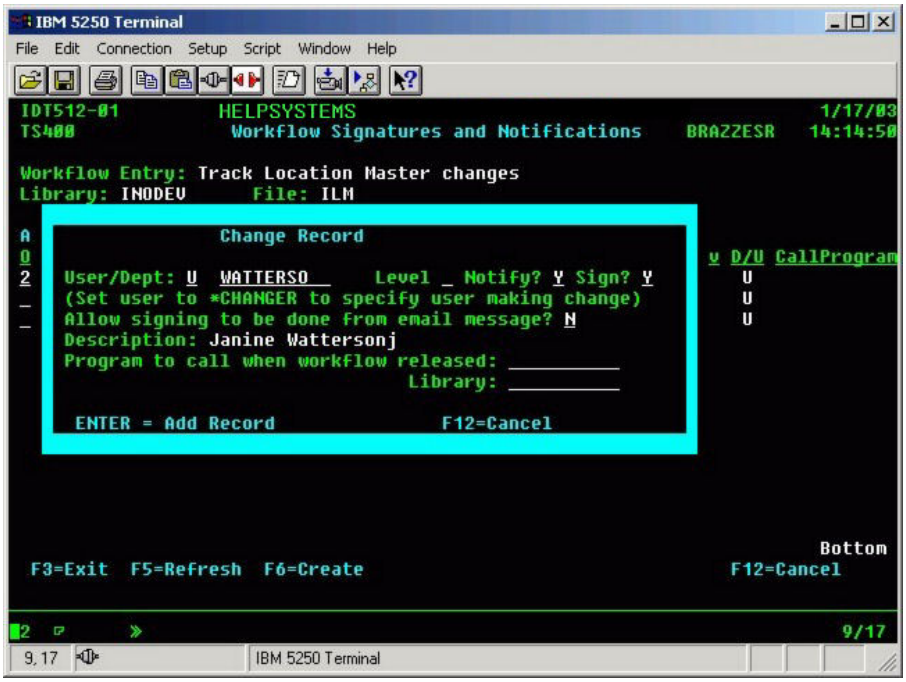
Parameter	Description
ALLOWWEB	Allow Web (email) signing
Similar to the ALLOWJRM setting, if signing from the notification email is not allowed, then this parameter should be set to N. If set to N, the two jobs, IDTSOCK, and IDT490 will not run in the background.	
HTTPHOST	IP address of host AS/400
This setting should be set to the numeric IP address of the AS/400. This will be the address which the Web Interface Manager jobs (IDTSOCK and IDT490) will listen on for email signatures. The format should be xxx.xxx.xxx.xxx, but with no leading zeros (e.g. 68.16.21.102, not 068.016.021.102)	
SCKJOBQ	Job queue to which IDTSOCK is submitted
Job queue to which the Database Monitor Sockets Manager (IDTSOCK) background processor is submitted. If this parameter is omitted, the 450JOBQ parameter value will be used when the DT Sockets Manager is submitted.	
SCKUSER	User Profile For IDTSOCK Job
User Profile For Background Job, IDTSOCK. If this parameter is omitted, the 450USER parameter value will be used when the DT Sockets Manager is submitted.	
SCKJOBD	Job description for IDTSOCK to run under

Parameter	Description
This is the job description which will be used in the submission of the Database Monitor sockets manager job. The default is *USRPRF. If this parameter is omitted, the 450JOBD parameter value will be used.	
SOCKPORT	Socket Port for IDTSOCK to listen on
Socket Port for Database Monitor WIM server job to listen on. A 5-character field is set aside for this purpose. This will be the port which IDTSOCK listens on for signatures via email.	

The above configuration will activate the email signature process. This will result in two additional jobs being submitted to run in the background.

Once the system has been prepared for email signature processing, a decision is made at the individual WorkFlow level whether signature through email will be permitted.

As each user is defined for the WorkFlow step, the system configurator can turn, on or off, the ability to approve via email.



Security considerations

Password

When the signature screen is accessed from the AS/400, a password is required. The current version of the email approval does not require the active entry of a password. The assumption is that access to the email was achieved after passing a security challenge. It is acknowledged that this is a lower level of security. Due consideration should be given to this prior to automating processes which may require a higher level of security. Encrypted password processing is being developed for future releases.

Opening ports

Opening a port on the AS/400 does not on its own give access to any functionality. The functionality is achieved by the program which "listens" on that port. The proprietary email processing program developed by HelpSystems simply associates the responses from an email to the unique open signature requirement; updating it as needed. There is no danger of other data being observed or updated. Development is in progress to allow for appropriate and secured inquiry via the web.

Appendix F: System oversight

In addition to being able to monitor your company's database files, Database Monitor also has the ability to monitor its own internal files. This is especially important for companies that must comply with regulations that require audit trails of electronic records, but also can be helpful for other companies as well. For instance, when trying to determine if all changes to a particular table have taken place during a given time frame, it is very important to know if the file in question was deactivated in Database Monitor during some of this time. This can provide valuable troubleshooting information.

Files which may not be audited by Database Monitor

The only files in Database Monitor which may not be audited are transactional files. The reason for this is that writing changes into a file which is also tracked would produce a "circular" or "recursive" situation. For instance, the IDTLOH file stores every transaction that is tracked by Database Monitor. If we track this file, itself, then when it is changed a new record of its change would then be logged, causing another one to be logged, and on and on.

The files which cannot be tracked in Database Monitor are: IDTLOH, IDTLOD, IDTSIG, IDTEMH and IDTEML.

Database Monitor files you may want to audit

The following Database Monitor files contain information which may be modified by a user or system administrator and are thus good candidates for being tracked by Database Monitor. Following each file are a list of the fields that should be used as the key fields when Database Monitoring these files.

IDTCOL - Table columns audit attributes

COLIB, COFILE

IDTCSA - Column signature Assignments

CAID

IDTFAR - File Level Archive Criteria

FALIB, FAFILE

IDTGRF - Database Monitor File Group Details

GFGROU

IDTGRP - Database Monitor File Groups

GRGROU

IDTKEY - Unique keys for tables

KELIB, KEFILE

IDTLOG - System status and error log

LGDATE

IDTMBR - Table member lists

MBLIB, MBFILE

IDTTAB - Tables to audit attributes

TALIB, TAFILE

IDTTRG - Tables Trigger Lists

TGLIB, TGFILE

IDTWFC - Workflow criteria

WCLIB, WCFILE

IDTWFH - Workflow header

WFLIB, WFFILE, WFID

INNCOD - Codes file

COTYPE, COCODE

INNCOH - Code types file

CHTYPE

INNPRM - Powertech system parameters

PRKEY

INNSCM - Powertech Security Matrix

SMUSER, SMPROC

INNSCP - Powertech Security - Processes

SPPROC

INNSCU - Powertech Security - Users

SUUSER

Activating files in Database Monitor

Since Database Monitor uses its own files, obviously there are some conflicts when trying to activate triggers on these files while the files, themselves, are open. For this reason, the Database Monitor configuration program (option 1) will not attempt to activate a Database Monitor file, itself. The way these ***may*** get activated is through the Database Monitor Manager (IDT460). To do this, you must first make sure no Database Monitor functions are being performed, including exiting from the Database Monitor menu. Then, simply end all of the processes and restart them again. This should cause the manager to activate the Database Monitor files which IDT500 could not.

The sequence of steps is as follows:

1. Ensure everyone is out of Database Monitor
2. Call END460 in the Database Monitor library.
3. Wait until the Database Monitor jobs end (should be within just a few seconds).
4. Restart the Database Monitor jobs, via a Call to STR460 in the Database Monitor library.

Notifications of IDTLOG records written

One of the more useful aspects of using Database Monitor to audit its own internal files is that adverse and otherwise interesting events which occur are often logged into the IDTLOG file. Using Database Monitor to monitor this file allows you to set up workflow events so that certain key users may be notified when these things have taken place. For instance, when files are activated or deactivated, an entry is written to the IDTLOG file. Also, since these log entries identify which object they refer to, notifications may be set up for changes to only the most important files in the system.

The following types of events cause an IDTLOG entry to be written:

- Failure when submitting background jobs, IDT450, IDT470, IDT490, IDTSOCK.
- User exiting signature window with F12 without signing for change
- User changing user id on signature window
- Incorrect password entries in signature window
- Failure to read processing files IDTOVR or IDTPRO withing Database Monitor monitor.
- Detailed error and warning messages for Purge and Archive runs.
- Adding/Removing triggers in Database Monitor
- Inability to add or remove triggers in Database Monitor
- Starting or Ending of Database Monitor journal, DTJOURNAL.
- Inability to start or end Database Monitor journal.

File groups

To make the oversight of Database Monitor files easier, you may wish to create a file group and place all of the Database Monitor internal files in it. This way, when inquiring into changes to Database Monitor's configuration, the file group may be specified as a criterion to the query, meaning only Database Monitor configuration changes will be included.

Appendix G: Purge and archive overview

Over time, the amount of storage space taken up by the Database Monitor files will grow considerably. This can be managed by employing a reasonable strategy of archiving older data when it is no longer needed on a day-to-day basis. The Purge and Archiving system of Database

Monitor provides a way to extract older information, remove it from the active files, and store it offline. This archived data may still be readily referred to simply by restoring it to an archive library and using the Archive History option in Database Monitor (42) to access it.

The way that data is archived in Database Monitor follows these principles:

- Each file in the system has a retention period, defined in days, months, or years.
- When a purge/archive is run, qualifying files have records which are older than the retention period removed and (optionally) moved to the archive.
- An archive corresponds to a library that contains the key Database Monitor transactional files.
- Once an archive is run, its resulting library may be saved to tape and removed from the system, freeing disk space.
- An archive may be restored at a later date (to the library having the archive name) and used for inquiry or reports.

Caution:

In order to restore an old Archive back into Database Monitor and read the 'details' of the archived file (before and after images) you must NOT remove the files from Option 11 (Database Monitor Configuration – Files).

You may remove the file and even the library from the system, but the file configuration must remain in Option 11 to be able to read the details from a restored Archive.

Recovery option:

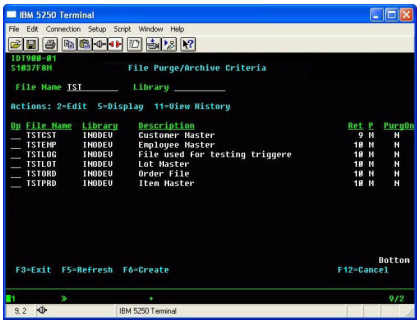
If available, you may be able to restore the files from a backup, reconfigure them back into Option 11, and then remove the file and library after it is configured back into Option 11.

For more details on the archive and purge process, refer to the sections that follow. Below is the menu screen for the two purge and archive functions in Database Monitor.

File retention maintenance

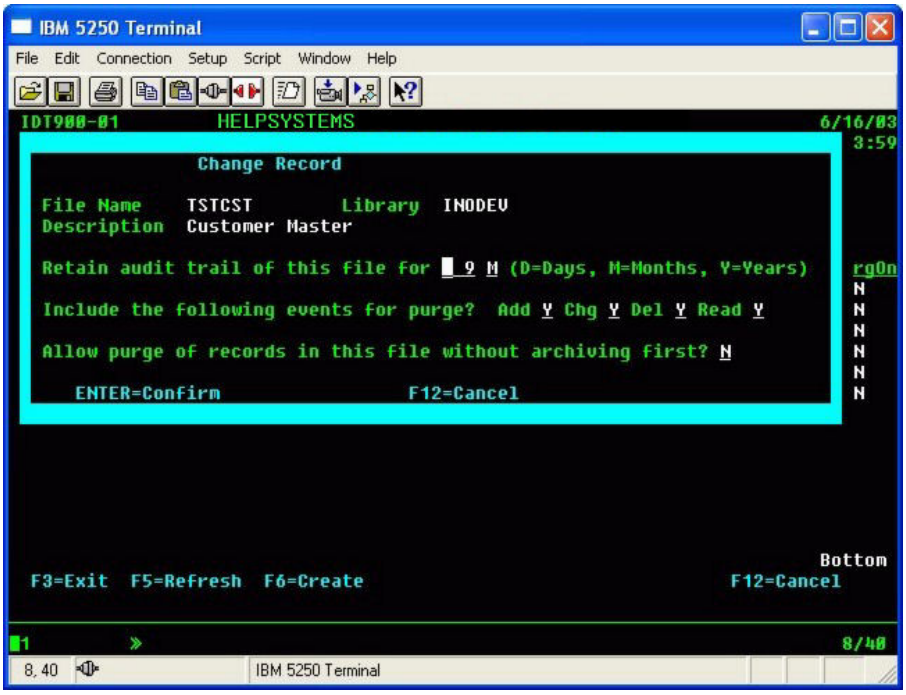
Every file setup in Database Monitor is assigned a default retention period. The retention period is the length of time that records for this file will remain in the Database Monitor database. After the retention period is exceeded, subsequent runs of the Archive and Purge Engine will remove these records from the active files and copy them to the archive library corresponding to the name given in the Archive and Purge run.

Below is a screen shot of the File Retention maintenance function.



As shown in this example, subsets of the files whose maintenance is being done may be viewed by specifying a portion of the file name. Along with the file name, library, and description, this subfile lists the retention period and units (days, months, years), along with the "Purge Only" flag.

Below is a figure of the details that may be maintained for each file.



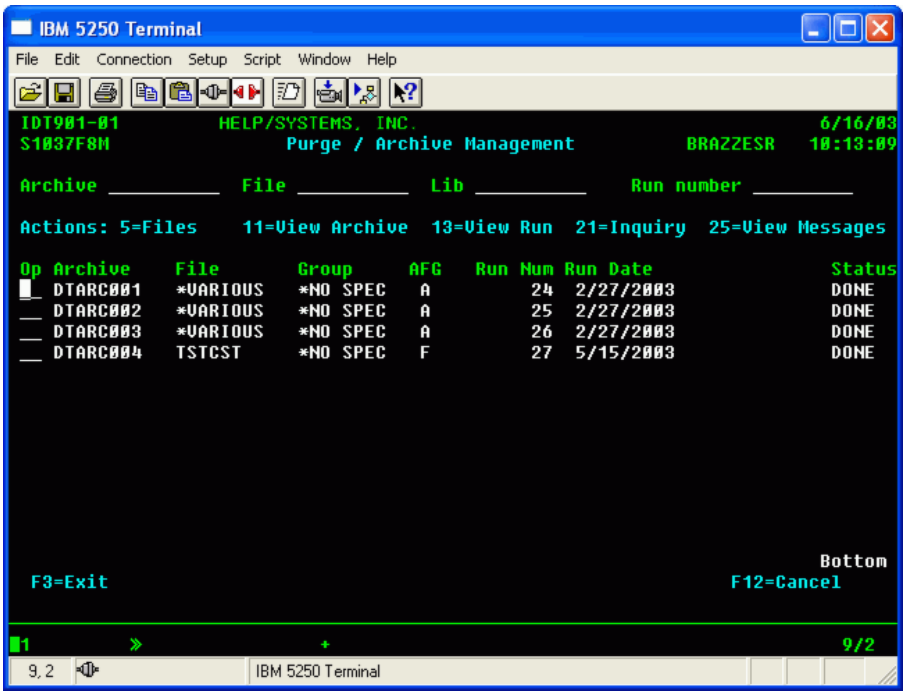
For each file, you must specify how long the records for this file will be kept. In the example above, all records are retained for the TSTCST file for 9 months. The flags that follow specify which events for the file will be purged (Add, Change, Delete, Read). Normally all events are purged for

a file once its records are outside the retention period, but if for some reason Deletes should always be retained, for instance, simply set the Del flag to N.

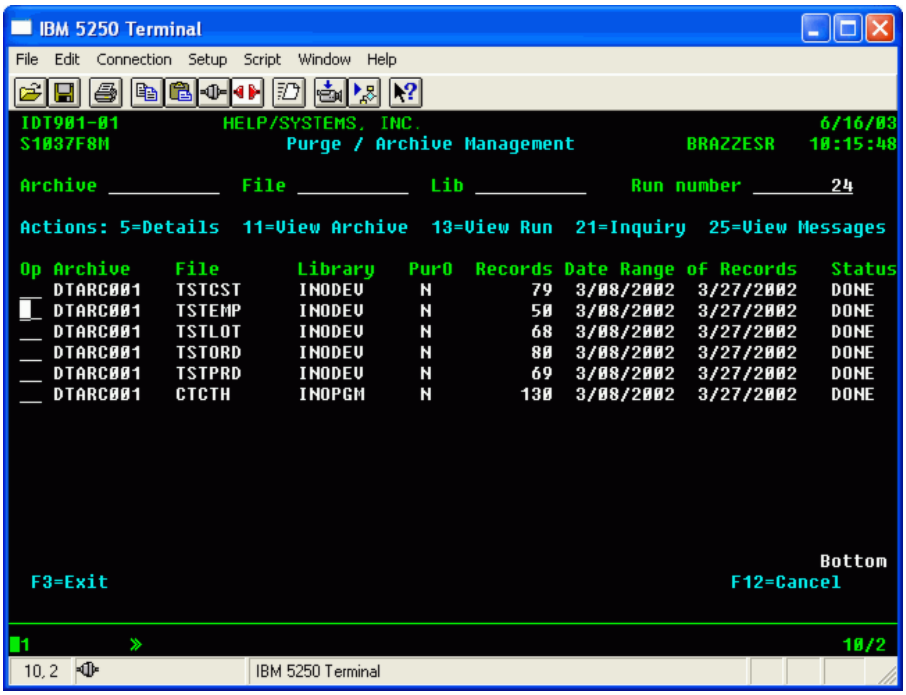
The final flag specified on this screen is the "Purge Only" flag. This specifies whether records for this file, once outside the retention period, will be purged only (and not saved in the archive). For data that does not need to be maintained at all beyond the retention period, you may set this flag to Y (allow purge only with no archive). Normally, this flag should be set to N.

Archive maintenance

Archive maintenance, shown below, is accessed from the Database Monitor menu using option 42. In this panel, all archives and purges that have been run may be browsed. Each time the Archive and Purge engine is run, a new record will be written to this archive history file.

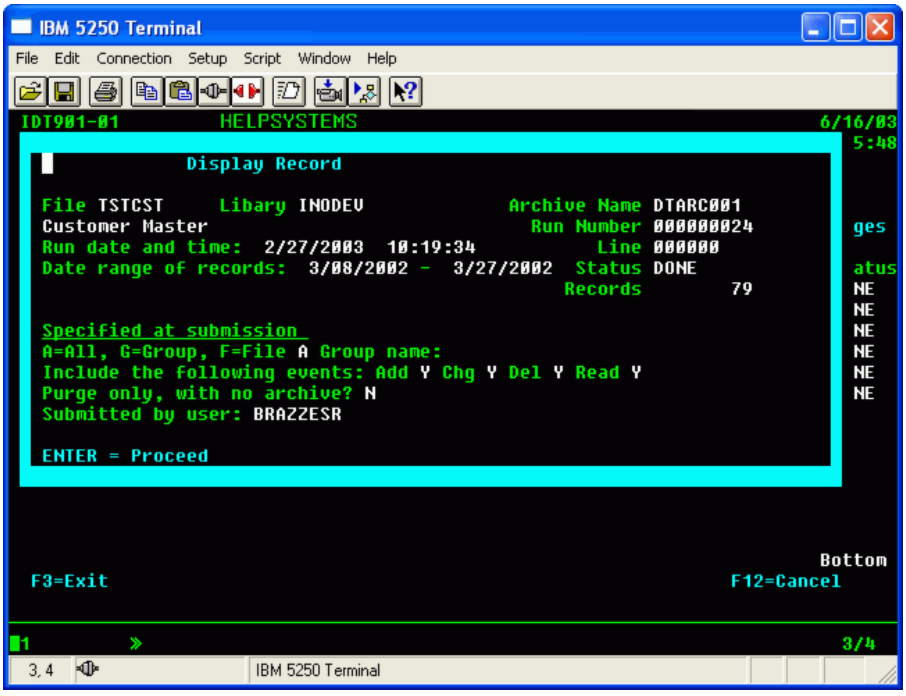


Each line on this panel shows a particular "run" of the Archive and Purge Engine, denoted by the Run number. If the run was for one specific file, the file name will show under the File heading. For runs that involved multiple files, the term *VARIOUS will be shown. The status field will show one of DONE (complete and successful run), FAILED (an error occurred), or RUN (currently running). On a failed archive run, using option 25 (View Messages) will show a window indicating the reasons for the failure of the archive run. For runs which were done on various files, you may use option 5 to see a list of the included files (see image below).



This detail window shows each of the files included in the run, along with whether the records were purged only (not archived), how many records were included, and the date range for the included records.

From this panel, you may view the details by placing a 5 on the file in question.



Purge and archive engine

The Purge and Archive Engine of Database Monitor is designed to be user-callable. There is no menu option that will invoke this program, primarily because archive and purge are serious functions for which considerable attention and planning should be given.

To run the Purge and Archive engine, you must call the program IDT905. Parameters for calling the program are listed in the table below.

Example of the called program syntax:

```
CALL IDT905 PARM('ARCHIVELIB' 'F' 'PAYROLL' 'TESTER' '' 'Y' 'Y' 'Y'
'Y' 'N')
```

IDT905 parameters

Parameter	Description	Values/Comments	Length (required/optional)
Archive Name	Name of archive, which is the name of the library that will be created	Must follow library naming rules for the AS/400	Char(10), Required
Run Mode	Specifies which files should be included in the run	Values are: A - All files considered F - Specific file G - File group K - One file, by key	Char(1), Required
File Name	Specify the f	Must match a specific file in Database Monitor	Char(10), Only required if F or K used as run mode.
Library Name	If a file is specified, specify the library here.	Along with the file, must match a specific Database Monitor file.	Char(10), Required if F or K used as run mode.

Parameter	Description	Values/Comments	Length (required/optional)
Group Name	Name of Group if G mode used. ...or... Key for the file if K mode used.	If running in G mode, must specify a file group in Database Monitor. If running in K mode, must specify the contents of a file key. Note that this often will require a data structure to hold the various fields making up the key. Each field must be in the same format as the key field in the file (e.g. packed, binary, date, etc.)	Char(10), if G mode. (*), if K mode.
Include Adds	Include Add events in the purge/archive process?	Specify a Y to include Add events in the run.	Char(1) optional.
Include Deletes	Include Delete events in the purge/archive process?	Specify a Y to include Delete events in the run.	Char(1) optional.
Include Changes	Include Change events in the purge/archive process?	Specify a Y to include Change (Update) events in the run.	Char(1) optional.
Include Reads	Include Read events in the purge/archive process?	Specify a Y to include Read events in the run.	Char(1) optional.

Parameter	Description	Values/Comments	Length (required/optional)
Purge Only	Purge Only?	Specify a Y in this field to simply delete the qualifying records, without archiving them first. Note that this flag is also able to be specified on the File Retention Maintenance panel. If either that flag or this one is N, then an archive will take place. Only if both are Y will a "purge only" be done.	Char(1) optional.

Archive concepts

When an archive and purge is run, a library will be created for the archive if it does not already exist. In this library, the system will create the following files: IDTLOH, IDTLOD, IDTSIG, IDTEMH, and IDTEML. Along with these physical files, the corresponding logical files are also created.

If the library already exists, the system will simply append the new archive data to the old. This way, multiple runs of the same archive are allowed, each building upon the other. The general concept is that, if a new archive is desired, it should be created using a new name. Running two separate archives with the same name, but removing/storing the library after the first run, will result in two separate archives with the same name that are not combined in content, thus leading to more difficulty in managing the archive.

So, generally speaking, if an archive is run with the same name as a prior one, the old archive should be resident on the machine when the new one is run.

Upgrading issues

Database Monitor currently supports OS/400 versions V4R4 and above. Because of the changes to trigger processing with V5R1 of the operating system, several things should be kept in mind when upgrading from from a V4 release to V5.

User-defined triggers

The purpose for Database Monitor being able to manage other trigger programs was to support versions prior to V5R1 of the operating system. Pre V5 releases could have only one trigger program per event (e.g. AFTER UPDATE, AFTER DELETE, etc.) defined and so a company already using a particular trigger program needed Database Monitor to allow them to continue to use it.

With the advent of V5R1, this restriction is no longer in effect. Therefore, Database Monitor on releases of V5 and above does not call user defined triggers. When upgrading to V5, all user triggers will need to be removed from the files in Database Monitor (menu option 1, suboption 14) and placed directly on the file via the ADDPFTRG command.

Before upgrading - deactivate files

Just before performing the operating system upgrade, all Database Monitor files should be deactivated in the configuration screen. This will remove all of the Database Monitor triggers. After upgrading, these files may be reactivated. The reason for these steps is that Database Monitor running in a V5 or above environment is not able to remove triggers that were added in a V4 environment.

If this step is not performed before the upgrade, a manual RMVPFTRG will need to be performed on each file which has been set up in Database Monitor and then the file re-activated in option 1 (Configuration).

Appendix I: Setting up SMTP on your IBM i system

SMTP can be setup on your iSeries by performing the following commands

With CFGTCP - Make sure the domain information is setup properly. It should be set to the domain name used by your ISP

With CHGSMTPA – Enter the following

Autostart Server - *YES

Mail Router – The IP address of your mail router

Firewall - *YES if you have a firewall

Use the command STRTCPSVR *SMTP to start up the Email server on the iSeries

> **NOTE:** Prohibiting Relay is the servers way of stopping spammers from using it to spam e-mail. Most servers close down Relay, but you can list your iSeries as the only address relay is allowed to come from.

You will need to enable your mail server to allow relay, but only from the IP address of your iSeries

Go to the smtp server and allow "only the list below" and put in the IP address for the iSeries.

Appendix J: Connectivity improvements

BioMetric and single signon connection

Connector – Biometric identity authentication and single signon for IBM i and System i compliance.

This built in connector offers Database Monitor users a high performance hybrid for IBM i and System i biometric authentication and single signon We developed this connector together, with our partner Tom Secreto of Valid Technologies, CTO and biometric security expert for the VSSA Valid Secure System Authentication solution. Database Monitor users who install Valid Technologies's VSSA biometric software, considered the industry leading solution for IBM i & i5/OS biometrics, now enjoy identity management and enforcement powered by Database Monitor.

Valid Secure System Authentication® (VSSA) is the answer to today's business and regulatory needs for strong user authentication. **VSSA** delivers advanced, proven fingerprint biometric technologies in a secure, compliant, and highly reliable SOA architecture. It adds the user convenience and process efficiencies of 'touch of a finger' biometrics to every logon and application throughout the enterprise – at the transaction level. VSSA speed, efficiency, availability, and security make complex passwords, clumsy tokens, and less secure and flexible 'convenience biometric' solutions obsolete.

With **VSSA** you can establish a firm, adaptable, and lasting foundation for user authentication - plus increase user productivity and compliance. **VSSA** lets you make strong biometric user authentication part of every application - network logons, web portals, 'green screen' programs, and more. So your information assets are protected while password-related IT support costs go down.

Simply put, VSSA eliminates passwords saving time and money while reducing risk of unauthorized access and ensuring people ARE who they say they are when performing activity on the system. Anyplace Database Monitor electronic signatures are used now support biometric authentication at the transaction level, deep into applications, based on configurable logic, without any application programming.

Automated, real time, identity audit at the transaction level, with no programming.

BioMetric signature setup

To set up BioMetric signature perform the following steps

- Rename the existing program in the Database Monitor library – IDT401 to IDT401NBM
- Rename the existing program in the Database Monitor Library – IDT401BM to IDT401
- Enter two new system parameters
    - USEBIOMT – Template of 1 Character - Value Y
    - BIOPGM – Template of 21 Character – Value library/program for the BioMetric Program to be called

- The biometric program to be called must accept the following parameters
  - User Id – 32 Char
  - Application – Calling Application ie DATATHREAD – 30 Char
  - Result – 4 Char
  - Desc – 70 Char
- The Result should be set to '0000' for a valid authentication. Any other result will be considered a failed authentication

Appendix K: Starting Database Monitor on a mirrored target machine

To start Database Monitor on a mirrored target machine

1. Confirm that a valid license has been applied to the installation of Database Monitor using menu option 18.
2. Clear the IDTJRN file using command CLRPFM FILE (DATATHREAD/IDTJRN). The IDTJRN file must be cleared in order to prevent files that were mirrored from the source system from appearing in the IDTJRN file. These files would likely not be valid for the journals on the target system.
3. Start Database Monitor by issuing the STRMGR command in Menu Option 17 of Database Monitor. The IDTJRN record(s) will be recreated with the appropriate values for the journals on the target system.
4. Confirm that an IDT470 job is running for each of the monitored journals. For the system audit journal, there should be an IDT475 job running.

Appendix L: Option 12 parameters

From any Database Monitor menu screen, enter option 12 System Parameters and Settings, and press Enter to display the INN100-01 screen including the following System Parameters.

Below is a list of each of the system-wide parameters used by Database Monitor, along with an explanation of each. The parameters shipped with Database Monitor should not be removed, and very careful consideration should be given before changing the default values. Some of these settings may have a dramatic effect on the performance of the system.

Param	Description
AFILEREF	Time between refreshes (clears) of IDTAUD
ALLOWJRM	Allow Journal Manager to run

Param	Description
ALLOWWEB	Allow web-based email signing to run? This parameter, if set to Y, will Allow Signatures via email. If set to N, the jobs IDTSOCK and IDT490 will not be submitted and no email signing will be possible.
ALMQREAD	Allow Message Queue Reader to run
ALSYSJRM	Allow System Journal Reader to run
ARCHPRFX	Archive prefix (3 characters)
ATTSIG	Attach Sig
AUDJWAIT	Audit Journal Reader Wait Time
BIOPGM	BioMetric Program to Call
CO-NAME	Enter Company and Environment Name (Example – HELPSYSTEMS). This will show on all reports and Datathread screens. If installing on production, change the environment name.Enter Company and Environment Name
CONTSESS	Continuous session timeout (minutes) This parameter specifies how long a continuous session may proceed before the user is asked to, again, identify both user id and password for contemporaneous signatures. In a tightly controlled continuous session, the password may sometimes be used on 2nd and subsequent signings, but only until this many minutes have elapsed between changes. Once this amount of time elapses, both user identifiers will be required (user id and password). Continuous session timeout (minutes)
CONTUPD	Length between *CONTEMP updates (in minutes). Length of time between refreshes of *CONTEMP signatures.
CURUSER	Allows for logging of the current user of the job. If the entry does not exist, the process will use the Job user. If the entry exists and is set to 'Y', tracking will be done by the current user of the job.
CSVDELMT	Customize the delimiter for .csv export. It can be set to any character, tab or blank. Comma is the default setting.
DQFORCE	Force Data Queues to auxiliary storage? Specify a Y here if you want the Database Monitor data queues to be forced to auxiliary storage (stored immediately to disk). This is a safer option if there is a major system crash, but will definitely harm performance. We recommend an N for this option unless company policy dictates otherwise.

Param	Description
DTOBJAUD	Allow System Auditing of DT objects. Allow System Audit Journal entries to be created for Database Monitor objects. Turning this on may cause unexpected results and system slow-down.
DTRPTDSC	Include Descriptions on DTRPT reports (Y or N)
DTRPTKEY	Include Key Fields on DTRPT Reports (Y or N)
DTRPTTA	Include Track Always Fields on DTRPT Rpt (Y or N)
EM-MAXSD	Maximum system emails per day. Set an upper limit on the number of emails Database Monitor will generate in a day. This number can be as high as 99,999, but should probably be set to a much lower value to prevent an inordinate number of emails from being generated via a batch file update that happens to trigger a workflow notification.
EM-MAXSH	Maximum system emails per hour. Set an upper limit on the number of emails Database Monitor will generate in an hour. This number can be as high as 99,999.
EM-MAXUD	Maximum emails to single user per day. Set an upper limit on the number of emails Database Monitor will send to a single user in a day. This number can be as high as 99,999.
EM-MAXUH	Maximum emails to single user in an hour - Set an upper limit on the number of emails Database Monitor will send to a single user in a day. This number can be as high as 99,999.
FLDDESC	Show Field Description by default in inq (Y or N). If Y, the Field Descriptions will be shown by default in the detail of a transaction instead of Field names.
HTTPHOST	IP address of host AS/400 - This setting should be set to the numeric IP address of the AS/400. This will be the address that the Web Interface Manager jobs (IDTSOCK and IDT490) will listen on for email signatures. The format should be xxx.xxx.xxx.xxx, but with no leading zeros (e.g. 68.16.21.102, not 068.016.021.102).
IDTLOGQ	Primary data queue – configurable for Maximum entry size and Maximum number of entries.
IDTLOGQA	Data queue – configurable for Maximum entry size and Maximum number of entries.
IDTLOGQB	Data queue – configurable for Maximum entry size and Maximum number of entries.

Param	Description
IDTLOGQC	Data queue – configurable for Maximum entry size and Maximum number of entries.
IDTLOGQD	Data queue – configurable for Maximum entry size and Maximum number of entries.
IDTLOGQE	Data queue – configurable for Maximum entry size and Maximum number of entries.
IDTLOGQF	Data queue – configurable for Maximum entry size and Maximum number of entries.
IDTLOGQG	Data queue – configurable for Maximum entry size and Maximum number of entries.
IFS-HOME	Home path for email creation in IFS Email text is created in a unique file in the IFS. This path, which must begin and end with /, will be where these files are placed. The authority to this path should be set so that Database Monitor can create files in it and also so that the SMTP server programs can delete the files when sent.
ITRAKALL	Initially track all fields for record? (Default = N) Set this to Y if you want every field of a record to be tracked the first time the record is encountered by Database Monitor. If N or parm not found, only C or A will be tracked.
JRMALLOC	Memory to allocate for IDT470 jobs. This parameter is used to specify the size of the block of working memory allocated by the journal manager jobs. These jobs retrieve blocks of journal entries into this allocated work area. The default for this field is 128,000 bytes.
JRMJRNQT	Quantity of journal entries to process in block. This number, which defaults to 64, tells the journal manager jobs how many journal entries to retrieve in each block of processing. This figure, along with that of JRMALLOC may be increased to improve performance, but keep in mind that making these values too large can negatively impact overall system performance. Obviously, the number specified here should ideally be roughly the value of JRMALLOC divided by the average audit entry size, so that an optimum number of entries is processed in each block. A file with a record length of x will have an audit entry size of roughly 2x+250.
JRNLIMIT	Max number of files to request data for. Maximum number of files to request data for from a journal. There is a system limit of 300, but this value may be lowered.

Param	Description
LOG-PRO	Log IDTPRO activity. Log IDTPRO activity to IDTPLOG. Do not turn on unless directed to by HelpSystems Support.
LOGSOCK	Log Socket Detailed Activity? Setting this parameter to 'Y' will turn on the function of logging detailed sockets activity. An 'N' here will turn it off. 'Y' is recommended. In this way if any investigation of sockets activity must be done, a log can be produced for analysis.
MAIL-FRM	Database Monitor e-mails are sent from the Internet address created in this setting. This may have any value, but will show up as the "from address" of the notification emails. A user may reply to a Database Monitor notification and, if so, the reply will go to the address in this parameter. This could be useful for indirect commentary review of Database Monitor notifications.
MAX-450	Maximum occurrences of IDT450 to run. This number represents the maximum number of IDT450 jobs to allow running at the same time. To balance the workload, Database Monitor supports the running of multiple background jobs. These jobs take the before and after images of database activity and logs records to the audit trail files. If very heavy activity is experienced with Database Monitor-tracked files, a single background job may get behind (though it should eventually catch up unless the activity is very large). To keep the background job(s) from getting behind, multiple version may be run.
MFILEREF	Time between refreshes (clears) of IDTMSQ (default = 60). In minutes.
MSGQMAXP	Message Queue Max Processing Time. In minutes.
MSGQUPD	Time between updates of Message Q Reader Time (in minutes) between refreshes of the message queue reader's internal list of message queues to read.
MSQALLOC	Memory to allocate to Message Q Reader Amount of Memory to allocate to Message Queue Reader, in bytes.
PFEXWAIT	Program/File Exclusion Refresh Wait Time Amount of time (in minutes) between refreshes of the program/file exclusions in the triggers/journal readers.
QUEUEAGE	Rebuild queues when they reach this age. This is the age, in days, of a data queues before it is deleted and recreated automatically by the system manager to reclaim its storage.

Param	Description
SGNALL*C	Sign multiple *CONTEMP Signatures Sign all *CONTEMP signatures created by one transaction (for instance, one SQL statement may create multiple *CONTEMPs, do we only ask for the sig once?)
SIGCHGUS	Allow change user in contemp. signature? Allow user id to be changed in a pop-up, contemporaneous signature? If N, user signed on will be user id of sig window.
SIGF12OK	Allow F12 to be pressed on pop-up sig? Setting this to Y will allow the user to press F12 and cancel the signing on contemporaneous signature window.
SINGAUDF	Single Audit File? (Y or N). N - All SysAud entries will go through IDTAUD. Y - SysAud Entries will go through individual files for each audit type
SOCKPORT	Socket Port for IDTSOCK to listen on Default = 03074
TRIGEXUP	Time period before checking for Job Excl (default = 001) This variable controls number of minutes between trigger program checks of jobs to exclude from monitoring.
TRIGFIXA	Automatic fix of triggers by IDT460? (Default = Y) Set to Y to have IDT460 automatically fix triggers it finds a problem with.
USEBIOMT	Use Bio Metric Device to Validate Sigs (default = N) Use an external Biometric device
WAIT-460	Length of time between system checks - Length of time between each of the system checks that IDT460 will wait, in minutes. This should not be set too low or system performance may be affected. IDT460 (Database Monitor Manager) runs in the background and manages system resources (data queue creations, checking on triggers that have been inadvertently removed from files, etc.). The job launches its check of the system every WAIT-460 minutes. If this value is set to, for instance, 1 minute, then IDT460 will run pretty much continuously, as the overall check time itself may take at least a minute to complete. A value more like 10 minutes is more reasonable.

Param	Description
WAITFULQ	Waiting period for data queues full timeout. The purpose of this parameter is to allow the user to specify how long the system will wait once all of the data queues have filled up before it tries sending back to the queues again, versus sending the audit entries to the overflow file. Normally, the data queues will not fill up, as they will be processed faster or nearly as fast as they are produced, but in instances where the background jobs have placed on hold, the queues may indeed fill up. If this happens, the system will notice that all of the queues are full and then go into a "file only" mode for the number of minutes specified here. If the queues were continually sent to, even though full, this could cause an overflow of the job log of the offending job. Typically, this parameter should be set to between 1 and 3 minutes.
WAITMSGQ	Message queue reader timeout value (default = 10) Wait time for message queue reader. When all queues have been read, we will wait this number of seconds before beginning to process again.
WARNFGO	Warn about file group omissions? Each time the inquiry program IDT300 is run, the system will remind the user that certain records not in users' file group will not be shown if this = Y.
XMLENCOD	XML Encoding Type (default = UTF-8) Specifies the XML encoding type. This may change depending on the local language.
450JOBD	Job description to use for submit (default = DATATHREAD/DATATHREAD) Job description to use when submitting jobs IDT450 and IDT460.
450JOBQ	Job queue to which IDT450 is submitted (default = QUSRSYS/DTJOBQ) Job queue to which IDT450 background processor is submitted.
450SUBMN	Minutes between resubmissions of IDT450 (default = 015) This value is used by IDT400.
450USER	User Profile For Background Job (default = DATATHREAD).