File Integrity Monitoring
Getting Started Guide
Version 2.1

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About this Guide

Thank you for your interest in Qualys File Integrity Monitoring (FIM). This new service allows you to log and centrally track file change events across your global IT assets. All you have to do is install lightweight agents on your assets and set up FIM monitoring profiles. We'll help you get started quickly!

About Qualys

Qualys, Inc. (NASDAQ: QLYS) is a pioneer and leading provider of cloud-based security and compliance solutions. The Qualys Cloud Platform and its integrated apps help businesses simplify security operations and lower the cost of compliance by delivering critical security intelligence on demand and automating the full spectrum of auditing, compliance and protection for IT systems and web applications.

Founded in 1999, Qualys has established strategic partnerships with leading managed service providers and consulting organizations including Accenture, BT, Cognizant Technology Solutions, Deutsche Telekom, Fujitsu, HCL, HP Enterprise, IBM, Infosys, NTT, Optiv, SecureWorks, Tata Communications, Verizon and Wipro. The company is also founding member of the Cloud Security Alliance (CSA). For more information, please visit www.qualys.com

Qualys Support

Qualys is committed to providing you with the most thorough support. Through online documentation, telephone help, and direct email support, Qualys ensures that your questions will be answered in the fastest time possible. We support you 7 days a week, 24 hours a day. Access support information at www.qualys.com/support/
Get Started

File Integrity Monitoring is a highly scalable, centralized solution that reduces the cost and complexity of detecting policy and compliance-related changes mandated by regulations such as the Payment Card Industry Data Security Standard.

Steps to start monitoring change events

Install lightweight agents in minutes on your IT assets. These can be installed on your on-premise systems, dynamic cloud environments and mobile endpoints. Agents are centrally managed by the cloud agent platform and are self-updating (no reboot needed).

Configure FIM monitoring profiles to tell us the files you want to monitor and the types of changes you want to know about. We provide several profiles in our Library to get you started but you can also create your own.

View your events in one central location. You’ll see all events detected across all of your assets. Search all of your events in a matter of seconds.

We’ll describe these steps in more detail in the sections that follow.

Quickly get started using our online tutorial

Just choose Get Started from the help menu and we’ll walk you through the steps. Here you’ll find links to helpful information.
Setting up asset tags (optional)

Setting up asset tags using AssetView helps you automate file integrity monitoring using FIM. You can avoid assigning configurations manually to each asset by adding asset tags to the required configurations - FIM monitoring profiles and CA configuration profiles.

We recommend you read these tips on configuring FIM monitoring profiles to help you with deciding how to assign tags to your assets.

How to create tags

Go to AssetView to get started.

Then go to Assets > Tags and click New Tag to add tags for your FIM assets. You can use a single tag or multiple tags to mirror your production configuration.

Not interested in tags? No problem. You can manually assign individual assets to your profiles.
Install Cloud Agents

You'll need to install a cloud agent that's been activated for FIM on each asset you want to monitor for file integrity. You'll install and manage agents using Qualys Cloud Agent (CA).

Let's get started!

Choose CA (Cloud Agent) from the application picker.

Create an activation key

Create an activation key. Go to Activation Keys, click the New Key button. Give it a title, provision for the FIM application and click Generate.

As you can see you can provision the same key for any of the other applications in your account.
Pick either Windows or Linux to get install instructions and download the installer.

Want to do this step later?
No problem, just exit the wizard. When you’re ready, return to your activation keys list, select the key you want to use, then Install Agent from the Quick Actions menu.

Review the installation requirements and click Download.

You’ll run the installer on each host from an elevated command prompt, or use a systems management tool or Windows group policy.
Your agents should start connecting to our cloud platform.
Activate your agents for FIM

Choose “Activate for FIM or IOC” for each FIM cloud agent on the Agents tab.

Enable FIM in a configuration profile

Go to the “Configuration Profiles” tab, create a new profile or edit an existing one. Walk through the profile creation wizard. When you get to the FIM tab:

1) Toggle “Enable FIM module for this profile” to On. This is required for FIM event data collection to occur.

2) Configure when events are transmitted to the Qualys Cloud Platform. Defaults are provided, so this step is optional. You can configure values for event log size, threshold time, disk usage.

(FIM settings are available only when FIM is enabled for your subscription)

Tip - We recommend you set up asset tags for your FIM assets using AssetView. This makes it easy to associate FIM assets with a CA configuration profile and a FIM monitoring profile - just apply the same FIM tags to these profiles.

Events are transmitted to the Qualys Cloud Platform when either of the following occurs:

- FIM event log reaches the maximum specified size
- Payload threshold time is hit
- Disk usage for total FIM data on the agent reaches the maximum specified size

What's next? Your assets will appear in Qualys FIM on the Assets list. Next we’ll describe how to create FIM monitoring profiles for your assets.
Configure FIM monitoring profiles

The FIM monitoring profile is where you’ll tell us the files you want to monitor and the types of changes you want to know about. We provide several profiles in our Library to get you started but you can also create your own.

Best practices for creating profiles

Configure as many profiles as needed for different situations, and apply multiple profiles to a single device. For example, you may want to configure profiles for these objectives:

- Monitor OS critical binary and configuration data
- Monitor application data
- Monitor rights and permissions database or log files
- Monitor application critical binaries

Define Windows and Linux profiles separately. We don’t currently support defining OS version subsets to a profile. Be very granular in assignment of profiles to assets to prevent getting more events than intended. For example, let’s say you have a Linux profile for CentOS and a Linux profile for Ubuntu and assign each a tag that contains both operating systems. Both profiles will be monitored for and if there are overlapping settings you could get more events than intended.

After creating a monitoring profile you must activate it to enable change detection. You can deactivate a profile at any time to suspend monitoring for that profile.

Create a FIM monitoring profile

Choose FIM (File Integrity Monitoring) from the application picker.
We provide several profiles in our Library to help get you started. Our out of box OS based profiles include pre-defined monitoring rules.

Go to Configuration > Library, select an OS specific profile and choose the Import to Profiles from the menu provided.

Choose whether to import the profile locked or without restrictions. Tip - If you pick No Restrictions you can edit the profile once imported (on the Profiles tab)

You can also create your own profiles. Click Create New Profile on the Profiles tab.
Provide basic profile details (name, operating system, category). Keep in mind - you’ll need to create separate profiles for Windows and Linux operating systems.
Add one or more rules to the profile to tell us what you want to watch for. Go to the Rules section, click Add New Rule and provide rule details.

When defining a rule:

1. choose a rule type (File or Directory) and provide the full path to the file/directory,
2. select the actions that should trigger events, and
3. click Save Rule to add the rule to the profile.

If you choose Directory as the Rule Type, you can click Advanced Options to include or exclude specific files/directories within that directory.
You can group the rules in sections. Create sections to group your monitoring rules. Go to the Rules tab and click New Section.

**Note**

It is mandatory for activated profiles to have at least one Rule or a Section with a rule in it. We show an error message if you try to 1) activate a profile that has no rule or section with a rule in it, 2) delete the only rule in the profile, and 3) remove the only section with rule.

Add assets to the profile. You can select individual assets in your account or assign asset tags in order to monitor all matching assets automatically.

We recommend you to create asset tags and assign the assets tags to profiles if the number of assets to be monitored in the profile exceeds more than 50 assets.
Activate your profile. New profiles are Inactive to start. Select the profile in the list and choose Activate to start using it.

**Activate / Deactivate profiles**

As mentioned earlier you must activate a profile to use it for monitoring. From the Profiles list, simply choose the action you want to take from the Quick Actions menu. Activate a profile to use it for monitoring; Deactivate a profile to suspend it from monitoring.

**Assign a profile to an asset**

Tip - If your profile has asset tags defined then there’s nothing you need to do. As long as the new asset has a tag that matches a tag in the profile it will use the profile automatically.
When you add a new asset you can quickly assign it to an existing monitoring profile. Go to the Assets list and choose Assign a Monitoring Profile from the Quick Actions menu. Then simply choose the profile you want to use.
View Your Events and Assets

FIM provides one central location for viewing all of the events detected across all of your assets. The Events tab and the Assets tab contain search capabilities, group by options, and download options. In the Assets tab you can find all assets impacted by FIM events.

Use tabs in the Events section to quickly identify:

(1) All events detected across all of your assets, except ignored events.

(2) Events waiting to be reviewed. You can choose to ignore events or create incidents.

(3) Ignored events.

View events

You can find events based on event data, file information, monitoring profile, and more.
Save and Manage Search Query

When you are searching for events in the All Events and Events Review tab, you can save these searches using the "Save this Search Query" option. Saved searches are available under "Manage Saved Searches" option.

Note: If you cannot see the saved search under the Manage Saved Searches option, press F5 or refresh the screen.

View event details

Clicking Event Details in the Quick Actions for an event brings up the Event Details page. This page provides complete information about the FIM event.
Group events by various filters to get count of events

You can view the total count of events by Assets, Operating System, Monitoring Profile, Severity and Platform in the All Events tab. To view the count of FIM events by any of the filters, go to Events > All Events tab, select a date range and select a filter from Group By drop-down.

Ignore events

Have an event you don’t need to track? Ignore it to move it out of your list.
Select specific events and choose Ignore Events from the Actions menu. Optionally, choose Ignore All Matching Events to ignore all events that are currently matching your query for the timeframe that you’ve selected. Ignored events are moved to the Ignored list. Note - You may get similar events in the future that will appear in your Events list and you’ll want to ignore those too.

Did you ignore an event by mistake? No worries. Easily restore any ignored event from the Ignored list.

Create and track incidents

You’ll want to review the events detected on your assets and group related changes into incidents. Review your incidents to determine if they’re valid, mark them approved or unapproved and classify them by the type of change.

You also have an option to create incidents based on certain criteria defined in a correlation rule. See “Create a correlation rule using correlation rule wizard”.
On the Event Review tab, run a query to find related events, click Create Incident and give your incident a name. Your new incident will be saved on the Incidents list where you can view and add details. All events matching your query will be included.

Note: After creating an incident manually, Events will be marked to the incident after 24 hours.

The Incidents list is where you’ll take actions on your incidents. View details for any incident to get a break-down of the events by severity, action and user. Edit any incident to rename it or change the events associated with it by modifying the query or timeframe.

Choose Start Review to review the events associated with an incident and then mark the incident Approved or Unapproved. You’ll also classify the events by disposition category (e.g. Pre-Approved by Change Control, Patching, Data Corruption, Human Error, etc.) and indicate the type of change (e.g. Manual, Automated, etc.)
Generate reports for incidents

Select an incident and click “Generate Report” from the Quick Actions menu. Select PDF/HTML format and click Download.
The report is created for the incident and placed in the Reports tab. Go to the Reports tab and download the report.

Report status

When you submit a request for generating a report, FIM assigns the following status to the report which you can see in the Report tab during different stages of its processing:

- Accepted: The request for generating the report is accepted.
- In Progress: The report generation is in progress.
- Completed: The report is generated and is available for download.
- Failed: Report generation process failed due to some reason.

Note: If the report is in the “Failed” state or is stuck in a particular state (except Completed state) for a long time, you can run the report again using the "Run Again" options from the Quick Actions menu.

Reopen Closed Incidents

You have an option to reopen a closed incident to modify the incident’s review information. When you reopen an incident, all the review information in the incident such as disposition, change type, approval and other information is set to blank. You can then review the reopened incident, provide review comments and mark it Closed.
To reopen an incident, click Reopen from the Quick Actions menu.

Enter the comments and click Yes.
View assets
You can find assets based on tags and operating system.

Clicking View Details in Quick Actions for an asset shows complete information about the Asset impacted by FIM. Asset details can also be seen from the Events tab by clicking Asset Details for an event. This brings up details of the asset impacted by that FIM event.

How to search
Our search capabilities give you the ability to quickly find events matching certain criteria. Here are the steps to search for events. Search for incidents and assets in a similar way.

You’ll notice the Search field above the Events list. This is where you’ll enter your search query.
Start typing and we’ll show you the event properties you can search like actor process, asset hostname, profile name, etc. Select the one you’re interested in.

Now enter the value you want to match, and click Search. That’s it! Your matches will appear in your events list.

Tip - Go to the FIM online help for details on search language and sample queries.

**Note**

Date range for searching events should be less than or equal to 365 Days. That date range can be any year to any year, but difference between total number of days should be less than or equal to 365 days.
Narrow your results

Once you have your search results you may want to organize them further into logical groupings. Choose a group by option on the left side. You’ll see the number of events or assets per grouping. Click on any grouping to update the search query and view the matching events or assets.
Download your results

By downloading search results to your local system you can easily manage file change events, incidents and assets outside of the Qualys platform and share them with other users. You can export results in multiple formats (CSV, XML, PDF, DOC, HTML, etc).

Just click the Download icon above any list, choose a format and click Download.
Customize Your Dashboard

You can create multiple dashboards and switch between them. Each dashboard has a collection of widgets showing event data of interest. And your dashboards/widgets are updated in real-time.

Switching dashboards

Click the down arrow next to the dashboard name and pick the one you want.

Adding widgets

1) Start by clicking the Add Widget icon on your dashboard.
2) Pick one of our widget templates - there are many to choose from - or create your own.
3) Each widget is unique. For some you’ll select event data, a query and layout - count, table, bar graph, pie chart.

Tip - Wondering how we created the widgets on the default dashboard? Choose Edit from the widget menu to see the settings.
Resizing and layout

Resize any widget horizontally, drag & drop widgets to change the layout.

1) Click the Tools icon on your dashboard.

2) Select Edit Dashboard Layout.

3) Adjust the width for any widget or drag the widget to a new location.

4) Click OK to save your changes.

Refresh your view

You might want to see the latest data for a particular widget.

Hover over the widget, click  and from the widget menu choose Refresh.
Choose the Refresh Dashboard option from the Tools menu to refresh all the widgets.

Creating Dashboards and templates

From the Tools menu you can choose to create a new dashboard from scratch or create a template for your subscription from the current dashboard.

Import / Export options

You can import and export dashboards with corresponding widgets, and import widgets.
Configure rule-based alerts for events and incidents

You can configure FIM to monitor critical events/incidents based on the conditions specified in a rule and send you alert messages by a specified messaging system if events/incidents matching the condition is found. The alert message will have the events/incidents details. For FIM to send alerts, you need to first configure a rule action to specify what action to be taken when events matching a condition is found. FIM will use the rule action settings to send you the alerts.

Finally, create an alert rule to specify the conditions for triggering the rule and select rule actions that you have configured earlier for sending the alert message when a rule is triggered.

Create a new action

Create a new action to define a mode of communication such as Email, PagerDuty or Post to Slack to be used for sending alert messages. To create an action, go to Responses > Actions and then click New Action.

Provide required details in the respective sections to create a new action:

- In the Basic Information section, provide name and description of the action in the Action name and Description fields respectively.

- Select an action from the Select Action drop-down and provide the settings for configuring the messaging system that FIM will use to send alerts.

- We support these three actions: Send Email (Via Qualys)/Send Email (Your SMTP), Post to Slack and Send to PagerDuty for alerts.

  a) Select "Send Email (Via Qualys)"/"Send Email (Your SMTP)" to receive email alerts. Specify the recipients’ email ID who will receive the alerts, subject of the alert message and the customized alert message. Note that based on the configuration settings you will see either of the two options.

  b) Select "Send to PagerDuty" to send alerts to your PagerDuty account. Provide the service key that FIM will require to connect to your PagerDuty account. In Default Message Settings, specify the subject and the customized alert message.
c) Select “Post to Slack” to post alert messages to your Slack account. Provide the Webhook URI that FIM will use to connect to your slack account to post alert messages. In Default Message Settings, specify the subject of the alert message and the customized alert message.

Manage Actions

View the newly created actions in the Actions tab with the details such as name of the action, type of the action, the number of rules for which this action is chosen are active or inactive and the user who created the rule. You can use the Actions menu or Quick Actions menu to edit, delete actions and save an existing action along with its
Configure rule-based alerts for events and incidents

Create a new alert rule

You can create a new rule from the following pages:

1) Go to Responses > Rule Manager and click New Rule.

2) Go to the Dashboard tab and choose a widget that is using a customized query for fetching the widget data. Then select the Widget menu and choose “Create Rule from this Widget” to create alert rules based on the customized query that you used for creating the widget.
Configure rule-based alerts for events and incidents
Create a new alert rule

Note that a search query is required in the "Query for the data in the widget" field to create a rule from a widget.

3) Go to the Events > All Events tab or Events > Event Review tab. Enter a search query in the search box and press Enter. Click menu button next to search box and select “Create Alert Rule from Search Query”. When you create an alert rule, the search query provided on the page is copied to the new rule.

4) Go to Incidents. Enter a search query in the search box and press Enter. Click menu button next to search box and select “Create Alert Rule from Search Query”. When you create an alert rule, the search query provided on the page is copied to the new rule.

Provide required details in the respective sections to create a new rule:

- In the Rule Information section, provide a name and description of the new rule in the Rule Name and Description.

- In the Rule Query section, choose Events or Incidents and specify a query for the rule. The system uses this query to search for events/incidents. Use the Test Query button to test your query. Click the "Sample Queries" link to select from predefined queries.

- In the Trigger Criteria section, choose from three trigger criteria that work in conjunction with the rule query. The trigger criteria are: Single Match, Time-Window Count Match and Time-Window Scheduled Match. See Trigger Criteria.
Configure rule-based alerts for events and incidents
Create a new alert rule

- In the Action Settings section, choose the actions that you want the system to perform when an alert is triggered.

**Trigger criteria**

- Select "Single Match" if you want the system to generate an alert each time the system detects an event/incident matching your search query.

- Select “Time-Window Count Match” when you want to generate alerts based on the number of events/incidents returned by the search query in a fixed time interval. For example, an alert will be sent when three matching events are found within 15 minutes window.
- Select "Time-Window Scheduled Match" when you want to generate alerts for matching events or incidents found during a scheduled time. The rule will be triggered only when an event/incident matching your search criteria is found during the time specified in the schedule. Choose a date and time range for creating a schedule and specify how often you want to run the schedule. For example, send daily alerts with all matches in a scheduled window between 4.56 pm and 5.56 pm.

For the Weekly option, select the days of the week on which the rule will run. For example, send weekly alerts with all matches generated between 4.56 pm and 5.56 pm every Monday and Wednesday.
Configure rule-based alerts for events and incidents

Manage alert rules

For the Monthly option, specify the day of the month on which the rule will run. For example, send monthly alerts on the first day of every month.

For “Select Time-Window Count Match” and “Select Time-Window Scheduled Match”, you have the option to aggregate the alerts by aggregate groups such as based on action, asset host name and so on. When you choose an aggregate alert option as “Yes” for a rule, FIM combines all the alerts generated during a schedule under a selected aggregate group and when the schedule ends, FIM sends a single alert message that contains all the alerts. If you select aggregate alerts option as “No”, then FIM sends you an alert message for each alert generated between the start and end of a specified schedule.

Manage alert rules

Rule Manager tab lists all the rules that you have created with rule name, trigger criteria selected for the rule, alert message aggregating enabled or disabled for the rule, action chosen for the rule, date and time when the rule is last triggered and state of the rule, whether the rule is enabled or disabled and created date and time of the rule. You can use the Actions menu or Quick Actions menu to edit, enable, disable, delete rules and save an existing rule along with its configuration to create a new rule with a new name. Use the search bar to search for rules using the search tokens.

Note that Last Triggered value for a rule is shown after the rule is triggered.
Manage alerts

Activity tab lists all the alerts. Here you will see for each alert, rule name, alert status to indicate whether sending of the alert is success, error or retrying (if the attempt to send the alert is not success), aggregate enabled (Yes) or aggregate disabled (No) for the rule, action chosen for the rule, matches found for the rule and the user who created the rule.

Search for alerts using our search tokens (1), select a period to view the rules triggered during that time frame (2), click any bar to jump to the alerts triggered in a certain timeframe (3), use these filters to group the alerts by rule name, action name, email recipients and status (4).
Configure correlation rules to auto-create incidents

We can help you automate the incident creation based on a QQL rule query defined in a correlation rule. To help you create correlation rules, FIM provides a Correlation Rule wizard. In the wizard, define a query to specify for which events you want to create incidents and a schedule to indicate when and how often you want to run the rule to create incidents for the events that matched the rule query.

Through auto correlation rules, incidents will get created when there is an event created that matches the Incident criteria. The correlation rule wizard also provides you an option to create alerts for the incidents that are created for this rule.

You can access the correlation wizard from the following pages:

1) Go to Incidents > Correlation Rules tab.
2) Go to Events > All Event tab or Events > Event Review tab. Enter a search query in the search box and press Enter. Click menu button next to search box and select “Create Correlation Rule from Search Query”. When you create a correlation rule, the search query provided on the page is copied to the new correlation rule.
3) Go to the Assets tab, select an asset and from the Quick Actions menu select “Create Correlation Rule” to create a correlation rule for an asset. When you create a correlation rule for an asset, the agent ID of the asset is copied to the new correlation rule. Use the operators “and/or” to customize your search query.

Create a correlation rule using correlation rule wizard

Provide the correlation rule name and description. Enter a rule query. When the rule is triggered, the events matching the rule query are picked and added to the incidents. Optionally, use the Choose from my saved searches option to select a search query. We also provide a Query Library from which you can choose predefined queries.
Configure correlation rules to auto-create incidents
Create a correlation rule using correlation rule wizard

Schedule the rule

Next, select the schedule to indicate when and how often you want to run the rule. By default, the rule will be run once. Schedule the rule by choosing a date, a start and end time. To set a recurring schedule, select Recurring Job check box. You have the option to schedule the rule to run daily between a specified time, every week or every month on chosen days between a specified time period.

FIM also supports cross date scheduling. Correlation can start at 10 pm on day 1 and end at 2 am on day 2 (effective schedule of 4 hours). If the end time is less than or equal to start time, the end time is considered as the time of next day. There is no end date for the schedule. User can deactivate or delete a correlation rule to stop creating incidents for the rule.

The scheduler runs every 5 minutes to pick up new jobs. Hence, it is recommended that while creating a schedule, you choose a "Start Time" greater than 15 minutes from the current time for a job to get picked up. If you choose a Start Time less than 15 minutes, it is possible that by the time you have created the rule, the scheduler has already picked up the job. In such a case your job will be picked up in the next scheduled cycle. This means One Time rule will never run as the time set for running the rule has already passed and if it is a Recurring rule, it will run at the next schedule.

When the correlation rule is run during the scheduled time, FIM will pick up all the events that are raised during the scheduled time and that match the search query provided in the rule. All these events are then added to the newly created incident. The naming convention used for incidents is correlation rule name followed by incident creation date and time. Note that you cannot change the Trigger criteria of a correlation rule in the edit mode.

![Schedule Management](image.png)
Choose review options for the auto created incidents

Finally, select an approval type to indicate if you want to automate the review process for the incident or manually review the incident. For Automated approval type, select a disposition category for reporting and classification, choose whether the incident resulted from a manual or automated change, mark the incident Approved, Unapproved Change or Policy Violation and provide a comment. Click Save to create the correlation rule.
Create an alerting rule for incidents

While saving a correlation rule, the Correlation rule wizard gives you an option to create alerts for the incidents created for a correlation rule.

When you choose the option to create a rule, FIM opens the Alert Rule wizard to help you configure the alert rule. The new alert rule name and description will be the same as the correlation rule name and description from which the alert rule is created. The search query for the alert rule will default to Incidents and a query is created with incident status open or closed and correlation rule ID. See Creating a rule based alert.
Configure correlation rules to auto-create incidents

Note that the option to create an alerting rule is available only when you create a new correlation rule.

Manage correlation rules

The Correlations Rules tab lists all the correlation rules. The page shows details such as the name of the rule, whether the rule is currently active or deactivated, reviewer of the incident. The page also shows approval status, change type and disposition category
Configure correlation rules to auto-create incidents

Manage incidents

values for approval type selected as Manual for incidents when creating/editing the rule. The Quick Actions menu on the page provides you options to view, edit, delete, activate/deactivate a rule and view the incidents of a rule.

Manage incidents

All the incidents generated for a correlation rule are listed in the All Incidents tab with type as "Automated". Note that you can not delete incidents that are generated for a correlation rule. Activate/deactivate option will be available for correlation rule that has a recurring schedule.

Review incidents

An incident generated for a correlation rule is available for manual review after a grace period of 10 minutes from the scheduled end time of the rule. The “Start Review” option on the Quick Actions menu will be available for the incident after the grace period ends.