



# **TIBCO Hawk<sup>®</sup> Microagent for TIBCO BusinessWorks<sup>™</sup> Container Edition**

## **Installation and Configuration**

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# TIBCO Hawk Microagent for TIBCO BusinessWorks Container Edition Overview

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By using this TIBCO Hawk microagent, you can monitor the applications in TIBCO BusinessWorks™ Container Edition (CE).

The microagent uses TIBCO® Operational Intelligence Hawk® RedTail for monitoring. The TIBCO Hawk Application Management Interface (AMI) API instruments the TIBCO BusinessWorks CE deployments, which make the deployments more manageable. For more details about the Hawk AMI API, see [TIBCO® Operational Intelligence Hawk® RedTail documentation](#).

TIBCO® OI Hawk® RedTail is a sophisticated hybrid monitoring and management application for distributed applications and systems deployed on both on-premises and container-based PaaS platforms by using rulebases and microagents. It allows for remediation actions when specific conditions are detected. TIBCO OI Hawk RedTail also enables multidomain monitoring and deeper analysis of metrics with centralized time-series metrics storage, advanced visualization dashboards, and preconfigured Content Packs. TIBCO OI Hawk RedTail allows persona-driven role-based access control to advanced features. In addition, Hawk® Microagent for TIBCO BusinessWorks Container Edition provides methods to perform the following tasks:

- Retrieve TIBCO BusinessWorks Container Edition AppNode details.
- Retrieve the details of TIBCO BusinessWorks processes in the deployed TIBCO BusinessWorks Container Edition applications.
- Collect statistics for the TIBCO BusinessWorks processes and their activities.
- Asynchronously subscribe to retrieve information about the TIBCO BusinessWorks Container Edition process, activity, and transition events from the internal processing pipeline.

The microagent (`COM.TIBCO.hawk.microagent.BWCEHawkMicroagent`) contains the methods required for monitoring TIBCO BusinessWorks Container Edition. `BWCEHawkMicroagent` and its methods can also be accessed from the microagents list in the Hawk RedTail Console. For more information about the methods provided with `BWCEHawkMicroagent`, see [BWCEHawkMicroagent: Microagent Methods](#).

## Related links

- For information about TIBCO OI Hawk RedTail, see the [TIBCO® Operational Intelligence Hawk® RedTail](#) documentation.
- For more information about TIBCO BusinessWorks™ Container Edition, see the documentation of [TIBCO BusinessWorks™ Container Edition](#).

# Installing Hawk Microagent for TIBCO BusinessWorks Container Edition

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This microagent enables you to monitor the TIBCO BusinessWorks Container Edition applications. To start monitoring the applications, you must add the microagent JAR files to the Docker image for TIBCO BusinessWorks Container Edition and then run the TIBCO BusinessWorks Container Edition (that contains the microagent) with the TIBCO OI Hawk RedTail containers.

## Procedure

1. Add the microagent JAR files to the Docker image for TIBCO BusinessWorks Container Edition. For more information, see [Adding the Microagent JAR Files to the TIBCO BusinessWorks CE Docker Image](#).
2. Run the TIBCO BusinessWorks Container Edition container (that contains the microagent) with the Hawk containers. For more information, see [Running the TIBCO BusinessWorks Container with the TIBCO OI Hawk RedTail Containers](#).

## Adding the Microagent JAR files to the TIBCO BusinessWorks Container Edition Docker Image

This section explains the procedure to add the microagent JAR files to the TIBCO BusinessWorks Container Edition Docker image.

### Before you begin

- Install Docker on the machine. For the installation procedure, see [Docker](#) documentation.

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- From the [TIBCO eDelivery](#) website, download the .zip file for Hawk Microagent for TIBCO BusinessWorks Container Edition. Extract the .zip file to get the following JAR files:
  - `com.tibco.hawk.microagent.bwce_<version>.jar`
  - `com.tibco.hawk.tcp.ami_<version>.jar`
- From the [TIBCO eDelivery](#) website, download and install TIBCO BusinessWorks Container Edition. For information about TIBCO BusinessWorks Container Edition installation, see the [TIBCO BusinessWorks Container Edition](#) documentation.

## Procedure

1. Create a base Docker image of TIBCO BusinessWorks Container Edition. For details, see the [TIBCO BusinessWorks Container Edition](#) documentation.
2. Create a Docker file with the following content in the temporary directory where you extracted the microagent JAR files. This Docker file copies the extracted JAR files to the TIBCO BusinessWorks Container Edition base Docker image.

```
FROM tibco/bwce:<tag>
COPY com.tibco.hawk.microagent.bwce_<version>.jar
  /resources/addons/jars
COPY com.tibco.hawk.tcp.ami_<version>.jar /resources/addons/jars
COPY <your_application>.ear /bwapp.ear
```

`<tag>`: replace this with the tag that was used to create the TIBCO BusinessWorks Container Edition Docker image in step 1.

3. To build the Docker image, run the following command:

```
docker build -t <TAG NAME> .
```

For example

```
docker build -t hkbwce:2.1 .
```

4. To verify whether the Docker image is successfully created, run the following

command:

```
docker images
```

## Result

The newly created Docker image is displayed in the list of Docker images.

# Running the TIBCO BusinessWorks Container with the TIBCO OI Hawk RedTail Containers

To use Hawk Microagent for TIBCO BusinessWorks Container Edition, you must run the TIBCO BusinessWorks container (that contains the microagent) with TIBCO OI Hawk RedTail containers. You must connect the microagent to the Hawk agent container using TCP transport. You must configure the connection by using the `ami_tcp_session` and `ami_agent_url` environment variables. The Hawk agent container listens for the incoming Hawk AMI session requests on the URL set by the `ami_tcp_session` environment variable. The microagent provides the `ami_agent_url` environment variable to connect to the Hawk agent container.

You can run the TIBCO BusinessWorks containers that contain the microagent in standalone mode or in PaaS environments, for example, Kubernetes.

## Related links:

- For more information about the environment variables available for the Hawk agent container, see [TIBCO® Operational Intelligence Hawk® RedTail](#) documentation.
- For more information about the environment variables available for Hawk Microagent for TIBCO BusinessWorks Container Edition, see [Environment Variables for Hawk Microagent for TIBCO BusinessWorks Container Edition](#).

## Running the TIBCO BusinessWorks Container in Standalone Mode

You can run the TIBCO BusinessWorks container with the microagent in standalone mode by using the Docker Compose tool. The Docker Compose tool is used for running multicontainer Docker applications. With the Docker Compose tool, you can define the configurations for the microagent, TIBCO BusinessWorks container, and TIBCO OI Hawk RedTail containers in a `docker-compose` file and run all the containers using a single command.

### Before you begin

No.	Task	Reference
1	From the <a href="#">TIBCO eDelivery</a> website, download and install TIBCO OI Hawk RedTail	<a href="#">TIBCO® Operational Intelligence Hawk® RedTail</a> documentation
2	Install Docker on the machine and perform the initial setup based on your operating system.	<a href="https://docs.docker.com">https://docs.docker.com</a>
3	Download and install the Docker Compose tool.	<a href="https://docs.docker.com/compose/">https://docs.docker.com/compose/</a>

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## Creating a Docker-compose.yml file

The `docker-compose.yml` file contains the configurations for the Hawk Microagent for TIBCO BusinessWorks Container Edition container. Append the following to the `docker-compose.yml` in the `samples` folder of TIBCO OI Hawk RedTail located at `OIHR_HOME/redtail/samples/docker/`. For more information, see the *TIBCO® Operational Intelligence Hawk® RedTail Installation, Configuration, and Administration Container Edition* guide.

The following sample shows the configuration of Hawk Microagent for TIBCO BusinessWorks Container Edition container in the `docker-compose.yml` file:



```

bwcontainer:
image: hkbwce:latest
environment:
  ami_agent_url: <HawkAgent_Container_Name>:2571
  tcp_self_url: bwcontainer:2655
  BW_JAVA_OPTS: -Dbw.smartengine.appStatistics.enabled=true
  bw_hawk_hma_tcp_max_reconnect_attempts_during_connect: '20'
  bw_hawk_hma_tcp_max_reconnect_attempts_after_restart: '1000'
  microagent_suffix: samplehkbwceApp
ports:
  - '2655:2655'

```

**i Note:** Ensure that the `ami_agent_url` environment variable value set in TIBCO BusinessWorks Container Edition is same as the `ami_tcp_session` environment variable value set in the Hawk agent container.

## Viewing Container Logs

### Procedure

1. To view logs of a particular container, run the following command:

```
docker logs <container_id>
```

### Result

You can access the microagent using Hawk RedTail Console at `https://<Host_IP>:<webapp_port>/redtail`.

## Running the TIBCO BusinessWorks Container in Kubernetes

### Before you begin

- Download and install kubectl, the Kubernetes CLI tool. For details about installation

and configuration, see the [kubect](#) documentation.

**i Note:** When you obtain third-party software or services, it is your responsibility to ensure you understand the license terms associated with such third-party software or services and comply with such terms.

- Set up a Kubernetes cluster.

## Procedure

1. Deploy the TIBCO OI Hawk RedTail components on the Kubernetes cluster. For more details, see the [TIBCO® Operational Intelligence Hawk® RedTail](#) documentation.
2. Create `hkbwce.yaml` file in a temporary directory and add the following content:

```
apiVersion: v1
kind: Pod
metadata:
  name: hkbwce
  namespace: redtail
  labels:
    name: hkbwce
    app: hkce
spec:
  containers:
    - name: bwcontainer
      image: hkbwce:latest
      env:
        - name: HOST_NAME
          valueFrom:
            fieldRef:
              apiVersion: v1
              fieldPath: status.podIP
        - name: HOST_IP
          valueFrom:
            fieldRef:
              fieldPath: status.hostIP
        - name: tcp_self_url
          value: $(HOST_NAME):2655
        - name: ami_agent_url
          value: redtail-agent-0.redtail-agent:2571
        - name: BW_JAVA_OPTS
          value: -Dbw.smartengine.appStatistics.enabled=true
```

```

- name: bw_hawk_hma_tcp_max_reconnect_attempts_during_connect
  value: '20'
- name: bw_hawk_hma_tcp_max_reconnect_attempts_after_restart
  value: '1000'
#These are optional fields.
- name: microagent_suffix
  value: hkbwceApp1
ports:
- containerPort: 2655
  protocol: TCP

```

**i Note:** Ensure that the `ami_agent_url` environment variable value set in TIBCO BusinessWorks Container Edition is same as the `ami_tcp_session` environment variable value set in the Hawk Agent container.

3. Run the following command to deploy TIBCO BusinessWorks Container Edition with the microagent in Kubernetes.

```
kubectl create -f hkbwce.yml
```

## Viewing Pod Logs

### Procedure

1. To view logs of a particular pod, run the following command:

```
kubectl logs <pod_id>
```

## Environment Variables for Hawk Microagent for TIBCO BusinessWorks Container Edition

You can use the following Hawk Microagent for TIBCO BusinessWorks Container Edition environment variables to configure it with Hawk agent container:

Environment variables	Description	Optional
tcp_self_url	Specifies the self URL for TCP Transport for TIBCO Hawk. The URL is in the form <SELF_IP_ADDRESS>:<PORT>.	No
ami_agent_url	Specifies the URL used by the microagent to connect to Hawk agent container using Hawk TCP AMI session.	No
microagent_suffix	Specifies the suffix for the microagent name. The default value is used if no value is specified for the variable.  <b>Default value:</b> Application name	yes
tcp_enabled_algorithms	Algorithm to be used for the security protocol.  <b>Default value:</b> TLS_RSA_WITH_AES_128_CB C_SHA	yes
tcp_key_password	Encrypted key password	yes
tcp_key_store	Path of the key store file	yes
tcp_key_store_password	Password for the key store file	yes
tcp_ssl_protocol	Protocol for a secure connection  <b>Default value:</b> TLSv1.2	yes
tcp_trust_store	Path for the trust store file	yes
tcp_trust_store_password	Password for the trust store file	yes
BW_JAVA_OPTS	Enables or disables process activity statistics instrumentation. Based on your requirement, you can set the value as one of the following: <ul style="list-style-type: none"> <li>-Dbw.smartengine.appStatistics.enabled=false: Disables process activity statistics instrumentation</li> </ul>	yes

Environment variables	Description	Optional
	<ul style="list-style-type: none"> <li>-Dbw.smartengine.appStatistics.enabled=true: Enables process activity statistics instrumentation</li> </ul>	
bw_hawk_hma_ tcp_max_ reconnect_ attempts_ during_connect	Denotes the number of reconnect attempts to be made when the HKBWCE microagent is unable to connect to the ami_tcp session on the first attempt	yes
	<b>Default value:</b> 20	
bw_hawk_hma_ tcp_max_ reconnect_ attempts_ after_restart	Denotes the number of reconnect attempts to be made when the HKBWCE microagent connection gets disconnected after a connection has been established	yes
	<b>Default value:</b> 1000	

# BWCEHawkMicroagent: Microagent Methods

Hawk agent uses BWCEHawkMicroagent to collect information from the TIBCO BusinessWorks Container Edition applications and operate using that information. BWCEHawkMicroagent runs specific tasks known as methods. Methods collect information and perform tasks. They can be called directly or from within a Hawk rulebase.

This section provides a complete list of all the available methods for BWCEHawkMicroagent.

## Method Type

Hawk microagent methods are classified by the functions they perform and can be of the following types:

- **IMPACT\_INFO**: Returns information
- **IMPACT\_ACTION**: Performs an action on the TIBCO Hawk system
- **IMPACT\_ACTION\_INFO**: Returns information and takes an action based on it

## Method Output

Methods can return information by invocation or subscription. Invocation returns information on a one-time basis. Subscription information is returned either synchronously, on a regular time schedule, or asynchronously, when data becomes available. Method invocation returns a table of results, according to specified arguments (if any).

## Methods

*AppNode, Application, and Component Methods*

Method Name	Description	Invoke/Subscribe	Arguments	Output
getBWEngineInfo	Retrieves information	Invoke/subscribe	None	Name Thread Count

Method Name	Description	Invoke/Subscribe	Arguments	Output
	about TIBCO BusinessW orks Container Edition engine currently installed on the appnode			Step Count Debugger Port Debugger Interface Persistence Mode Group Name Group Provider Technology State Errors
getBWApplication	Retrieves details of the application deployed on the container	Invoke/subsc ribe	None	Name Version Application Module Shared Module State State-bit BWProcessStatisticsCollec tionEnabled
getAppNodeRuntimeIn fo	Retrieves information about runtime state of TIBCO BusinessW orks Container Edition	Invoke/subsc ribe	None	AppNode Name AppNode State Config State System Process Id Up Since

Method Name	Description	Invoke/Subscribe	Arguments	Output
	appnode			
getBWApplicationProcessInfo	Retrieves information about system process of TIBCO BusinessWorks Container Edition application.	Invoke/subscribe	None	System Process ID Active Thread Count Total Memory Used Memory Free Memory Used Memory Percentage Used CPU Percentage Up Since Up Since in Milliseconds Application Name Application Version
getProcesses	Retrieves the details of the process names in the deployed application on the container	Invoke/subscribe	None	Application Name Application Version Process Name Module Name
getProcessIntanceCount	Returns the total number of running process instances	Invoke/subscribe	Process Name (Optional)	Application Name Application Version Total Running Processes



Method Name	Description	Invoke/Subscribe	Arguments	Output
	for the given application			
getProcessInstanceInfo	Retrieves information about the running process instances for a given application	Invoke/subscribe	Process ID (Optional) Process Name (Optional)	Process ID Process Name Parent Process Name Main Process Name Application Name Application Version Status Start Time Duration Duration in numeric type
suspendComponent	Suspends the specific component inside a TIBCO BusinessWorks Container Edition application	Invoke	Component Name	None
resumeComponent	Resumes the specific component inside a TIBCO	Invoke	Component Name	None

Method Name	Description	Invoke/Subscribe	Arguments	Output
	BusinessWorks Container Edition application			
getComponentStatus	Returns details of components inside a TIBCO BusinessWorks Container Edition application.	Invoke/subscribe	Component Name (Optional)	Name State State code Activation status Starter state Starter state code Process Name Application Name Application Version
getThreadInfo	Returns the details of a specific thread or all threads running on a particular Java Virtual Machine such as execution information, synchronization statistics of	Invoke/subscribe	Thread Name (optional)	Application Name Application Version Thread Name Thread ID Thread State User Time isInNative Suspended Blocked Count Blocked Time

Method Name	Description	Invoke/Subscribe	Arguments	Output
	a specific thread or all threads			Lock Name Lock Owner Name Lock Owner Id Waited Count Waited Time UncaughtException StackTrace
getVirtualMachineInfo	Detects all the Java Virtual Machines started by a user on the local machine and retrieves their detailed information	Invoke/subscribe	None	Name Application Name Applictaion Version Start Time Up Time VM Name VM Vendor Version Current Heap Size Committed Memory Maximum Heap Size Free Heap Size Heap Usage Percentage Non-Heap Memory Used Live Threads Peak Threads

Method Name	Description	Invoke/Subscribe	Arguments	Output
				Daemon Threads
				Total Threads Started
				Current classes loaded
				Total classes loaded
				Total classes unloaded
getMemoryPoolInfo	Returns the details of memory pools of the Java Virtual Machine process started by a user on a local computer	Invoke/subscribe	None	Application Name Application Version Memory Pool Name Peak Usage Committed Peak Usage Init Peak Usage Max Peak Usage Used Memory Pool type Current Usage Committed Current Usage Init Current Usage Max Current Usage Used

#### Statistics Collection Methods

Method Name	Description	Invoke/Subscribe	Arguments	Output
enableProcessStats	Enables statistics collection for the application	Invoke	Process Name (Optional)	None

Method Name	Description	Invoke/Subscribe	Arguments	Output
	processes			
disableProcessStats	Disables statistics collection for the application processes	Invoke	Process Name (Optional)	None
listProcessesEnabledForStats	Lists all processes currently enabled for statistics collections on the appnode	Invoke/subscribe	None	Process Name
getProcessStats	Retrieves statistics about the processes that are running for the given application because the instrumentation is enabled	Invoke/subscribe	Process Name (Optional)	Process Name Main Process Name Application Name Application Version Module Name Module Version Created

Method Name	Description	Invoke/Subscribe	Arguments	Output
				Suspended
				Failed
				Completed
				Total Execution
				Average Execution
				Total Elapsed
				Average Elapsed
				Min Elapsed
				Max Elapsed
				Min Execution
				Max Execution
				Most Recent Execution Time
				Most Recent Elapsed Time

Method Name	Description	Invoke/Subscribe	Arguments	Output
				Count Since Reset
getActivityStats	Retrieves statistics about the activities of processes that have been executed for a given application since the instrumentation is enabled	Invoke/subscribe	Process Name (Optional)	Activity Name Process Name  Application Name  Application Version  Execution Count  Error Count  Last Return Code  Execution Time  Elapsed Time  Min Elapsed Time  Max Elapsed Time

Method Name	Description	Invoke/Subscribe	Arguments	Output
				Min Execution Time
				Max Execution Time
				Most Recent Execution Time
				Most Recent Elapsed Time
				Execution Count Since Reset
resetProcessStats	Resets the minimum, maximum, and average time statistics for the specified process	Invoke	Process Name (Optional)	None
resetActivityStats	Resets the minimum and maximum time statistics for each activity in the specified process	Invoke	Process Name (Optional)	None



*Event Subscription Methods*

Method Name	Description	Invoke/Subscribe	Arguments	Output
getTracing	Returns list of traces with details	Invoke/subscribe	TraceId	TraceId ProcessName ActivityName TransitionName ActivityPayload
addTracing	Adds tracing for the specified parameters. Use either asterisk(*) or exact names.  <b>Note:</b> Adding multiple traces impacts the application performance.	Invoke	ProcessName ActivityName TransitionName ActivityPayload	TraceId
onProcessEvent	Gives information about each TIBCO BusinessWorks CE process event from the	Subscribe	None	Type ApplicationName ApplicationVersion ComponentName ModuleName ModuleVersion

Method Name	Description	Invoke/Subscribe	Arguments	Output
	EventBus. Use addTracing to get relevant TIBCO BusinessWo rks CE process events.			Timestamp  ComponentProcessName  CustomJobId  JobId  ParentProcessInstanceId  ParentProcessName  ProcessInstanceEndTime  ProcessInstanceFaultMsg  ProcessInstanceFaultStack  ProcessInstanceFaultCauseMsg  ProcessInstanceFaultCauseStack  ProcessInstanceId  ProcessInstanceStartTime  ProcessInstanceState  ProcessName  BWTimestamp  TraceId
onActivityEvent	Gives information about each TIBCO BusinessWo rks CE	Subscribe	None	Type  ApplicationName  ApplicationVersion  ComponentName

Method Name	Description	Invoke/Subscribe	Arguments	Output
	activity event from the EventBus. Use addTracing to get relevant TIBCO BusinessWorks CE activity events.			ModuleName ModuleVersion Timestamp ActivityEndTime ActivityEvalTime ActivityExecutionId ActivityName ActivityStartTime ActivityState IterationCount ParentActivityExecutionId ProcessInstanceId ProcessName BWTimestamp SerializedInputDataLength SerializedInputDataArray SerializedOutputDataLength SerializedOutputDataArray LoopStructure

Method Name	Description	Invoke/Subscribe	Arguments	Output
				TraceId
onTransitionEvent	Gives information about each TIBCO BusinessWorks CE activity transition event from the EventBus. Use addTracing to get relevant TIBCO BusinessWorks Container Edition transition events.	Subscribe	None	Type ApplicationName ApplicationVersion ComponentName ModuleName ModuleVersion Timestamp ProcessInstanceId ProcessName TransitionName TraceId
removeTracing	Deletes traces for the given TraceId	Invoke	TraceId	None

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For information about this product, you can read the documentation, contact TIBCO Support, and join TIBCO Community.

## How to Access TIBCO Documentation

Documentation for TIBCO products is available on the [TIBCO Product Documentation](#) website, mainly in HTML and PDF formats.

The [TIBCO Product Documentation](#) website is updated frequently and is more current than any other documentation included with the product.

## Product-Specific Documentation

The following documentation for this product is available on the [TIBCO Hawk® Microagent for TIBCO BusinessWorks™ Container Edition](#) product documentation page:

- *TIBCO Hawk® Microagent for TIBCO BusinessWorks™ Container Edition Release Notes*
- *TIBCO Hawk® Microagent for TIBCO BusinessWorks™ Container Edition Installation and Configuration*

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- For creating a Support case, you must have a valid maintenance or support contract with TIBCO. You also need a user name and password to log in to [TIBCO Support](#) website. If you do not have a user name, you can request one by clicking **Register** on the website.

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