

Foglight for AWS Hosts

Cartridge Guide

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Introduction to AWS Hosts

Amazon Web Services (AWS), a subsidiary of Amazon, is the world's most comprehensive and broadly adopted cloud platform, offering over 200 fully-featured services from data centers globally. The AWS Cloud spans 77 Availability Zones within 24 geographic regions worldwide, with plans announced for 18 more Availability Zones and six more AWS Regions. Partners number in the millions and span all sizes and industries.

AWS provides services hosted on various Linux/Unix and Windows operating systems. These services include Amazon Elastic Cloud Compute (EC2) and Amazon Relational Database Service (RDS). EC2 provides secure, scalable compute capacity in the cloud and direct access to a virtual machine customized to the user's needs. RDS provides several database engine types and automates many administrative tasks while providing easy scalability.

Foglight for AWS Hosts Overview

Foglight for AWS Hosts brings comprehensive, non-siloed, enterprise-class monitoring to the industry's leading cloud computing platform. Used standalone, Foglight for AWS Hosts is a robust monitoring solution providing insight into applications. When used in conjunction with other Foglight monitoring components, operators can collect and correlate information across infrastructure layers. This added value makes Foglight for AWS Hosts an invaluable part of this industry-leading Database Performance Monitoring solution.

Foglight for AWS Hosts monitors all operating systems and database engines for EC2 and RDS, bringing in critical availability data and in-depth performance metrics on the system and individual process usage of CPU, memory, network, and disk resources. By accessing data from multiple AWS sources, including the AWS SDK for Java API, CloudWatch, and CloudWatch Logs services, Foglight for AWS Hosts brings together performance data for EC2 and RDS hosts into a unified interface.

Ease of Installation

Installation of the solution takes only minutes. One remote agent can monitor an entire AWS region. Configuration requires only a valid IAM user with the necessary permissions and IDs for the EC2 and RDS instances you wish to monitor. Aurora Cluster nodes are automatically discovered and monitored without the need to reconfigure the agent when nodes are added or removed.

Data Visualization and Reporting

Foglight for AWS Hosts provides quick access to vital host statistics. The solution leverages rich dashboards and robust data analysis to quickly uncover critical issues affecting host resource utilization, allocations, and processes. Foglight for AWS integrates data from several AWS sources and incorporates these metrics into logical dashboard groups.

Extensibility

Through the AWS cloud, Amazon offers a broad range of solutions in product categories, including but not limited to Analytics, Business Productivity, Customer Engagement, Database, and Machine Learning. The Foglight for AWS Hosts solution provides the interface necessary to monitor virtually any AWS cloud service. SMA maintains a library of supported services, with new ones being created every day.

Paying Dividends

With feature-rich out-of-the-box dashboards and rules, Foglight for AWS Hosts provides unparalleled insight into your AWS services infrastructure and offers immediate benefits to system administrators. As data is collected, the solution pays additional dividends delivering historical trend analysis, scheduled reports, and improved alerting. Operators can easily create user-defined dashboards to represent data in a manner unique to their organization.

Combined, these features bring great insight into database and application availability and ensure improved access to mission-critical data.

Foglight for AWS Hosts Requirements

Foglight for AWS Hosts uses AWS SDK for Java 2.x and is compatible with all supporting AWS services.

The agent may be run on a FglAM located either on an EC2 instance or off the AWS cloud as long as services are reachable and the IAM user has the necessary privileges. More information on configuration can be found in the [Installing and Configuring Agents](#) section of this document.

Installing and Configuring Agents

Installation instructions for Foglight for AWS Hosts are detailed in the following sections and should be performed in order:

- [AWS Pre-Configuration](#)
- [Cartridge Installation](#)
- [Creating and Configuring Agents](#)

AWS Pre-Configuration

Monitoring of AWS hosts requires the agent to be provided with an AWS Identity and Access Management (IAM) user. That user should have sufficient privileges to access instance metadata as well as access to metrics through CloudWatch. The following is a brief list of steps on how to do this. Skip any steps in user or RDS configuration that were previously completed. For additional information, refer to the complete AWS [IAM Documentation](#) and [RDS Documentation](#).

IAM User Setup

1. Using the IAM service, create an IAM user
2. Create a name for the user and select the "Programmatic Access Option" (uses access ID and secret access key). Save these keys as they are used later for configuring the agent.
3. When configuring permissions, select the "Attach existing policies directly" option and search for and add the following permissions:
 - a. *CloudWatchReadOnlyAccess*
 - b. *AmazonEC2ReadOnlyAccess*
 - c. *AmazonRDSReadOnlyAccess*
4. Finish creating or modifying the user

RDS Enhanced Monitoring Configuration

Enhanced monitoring is supported for all RDS database types except for SQL Server. AWS MS-SQL will be supported in an upcoming release. Enabling enhanced monitoring will allow the collection of more detailed metrics for CPU, Memory, Network, and Disk utilization and tasks and processes. The agent will automatically detect whether enhanced monitoring is enabled for a database, though an agent restart may be necessary if enhanced monitoring is enabled while the agent is running.

1. Create or modify an RDS instance
2. In the Additional Configuration > Monitoring section, check the "Enable Enhanced monitoring" box
3. For the Monitoring Role dropdown, select either an IAM role that has the `AmazonRDSEnhancedMonitoringRole` permission or "default," in which case AWS will automatically create `rds-monitoring-role` and assign it to the database. This role allows the DB instance to publish metrics to the CloudWatch Logs service and can be used for all instances where enhanced monitoring is enabled.

Cartridge Installation

1. Open the Foglight Web Console.
2. From the navigation pane, select: **Dashboards > Administration > Cartridges > Cartridge Inventory**. The Cartridge Inventory screen appears. For more information on agents, see the *Foglight User Guide*.
3. Load the **AWSHostsAgent-7.1.xx.car** file by browsing to the location where the .car file exists and then clicking on "Install Cartridge." Leave the "Enable on Install" check box checked.
4. Once the installation is complete on the Foglight Management Server, the AWSHostsAgent Cartridge will appear in this list below as an installed cartridge.

Cartridge Inventory Feb 23, 2021 3:54:23 AM EST | Reports

Cartridge Inventory

The Cartridge Inventory dashboard contains controls for installing, enabling, disabling, and uninstalling cartridges, as well as for viewing information about the installed cartridges.

Installed Cartridges | Core Cartridges

Install Cartridge Uninstall Enable Disable Reset awshosts

<input type="checkbox"/>	Status	Cartridge Name	Version
<input type="checkbox"/>		AWSHostsAgent	5.9.5.23
<input type="checkbox"/>		AWSHostsAgent	5.9.5.24
<input type="checkbox"/>		AWSHostsAgent	5.9.5.25

Creating and Configuring Agents

Using the Agent Status Dashboard

The Agent Status page can be used to create new agents and configure and manage existing agents. To access the page from the navigation pane, select: Dashboards > Administration > Agents > Agent Status.

Use the following steps to create a new agent instance:

1. If the AWSHosts agent package was not previously deployed to the FglAM hosting the agent, it must be done before an agent has been created, or it will be performed automatically when the first agent is created on that FglAM. You can use the Deploy Agent Package button on the Agent Status or Agent Managers page to perform this.
2. Click the Create Agent button and follow the instructions for the cards:
 - a. **Host Selector** - Choose the Agent Manager on which the agent should run. Considerations for this may include physical or virtual locality to the monitored instance, allocated resources, or grouping with other agents of the same type or monitored environment.
 - b. **Agent Type and Instance Name** – Select the AWSHostsAgent type. Then, select the Specify Name radio button and provide a name for the agent that will be created. This is not canonical and should be representative of the database instance that this agent will monitor.
 - c. **Summary** – Click Finish.
3. Once the agent has been created, click the checkbox next to the AWS Hosts agent.
4. Click the **Edit Properties** button.
5. Select **Modify the default properties for this agent**.
6. Edit the agent properties for the AWS Hosts agent instance:
 - [Setting AWS Connection \(mandatory\)](#)
 - [Setting Collection Periods \(optional\)](#)
7. Click the **Activate** button.

To modify the properties for an existing agent, skip to step 3 and Deactivate, then Reactivate the agents after changing the configuration.

Agent Properties

AWS Connection

Region	<input type="text" value="us-east-1"/>
IAM Access Key	<input type="text"/>
IAM Secret Access Key	<input type="password" value="*****"/>
EC2 Instances	<input type="text" value="ec2InstancesList"/> <input type="button" value="Edit"/> <input type="button" value="Clone"/> <input type="button" value="Delete"/>
RDS Instances (non-Aurora)	<input type="text" value="rdsInstancesList"/> <input type="button" value="Edit"/> <input type="button" value="Clone"/> <input type="button" value="Delete"/>
RDS Aurora Clusters	<input type="text" value="auroraClustersList"/> <input type="button" value="Edit"/> <input type="button" value="Clone"/> <input type="button" value="Delete"/>

Collection Periods (sec)

EC2	<input type="text" value="300"/>
RDS	<input type="text" value="300"/>
Aurora	<input type="text" value="300"/>

Setting AWS Connection (mandatory)

- **Region** – The region for the AWS Hosts to be monitored. Region information for accounts and instances can be found through the AWS Console. NOTE: This differs from the Availability Zone, which will end in a letter. An explanation of these and related terms can be found [here](#). An agent can only monitor instances in a single region, so additional agents will need to be created if multiple regions are used.
- **Access Key ID** – Access Key ID of the IAM user created during pre-configuration or existing user with necessary attached policies.
- **Secret Access Key** – Secret access key for the user described above.
- **EC2 Instances** – List of EC2 Instances to monitor.
 - **Instance ID** – Unique identifier for an EC2 instance. It can be found through the EC2 Instances dashboard. Will be a single alphanumeric string prefixed with "i-."
 - **Display Name (optional)** – An optional display name that will be associated with the EC2 instance and appear in Foglight dashboards. If one is not provided, the agent will find and use the value for the "Name" tag associated with the instance. If that does not exist, the instance ID will be used.
- **RDS Instances (non-Aurora)** – List of non-Aurora RDS Instances to monitor.
 - **DB Instance ID** – Unique DB Identifier for an RDS instance. It can be found through the RDS Databases dashboard.
 - **Display Name (optional)** – An optional display name that will be associated with the RDS instance and appear in Foglight dashboards. If one is not provided, the agent will use the DB Instance ID.
- **RDS Aurora Clusters** – List of Aurora RDS Clusters to monitor. Instances belonging to the cluster will be automatically discovered and do not need to be specified here.
 - **DB Instance ID** – Unique DB Identifier for an Aurora cluster. It can be found through the RDS Databases dashboard.
 - **Display Name (optional)** – An optional display name that will be associated with the Aurora cluster and appear in Foglight dashboards. If one is not provided, the agent will use the DB Instance ID.

Setting Collection Periods (optional)

The Collection Period fields in the agent properties are used to set the sample frequencies. CloudWatch metrics will always be collected in 5-minute segments.

- **EC2** – Period for EC2 instance using the EC2 API. Set to 300 seconds by default.
- **RDS** – Period for RDS instance collections using the RDS API. Set to 300 seconds by default.
- **Aurora** – Period for Aurora cluster collections using the RDS API. Set to 300 seconds by default.

Upgrading the Agent

1. Go to Dashboards > Administration > Cartridges > Cartridge Inventory and click the Install Cartridge button.
2. Locate the .car file on your system and install it with auto-enable selected.
3. Once the Cartridge is installed and enabled, go to Dashboards > Administration > Agents > Agent Managers. Agent Managers that can be upgraded with newer agent packages will show "yes" in the Upgradable | Agents column. Select all Agent Managers you wish to upgrade and click the Upgrade or Deploy Agent Package button and select the AWSHosts package.

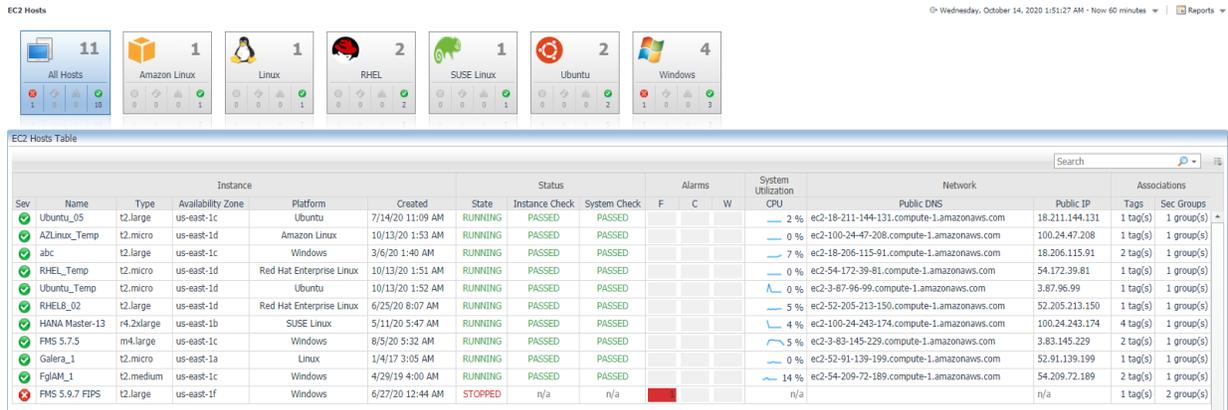
Note: If an Agent Manager is not upgradable, check that the Agent Manager version is compatible with the newer agent version. If it is not, the Agent Manager will need to be upgraded first.

AWS Hosts Dashboards

The installation of the AWS Hosts Cartridge includes the AWS Hosts Dashboards. The AWS Hosts Cartridge offers these main dashboards:

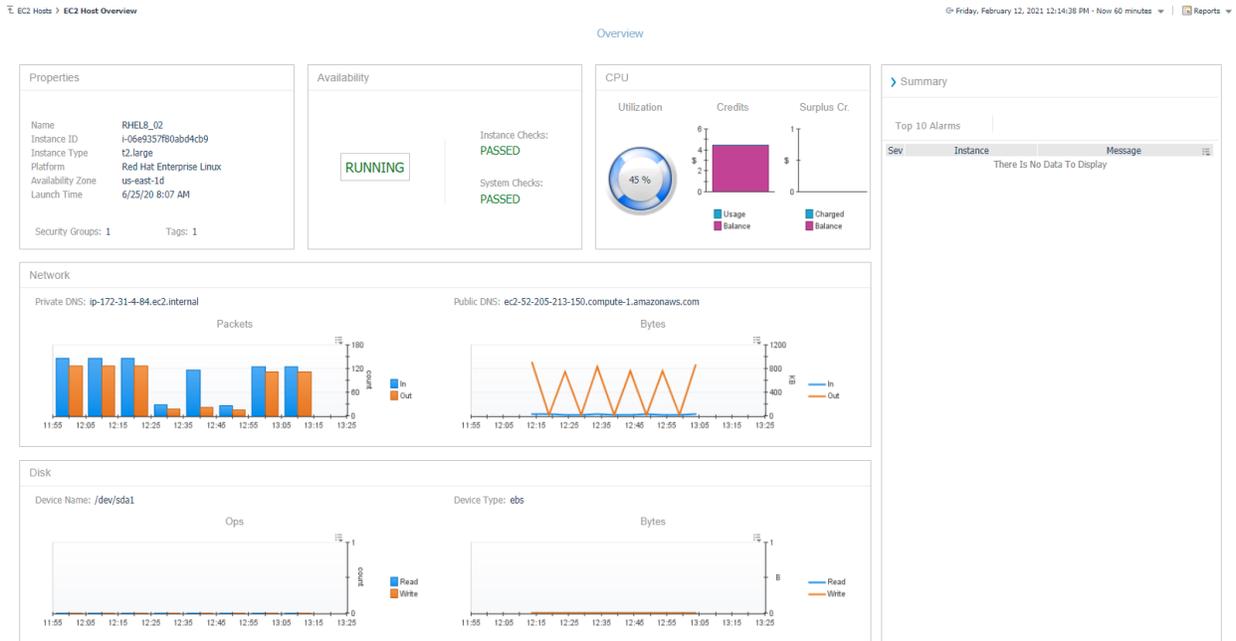
- EC2 Hosts
- EC2 Overview
- RDS Hosts
- RDS Host Overview
- RDS CPU/Memory (if enhanced monitoring is enabled)
- RDS Processes (if enhanced monitoring is enabled)
- RDS Network (if enhanced monitoring is enabled)
- RDS Disk (if enhanced monitoring is enabled)

EC2 Hosts



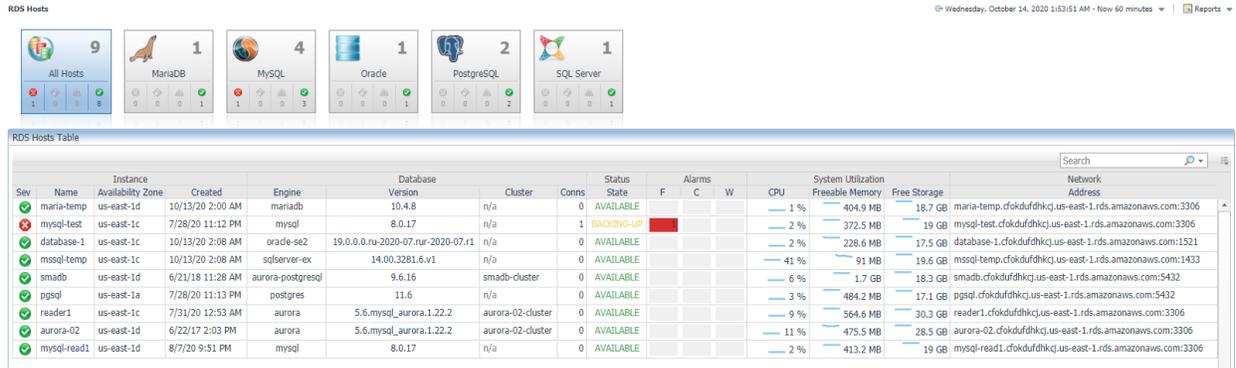
The EC2 Hosts dashboard shows all monitored EC2 hosts grouped by OS type. Displayed for each Host are instance identity and location properties, current status and health, CPU utilization, network configuration, and associated tags and security groups. Clicking on the instance name will drill down to the EC2 Overview page for the selected instance, while clicking or hovering on many other column values will expose more data.

EC2 Host Overview



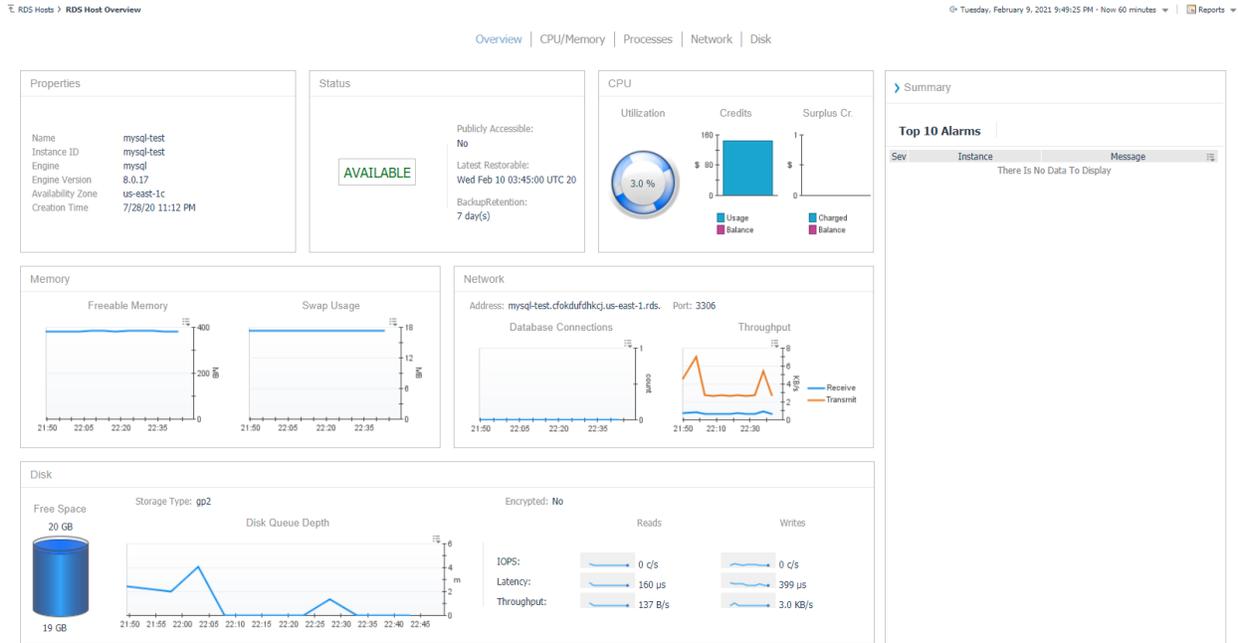
The EC2 Overview page gives an overview of key segments for the EC2 Host. Information includes configuration properties, availability and status checks, CPU utilization and credit balances, and network and disk metrics. The page's right side features an expandable summary box that displays the Top 10 Alarms by severity currently active for this instance.

RDS Hosts



The RDS Hosts dashboard shows all monitored RDS hosts grouped by database type. Displayed for each Host are instance identity and location properties, database engine and version, current status and health, system utilization, network configuration, and Aurora cluster, if applicable. Clicking on the instance name will drill down to the RDS Host Overview page for the selected instance, while clicking or hovering on many other column values will expose more data.

RDS Host Overview



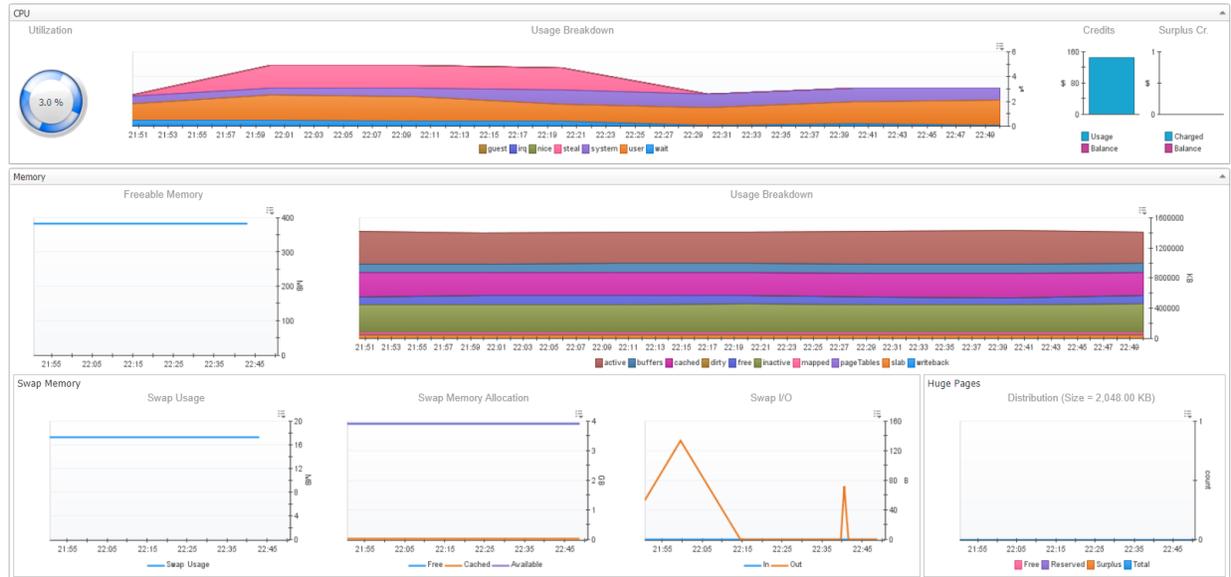
The RDS Host Overview page gives an overview of key segments for the RDS Host. Information includes configuration properties, availability and status checks, CPU utilization and credit balances, memory, network, and disk metrics. The page's right side features an expandable summary box that displays the Top 10 Alarms by severity currently active for this instance. Available data on this page will vary depending on database type and whether enhanced monitoring is enabled for the instance.

RDS CPU/Memory

RDS Hosts > RDS Host Overview > CPU/Memory Overview

Tuesday, February 9, 2021 9:50:34 PM - 10:50:34 PM 60 minutes | Reports

Overview | CPU/Memory | Processes | Network | Disk



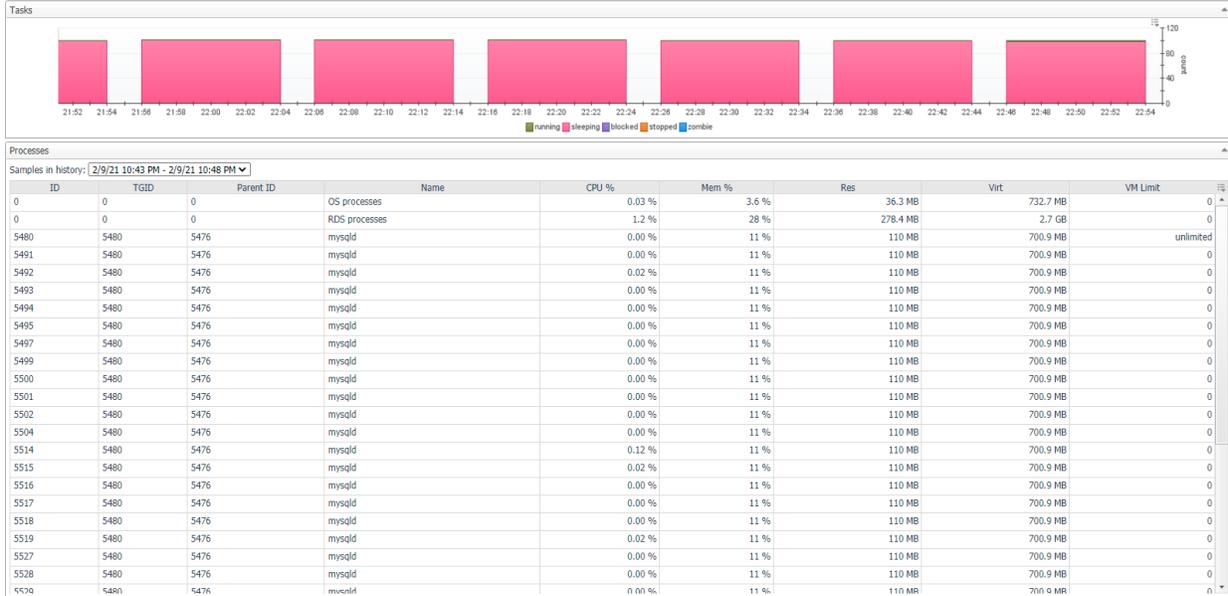
The CPU/Memory page features two sections. The top section features CPU utilization and a usage breakdown of CPU activity, current usage, and balance of CPU credits and surplus credits. The bottom section displays memory-related metrics, including freeable memory – the amount of memory that can be made available to processes that require it and a usage breakdown of memory consumption by type. Swap memory operations and huge page distribution are shown below that. This page is only available if enhanced monitoring has been enabled for the instance. Additionally, data on this page may vary depending on the database type.

RDS Processes

RDS Hosts > ... > CPU/Memory Overview > ProcessList Overview

Tuesday, February 9, 2021 9:51:11 PM - 10:51:11 PM 60 minutes | Reports

Overview | CPU/Memory | Processes | Network | Disk

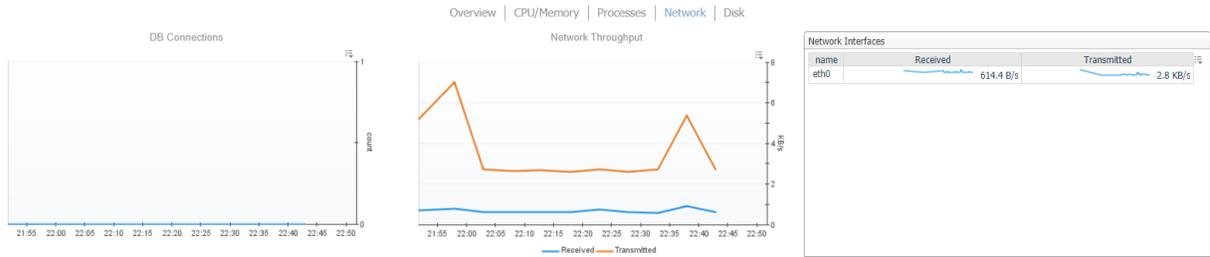


The Processes page displays a stacked bar chart of task counts organized by state and samples of processes running on the instance. Process data includes identifying information and related CPU, memory, thread usage, and allocations. The Process Samples dashboard shows all samples present in the page's time range. Samples older than a particular time may be purged or combined depending on the configured retention policy. This page is only available if enhanced monitoring is enabled for the instance. Additionally, data on this page may vary depending on the database type.

RDS Network

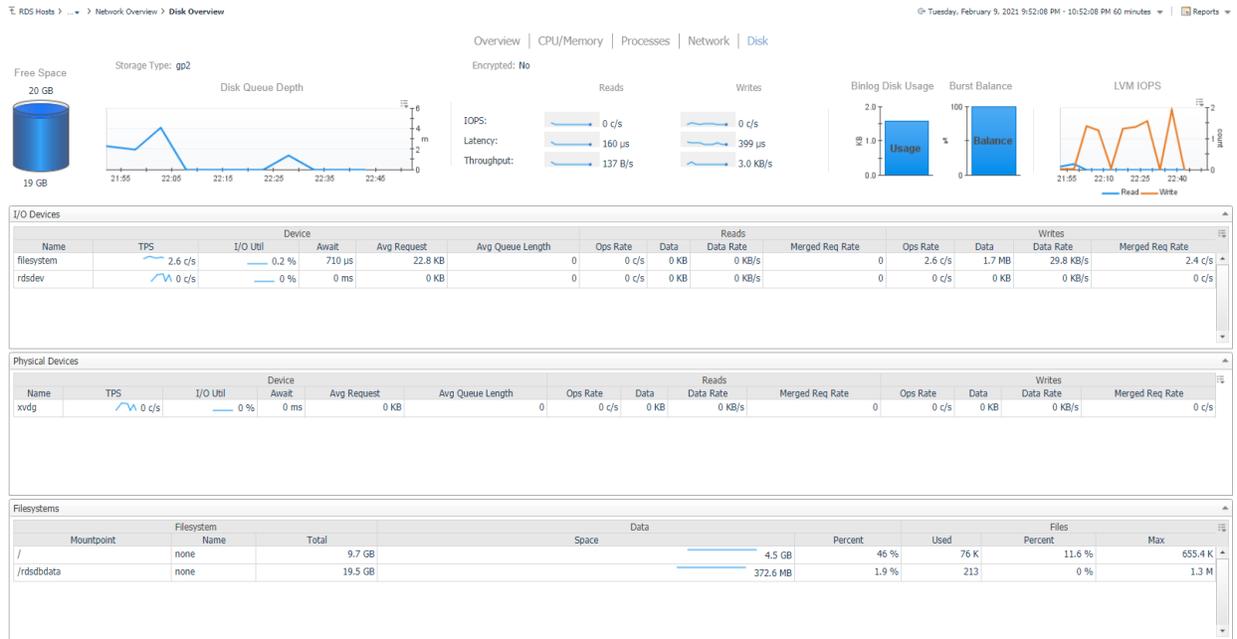
RDS Hosts > ... > ProcessList Overview > Network Overview

Tuesday, February 9, 2021 9:51:44 PM - 10:51:44 PM 60 minutes | Reports



The Network page shows the number of DB connections to the instance over time, network throughput, and a table of network interfaces related to the database instance. Each row shows the network traffic received and transmitted rate over that interface. This page is only available if enhanced monitoring is enabled for the instance. Additionally, data on this page may vary depending on the database type.

RDS Disks



The Disks page displays a summary of the disk configuration, storage usage, queue depth, operations, several other metrics, and all associated disk devices. Associated disk devices include I/O and physical devices and their associated performance, timing, and read/write operations data. Below are filesystems, including name, mount point, and size and space usage by data, percentage, and file count. This page is only available if enhanced monitoring is enabled for the instance. Additionally, data on this page may vary depending on the database type.

AWS Hosts Rules

The following is a summary of rules available out-of-the-box with the AWS Hosts cartridge. Default threshold values can be changed or scoped to specific values, generally through registry variables. These rules can be copied, modified, disabled, or customized in a wide variety of ways. For more information on this, refer to Foglight documentation or contact Quest Software PSO.

EC2 CPU Utilization

Determines if a system is constrained by the load on the CPU. Insufficient CPU power reduces throughput and increases interactive response time.

EC2 Host Not Running

Alerts if Host is not in a running state for two consecutive times.

EC2 Status Check Failed

Alerts if Host fails a status check two consecutive times.

RDS Cluster Not Available

Alerts if cluster is not in an available state for two consecutive samples.

RDS CPU Utilization

This rule determines if a system is constrained by the load on the CPU. Insufficient CPU power reduces throughput and increases interactive response time.

RDS Instance Not Available

Alerts if instance is not in an available state for two consecutive samples.

RDS Instance Running Out of Disk Space

Alert if the database instance will run out of disk space soon given the current growth rate.