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HPE CLOUDPHYSICS DEPENDENCY MAPPING

Frequently asked questions



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BASIC DEPENDENCY MAPPING QUESTIONS

What is the new dependency map feature?

The new **HPE CloudPhysics dependency map** feature combines infrastructure relationships (between VMs, clusters, and data centers) with logical relationships between application components, enabling a clear understanding of the ways applications and systems depend upon each other in your environment. These dependencies show the scope of resources that need to move or workloads that will be impacted if a workload is changed. These observations are critical when planning which workloads might have egress data costs in the cloud or which applications have complex dependencies when planning an upgrade or outage.

The dependency map presents data from an optional elevated data collection process from the HPE CloudPhysics Observer. This data represents the relationship between VMs and other network resources based on observed processes and communications from within a guest OS. This data consists of processes or process IDs, local IP addresses, local ports, protocols, and remote IP addresses. If an IP address can be associated with a known VM, the known VM name is presented as well. Remote objects can be known or unknown objects within the organization or potential destinations outside the organization.

How do I gain access to the dependency map?

Dependency maps are available to all customers who have deployed the latest HPE CloudPhysics Observer, provided the necessary credentials for data collection, and added the revised VMware vCenter® credentials for data collection.

For information about required credentials for guest process collection, see the section in **Installing the HPE CloudPhysics Virtual Appliance** titled [Configure the Observer Virtual Appliance](#). For information about required credentials for vCenter, see the [vCenter Server Credentials](#) section.

How do I start getting data into the dependency map analytics, and how do I see my data?

To get started, confirm that you have the latest HPE CloudPhysics Observer and have provided additional credentials for guest process discovery in the appliance. In addition, you confirm that you have revised your vCenter credentials for process data collection within the guest OS. VMware Tools™ is required in a guest OS where data is to be collected.

After the Observer and your credentials are updated, data collection starts within the next collection cycle and is refreshed approximately once every 6 hours. For more information about the credentials needed for vCenter, see the [vCenter Server Credentials](#) section of *Installing the HPE CloudPhysics Virtual Appliance*.

How do I know if I have the most recent HPE CloudPhysics Observer?

The HPE CloudPhysics Observer version is reported on the Observer Configuration Status page.

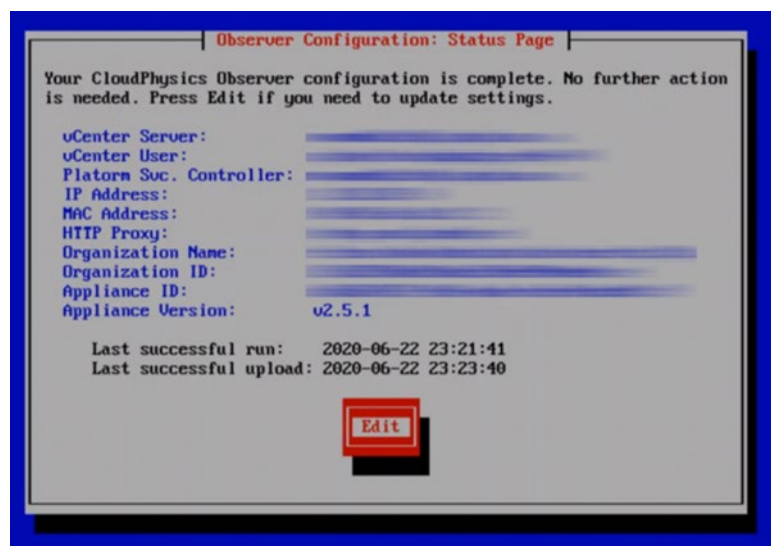


FIGURE 1. Observer Configuration Status page

How do I update my HPE CloudPhysics Observer?

You can replace your HPE CloudPhysics Observer with the latest Observer version available on the HPE CloudPhysics platform from Hewlett Packard Enterprise. Simply download and redeploy the new Observer. An organization token, which is required to activate the Observer, is available from the HPE CloudPhysics Observer Status page (or from the HPE CloudPhysics Welcome page for new users). Click **Reveal Token** in the left-hand instructions to receive your token. Tokens are valid for 24 hours and can be used with multiple vCenter instances within the organization. Be sure to provide the same vCenter name and credentials. HPE CloudPhysics will resume the collection of your data.

For more information about deploying the HPE CloudPhysics Observer, see [Installing the HPE CloudPhysics Virtual Appliance](#). For more information about using organization tokens, or to claim your token, go to the [HPE Observer Status page](#).

What credentials do I need to provide to the HPE CloudPhysics Observer?

Two different sets of credentials are required. The first set allows the Observer to read data from VMware vCenter. A second set of credentials is required to collect guest process data and dependency data from guest operating systems. In many cases, these may be two different credentials.

Do I need to change my vCenter instance?

If you have never set up your account for process collection before, you will need to revise your vCenter credentials. If you plan to use Dependency Discovery or Guest Process Identification, additional VMware vCenter policy settings will be required. This is an elevated level of VM security to allow VMware Tools to gather guest data. These features will require VMware Tools to be present and enabled in the guest OS:

- **VirtualMachine.GuestOperations.Query**
- **VirtualMachine.GuestOperations.Execute**
- **VirtualMachine.GuestOperations.Modify**

What credentials are required for my vCenter user account that is used by the HPE CloudPhysics Observer?

For the server, user name, and password, provide a fully qualified domain name or an address for the VMware vCenter instance (for example, **vCenter.company.local**). The name or address might be prepopulated from the platform services controller (PSC) section.

For the vCenter credentials, provide a user ID and password. Windows-style credentials might be required in the **domain\user** format.

What specific configurations are required within the guest OS?

Because HPE CloudPhysics is agentless, it relies on VMware Tools and some environmental attributes of the guest OS to ensure that it can collect data. The VMware Tools feature is required to request guest data. The process collects data to a temp file located in the system temp folder. If the system does not have a temp variable or a temp folder available, the collection process cannot create the intermediate field that is required for data collection. Using temp files eliminates the need to keep all data in memory.

Can I use Windows domain credentials?

Yes, a domain credential can be used. CloudPhysics currently uses a single user ID and password pair for all guest operating systems. Assuming that all guest operating systems are on the same domain, a single domain user credential can be used.

What credentials can I use for Linux?

If the organization has a single administrator ID and password, then a single credential can be used across both Windows and Linux®. If your environment includes only Linux, a single login ID and password is required. If your environment is mixed, a common user ID and password is required.

What if I have multiple domains or different credentials for differing operating systems or locations?

Currently, the HPE CloudPhysics Observer is able to use only a single credential for Windows, a single credential for Linux, and a single credential for every other OS type. If you have a different credential in a different domain or location, you will be unable to collect data from both environments unless you have a common login and password.

What data is collected?

Three data points are collected from within the guest OS by using the elevated guest credentials:

- Running guest processes
- Installed applications (Windows only)
- Open network communications by process or process ID



How is data collected?

The HPE CloudPhysics Observer requests the following details from VMware vCenter to collect using VMware Tools. HPE CloudPhysics issues a command to VMware vCenter through an IP address and pass credentials to vCenter to request the required data from the guest OS.

The HPE CloudPhysics Observer uses public APIs to collect data from VMware vCenter and cloud providers:

- **For vCenter**, HPE CloudPhysics requires a read-only account, with access to list and read configurations of the virtual environment. It collects performance and configuration data and other metadata from the vCenter instance on a defined schedule. vCenter collects performance and configuration data natively from its managed resources at a 20-second granularity. This data is typically rolled up and destroyed by vCenter after it is an hour old. Before that happens, HPE CloudPhysics collects the performance and configuration data directly from vCenter frequently enough to maintain the 20-second granularity. This data collection process is agentless and has no impact on the VMs or hosts being analyzed because it already exists in vCenter.
- **For cloud providers**, HPE CloudPhysics collects configuration and performance history data from the public APIs once a day.

How frequently is data collected, and how often is the data in the dependency map refreshed?

Dependency map data is collected once every 6 hours. Each time the collection runs, it adds to the existing map any new dependencies that are discovered. After 7 days, old dependencies that are no longer in the current map are deleted.

The HPE CloudPhysics dependency map says that I do not have data for a specific VM. Why?

There are potentially multiple reasons. In most cases, when a VM is displayed in the Data Table View, there is an amber flag in the corner near the VM name. This flag provides some explanation of why data could not be collected from a VM.

I see VMs and other workloads not controlled by my vCenter. How did they appear in my results?

These items are destinations that are observed through the communications of a VM in your data collection. Both internal and external communications for a VM are visible, and many of these might not be managed by your VMware® environment. Common resources such as load balancers, network file servers and physical arrays used for NFS/iSCSI, user desktops, and public internet communications can appear as discovered targets of a VM.

How do I select multiple VMs in the map view?

Use the shift key and left-click with your mouse to select a single VM. Repeat as necessary to select additional VMs.

What do the shapes in your diagrams mean?

The dependency graph objects have the following meanings:

- **Circles** depict nodes that represent VMs in your filtered VM result set.
- **Triangles** depict nodes that represent VMs that are not in your filtered scope but are connected to VMs in your filtered scope.
- **Diamonds** depict nodes that represent non-VMs on your network, including, for example, user desktops, standalone systems, or network devices.
- **Pentagons** depict nodes that represent public non-VMs. These might be external to your organization or located within a public network segment such as a DMZ.
- **Filled shapes** indicate that all edges are displayed.
- **Half-filled shapes** indicate that some edges are hidden.

How do I find a specific port?

Using the compass filters on the left-hand side of the page, scroll down to **Ports**. Specify the particular port you are looking for in the environment. The results set will reduce the scope to only those VMs using the specific port.



After guest OS credentials are updated in the Observer, how long does it take for the dependency map to populate in the UI?

The two sides to this process are data collection and data processing:

- Data collection timeline:
 - If the guest credentials are set up during the initial Observer configuration, the dependency map collection kicks off right away.
 - If the user adds guest credentials to an already-running Observer, there is a 2-minute delay.
 - If there is a collection failure, there is a 5-minute timeout, and then it tries again.
- Data processing timeline:
 - After dependency data is collected, it takes approximately 15 minutes to be processed and made available in the UI.

Is it acceptable for the customer provide the guest OS credentials of a service account? Or must the account have admin access?

A local user or service account can be used for guest data collection. In some cases, the guest account might not be able to see processes that are not controlled by the user account. If you want to include all processes within the guest OS, use an account that has privileges to see all processes.

What is the granularity of the dependency mapping? For example, if a connection lasts for 1 second, will we see it?

Most guest operating systems keep a brief history of process connections, ports, and process IDs (PIDs). If the process ends, the PID might no longer be present, but the connection history may still be collected.

What happens if my user credentials expire?

Expired user credentials are flagged with an amber flag near the VM in the data table view, indicating that an error has occurred as well as the state of the collection.

If a user removes guest OS credentials, what happens after 7 days? Will dependency mapping be blank? Or do we just keep the latest collection?

HPE CloudPhysics keeps the last 7 days of data collection visible in the dependency map. If you stop collecting data, the last collections will remain.

Do I need to update my VMware Tools? Is there a particular version of VMware Tools that VMs should be on?

To be able to request data from a guest OS, HPE CloudPhysics requires VMware Tools. The minimum version for VMware Tools is version 10, which was released in 2016.

Am I required to configure the guest process collection or dependency mapping collection?

No. Data collection within guest operating systems is entirely optional and definable during installation and configuration of the HPE CloudPhysics Observer.

Can I disable guest process collection and network dependency mapping?

Yes. Dependency mapping and guest process collection are options that require dedicated credentials during the setup of the HPE CloudPhysics Observer. If no credentials are provided, the collection process will not be executed.

How are the guest processes collected?

A feature of VMware Tools is used to collect guest processes. This request to VMware vCenter originates from the HPE CloudPhysics Observer. When it receives the request, vCenter tries to issue the command to the VMware Tools feature within the guest OS. The VMware vCenter instance initiates a process collect command under the identity of the guest account that was specified in the HPE CloudPhysics Observer when it was set up.

VMware Tools issues the command as the specified guest user every six hours. If the guest OS allows the guest user, the process list from the host is collected and stored in a guest user home directory. After the collection is complete, the HPE CloudPhysics Observer collects the output of the command execution. The HPE CloudPhysics Observer uses a VMware vSphere® API, which in turn uses VMware Tools to collect the command output that is temporarily stored in the output file.



How is dependency mapping data collected?

Dependency mapping is derived from a network analysis tool called **NetStat**. HPE CloudPhysics issues a request to VMware vCenter for details from the guest OS. vCenter can direct queries to the guest OS if VMware Tools is deployed and enabled. The request is a simple command to issue a NetStat command and direct the output to a temporary file located in the guest user's home directory. The NetStat command collects all open network communications and reports source and destination IP addresses, TCP/UDP, and port. This data is directed into a local temp storage file, where it is processed and sent to VMware vCenter by VMware Tools.

How frequently is my data collected?

HPE CloudPhysics collects guest process and network dependency data independently on a defined schedule. Initial releases collect data every six hours.

How do you create a dependency map?

Dependency maps are generated based on source and destination IP addresses and ports identified by NetStat during the online dependency mapping data analysis. The data identifies all major network communications by the guest OS and map IP addresses to other VMs. If any VM communicates outside of the private network ranges, those communications are considered to be outside of your data center.

What credentials are required to collect guest processes and dependency data?

A domain guest ID is best for collection of data. This user credential does not need to be a domain administrator or to have root access within a guest OS. For mixed environments, make sure that the same user ID and password exist in both Linux® and Windows environments.

What data is collected for the guest process?

A simple table of process ID and process name is generated when the vSphere API command is issued. This command returns a simple text list of all processes currently running in the guest OS.

What data is collected for dependency mapping?

NetStat returns a text output of the source, destination, port, and potentially of protocol information from the guest. This data varies slightly from OS to OS; typically, however, additional data might include packet count, state, or world ID.

What is the data flow during collection?

HPE CloudPhysics issues a request for data to VMware vCenter for a specific guest OS. VMware vCenter issues the credential and command to the guest OS. If the command is allowed to execute, VMware Tools directs all output from the command to a temp file in a guest user home directory. Upon completion of the command, VMware Tools retrieves the temp file and directs the output back to VMware vCenter as a temporary variable for the guest OS. CloudPhysics then collects the temp variable from VMware vCenter on the next data collection cycle. If the data collection fails or an error is generated, this data is also reported back to VMware vCenter for collection by the HPE CloudPhysics Observer.

How long is my data kept?

All data is retained indefinitely for a user account to enable historical analysis by the users.

Who has access to the guest process and dependency mapping data?

All users with access to your HPE CloudPhysics account can use analytics that derive data from the data collection process. The processes are used as tags in the HPE CloudPhysics environment to enable quick classification of applications and guest OS instances. NetStat dependency mapping data is available only through dependency mapping cards that are enabled to account users.

Can I remove or delete my data?

All account data can be removed by sending a request to cloudphysicssupport@hpe.com. HPE CloudPhysics keeps all anonymized metadata for global comparison of performance and configurations. The metadata is used to compare users against the global dataset. Account validation and notification to all partner and customer users are required before data deletion can occur.

How do I access my guest process data in the HPE CloudPhysics portal?

HPE CloudPhysics makes all guest process data available today in Card Builder for the VM object called **guest processes**. In addition, some guest processes are used to generate tags or events for some analytics. For example, the Microsoft SQL Server process is used to identify guest operating systems that have SQL databases installed, and it can be used to automatically generate tags associated with these VMs.



Frequently asked questions

Resources, contacts, or additional links

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[Installing the HPE CloudPhysics Virtual Appliance](#)

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