Azure Monitoring for VMs

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Overview

The Azure Monitoring for VMs provides a service to monitor the health of virtual machines. The solution has a pre-configured set of health criteria and alerts that checks the health of the VMs.

The VM Health solution experience can be viewed by the user both at the Azure Monitor pivot and as part of the per VM resource blade referred in the document as the following:

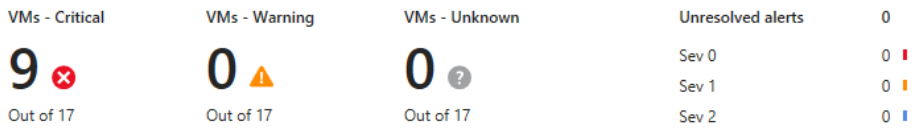
1. The aggregate VM view
2. Single VM instance view

1. The aggregate VM view

The user can get an overview of the health of the collection of VMs that are being monitored by this solution. In this view, the user would be able to get health perspective of VMs based on the different pivot of VM distribution such as Operating Systems, basic components of the VMs I.e. CPU, network, disk, and memory. The user would be able to quickly identify critical issues affecting the VMs, diagnose and localize the issue.

1.1 Insights Pane

At the top of the page, there is an insights pane that gives a quick stat of the number of VMs that are being monitored and the distribution based on their current health state (healthy VMs are not listed here). The user can click on any of VM category and drill down to find a list of VMs in that category.



The Unresolved alerts section gives the stat on the number of alerts fired by this solution that is currently in an unresolved state that is distributed based on the alert severity. Refer Alerting and Alert Management section for more details.

1.2 VM distribution

This section provides the distribution of VMs based on Operating System or basic components of a VM. In the Operating Systems tab, the VMs are grouped based on the Operating Systems covering both Windows and Linux distribution along with the version. In each Operating System category, the VMs are further distributed based on the health of the VM. The health states defined for a VM are

1. Healthy – there are no issues detected for the VM and it is functioning as expected
2. Critical – the VM has some critical issues which need to be addressed for it to be functioning as expected
3. Warning - the VM has some issues which if not addressed can get critical
4. Unknown – if the service were not able to make a connection with the VM, it moves to unknown state

VM distribution

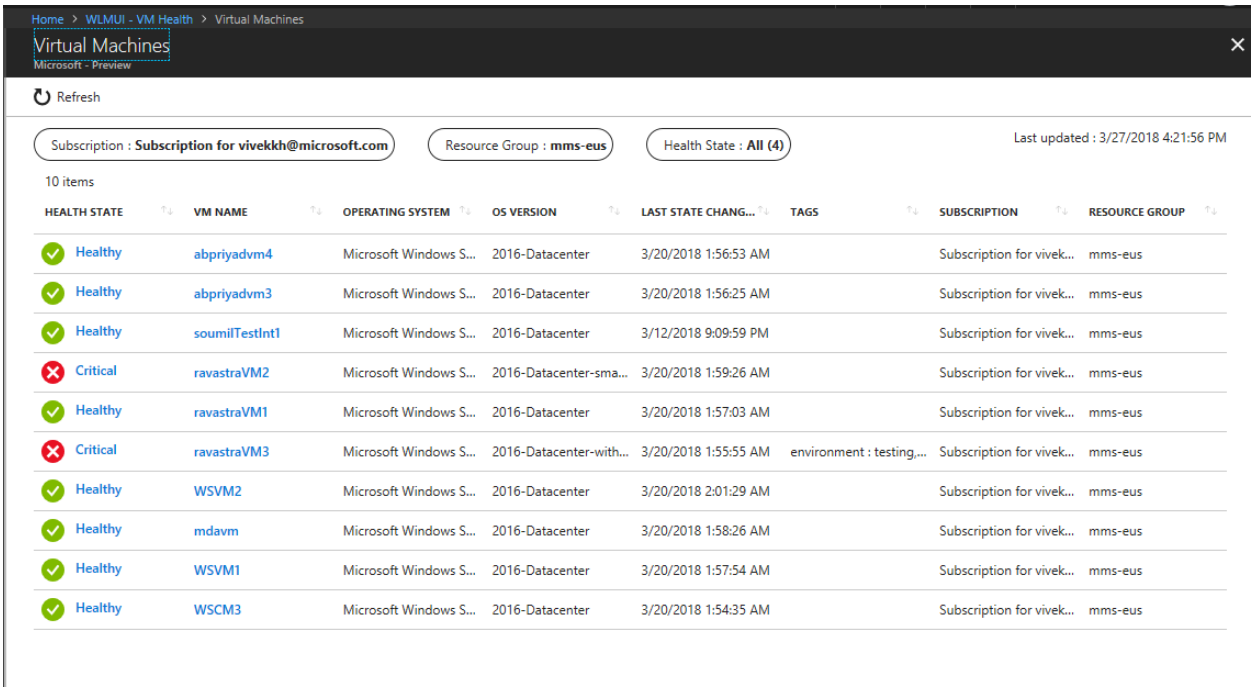
Showing health state of 17 virtual machines split across Operating systems and Components

Operating systems | Components

OPERATING SYSTEM	OS TYPE	VM COUNT	CRITICAL	WARNING	HEALTHY	UNKNOWN
Ubuntu 17.04 (x86_64)	Linux	1	1	0	0	0
SUSE Linux Enterprise Server 1...	Linux	1	1	0	0	0
Debian GNU/Linux 7.0 (x86_64)	Linux	1	1	0	0	0
Microsoft Windows Server 201...	Windows	10	2	0	8	0
CentOS Linux 7.0 (x86_64)	Linux	2	2	0	0	0

See more...

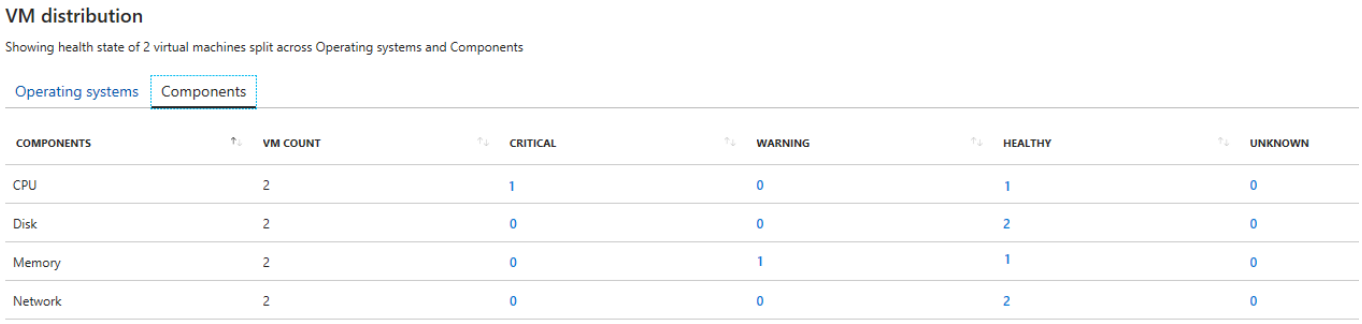
The user can click on any column items in VM count, Critical, Warning, Healthy or Unknown to drill down into that specific VM list view as below to get more details. Based on the column cell selected, the appropriate filters are applied, the user can adjust the filters further in this list view page to get to a more curated list for debugging. For example, if the user wants to check all VMs with Windows Server 2016 OS running, they will click on the VM count 10, that leads the user to the page below, listing the 10 VMs, of which 2 are in critical health state.



In the VM list view, click on the VM name leads the user to the VM instance page with more details on the alerts and the health criteria affecting that specific VM. The user can click on the health state that

leads the user to the Health Diagnostic view of the VM which depicts the different health criteria running on the VM and how the health rolls up. Please refer to the Health Diagnostic section for more details.

The Components tab in this section provides the distribution of the VM based on the health of the 4 major components of the VM - CPU, network, disk, and memory. The user can read this table as, there are 2 VMs monitored out of which 1 VM has its CPU component critical. The user can click on any of the numerical counts of VMs to drill down to the list view of the VMs, the list view is same as the one explained above.



VM distribution

Showing health state of 2 virtual machines split across Operating systems and Components

Operating systems | Components

COMPONENTS	VM COUNT	CRITICAL	WARNING	HEALTHY	UNKNOWN
CPU	2	1	0	1	0
Disk	2	0	0	2	0
Memory	2	0	1	1	0
Network	2	0	0	2	0

1.3 Top Health Issues

The solution has a preconfigured set of health criteria that run on the VM to calculate the health of the VM. The user can view the top health issues affecting his/her environment in this grid. Each row in this grid indicates a health criterion present in the solution. The columns in this grid are:

i. Health Criteria – the condition that is running on different health signals on the VM that has the associated health state logic defined
ii. Unhealthy components – the number of components in the environment that are in an unhealthy state with respect to this health criterion
iii. Unknown state components – the no of components whose health state is unknown with respect to this health condition
iv. Category – the health criteria are grouped into 4 major health categories based on the aspect that they align with
    a. Availability
    b. Performance
v. Component type – this indicates the type of component of the VM on which this health criterion is acting, for e.g. Logical disk, physical disk, Network adapter etc.

Top health issues

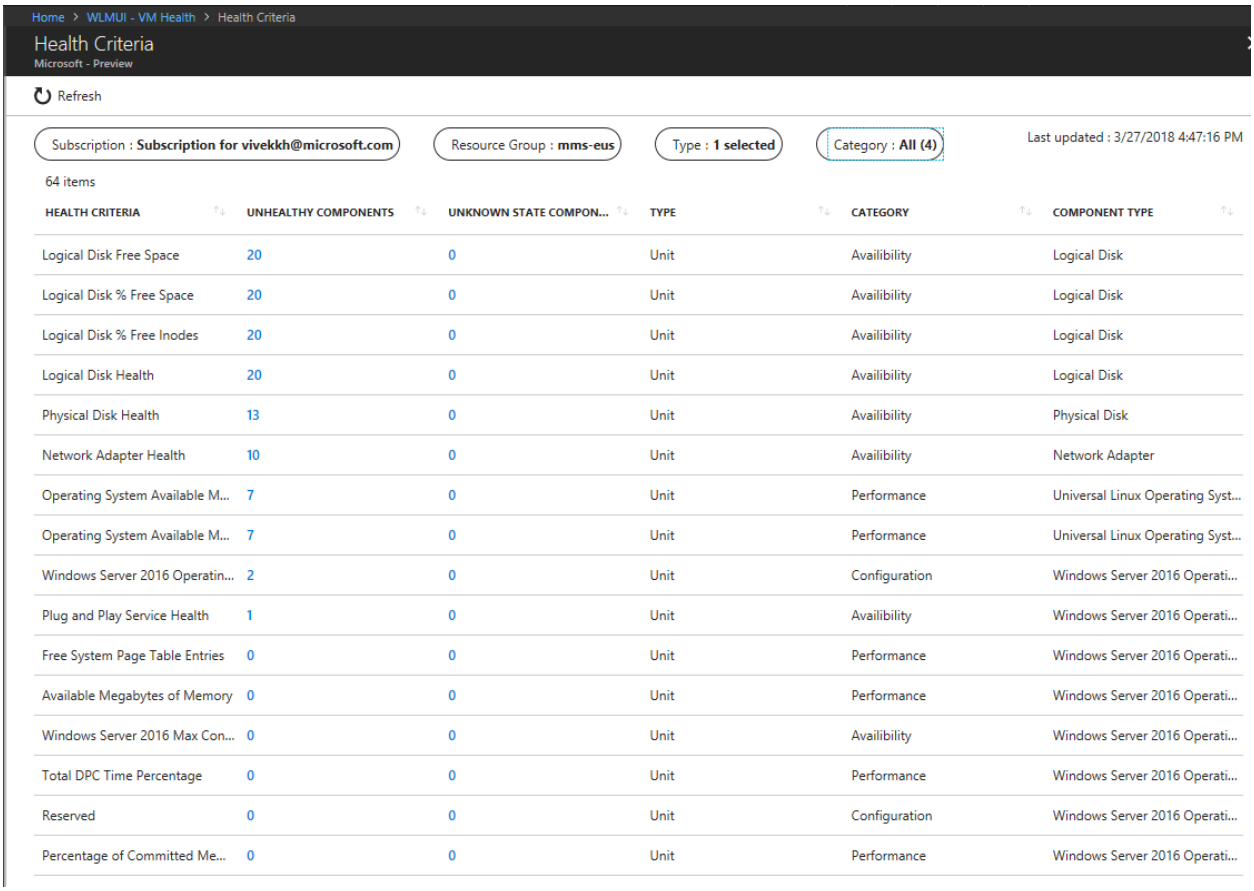
HEALTH CRITERIA	UNHEALTHY COMPONEN...	UNKNOWN STATE COMP...	CATEGORY	COMPONENT TYPE
Logical Disk Free Space	20	0	Availibility	Logical Disk
Logical Disk % Free Space	20	0	Availibility	Logical Disk
Logical Disk % Free Inodes	20	0	Availibility	Logical Disk
Logical Disk Health	20	0	Availibility	Logical Disk
Physical Disk Health	13	0	Availibility	Physical Disk

See all Health Criteria...

See All Health Criteria link leads the user to the list view of all the health criteria that come as part of this solution. This page can be further filtered based on the below filter options

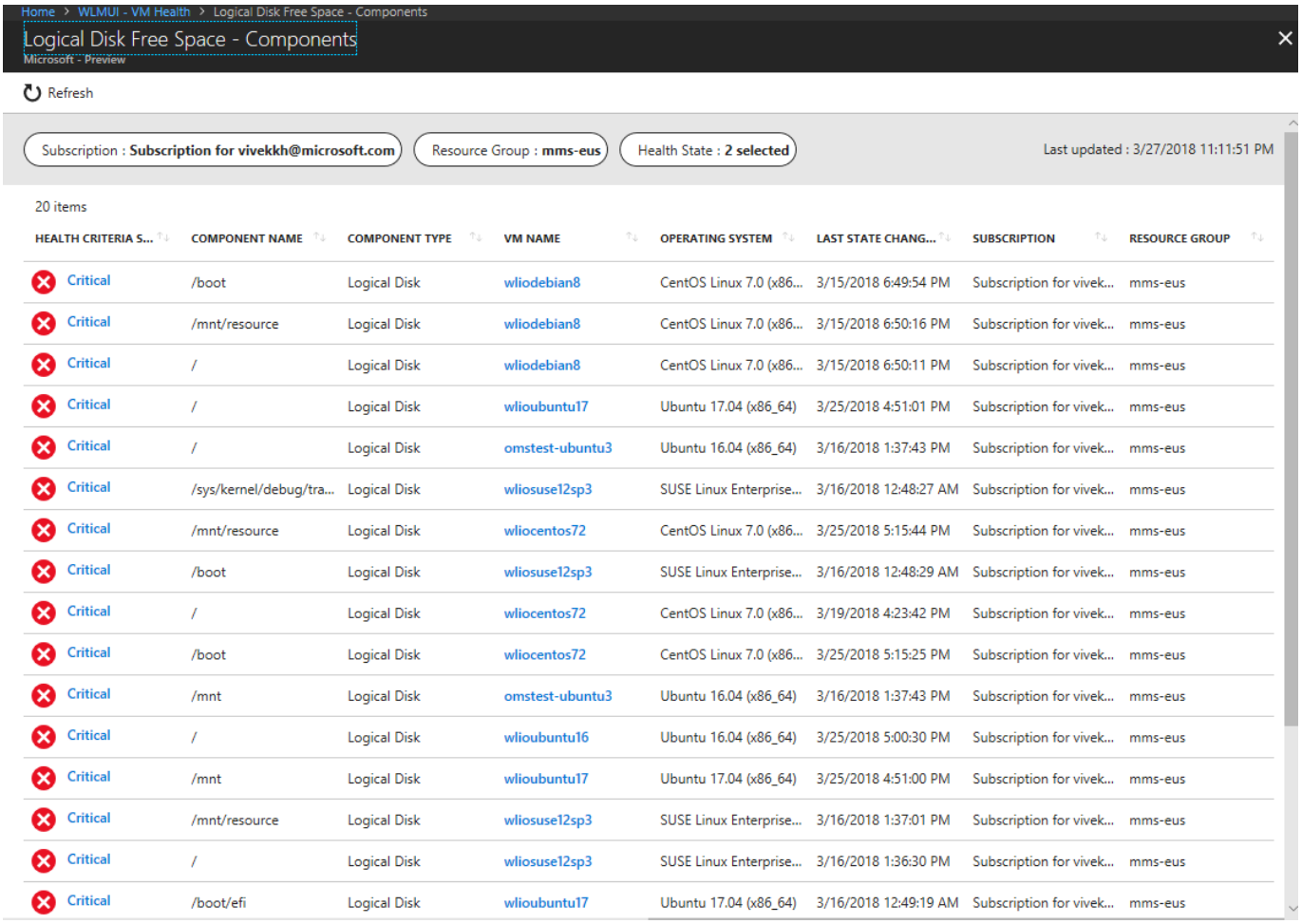
i. Type – Types of health criteria are
   a. Unit – leaf-level measurement of the health. There will be many unit health criterion targeted to an entity to test aspects of the health. By default, the filter is set to unit.
   b. Dependency - Provides health rollup between different entities. This allows the health of an entity to depend on the health of another entity that it relies on for successful operation
   c. Aggregate - Provides a combined health state of similar health criteria. Unit and dependency health criterion will typically be configured under an aggregate health criterion. In addition to providing better general organization of the many different health criteria targeted at an entity, aggregate health criterion provides a unique health state for distinct categories of the entities.

ii. Category – Type of health criteria, it can be either Availability, or Performance



HEALTH CRITERIA	UNHEALTHY COMPONENTS	UNKNOWN STATE COMPON...	TYPE	CATEGORY	COMPONENT TYPE
Logical Disk Free Space	20	0	Unit	Availibility	Logical Disk
Logical Disk % Free Space	20	0	Unit	Availibility	Logical Disk
Logical Disk % Free Inodes	20	0	Unit	Availibility	Logical Disk
Logical Disk Health	20	0	Unit	Availibility	Logical Disk
Physical Disk Health	13	0	Unit	Availibility	Physical Disk
Network Adapter Health	10	0	Unit	Availibility	Network Adapter
Operating System Available M...	7	0	Unit	Performance	Universal Linux Operating Syst...
Operating System Available M...	7	0	Unit	Performance	Universal Linux Operating Syst...
Windows Server 2016 Operatin...	2	0	Unit	Configuration	Windows Server 2016 Operati...
Plug and Play Service Health	1	0	Unit	Availibility	Windows Server 2016 Operati...
Free System Page Table Entries	0	0	Unit	Performance	Windows Server 2016 Operati...
Available Megabytes of Memory	0	0	Unit	Performance	Windows Server 2016 Operati...
Windows Server 2016 Max Con...	0	0	Unit	Availibility	Windows Server 2016 Operati...
Total DPC Time Percentage	0	0	Unit	Performance	Windows Server 2016 Operati...
Reserved	0	0	Unit	Configuration	Windows Server 2016 Operati...
Percentage of Committed Me...	0	0	Unit	Performance	Windows Server 2016 Operati...

The user can further drill down to see which instances affected by a particular health criterion by clicking on the unhealthy components number. It would lead the user to a list view of the components which have that health criterion in a critical state. The list view of unhealthy instances would be as below



The view provides more details regarding the unhealthy components to help the user troubleshoot the issue causing the health of the VM unhealthy. The different columns here are

I. Health criteria state – this indicates the health of the health criterion in reference, clicking on this would lead the user to health Diagnostic view. Please refer the health diagnostic section for more information
II. Component name – the name of the component of the VM on which the health criterion is acting
III. Component type – this indicates the type of component of the VM on which this health criterion is acting, for e.g. Logical disk, physical disk, Network adapter etc.
IV. VM name
V. Operating System
VI. The last state changed – this provides the time when last the state of this health criterion was changed for the user to be able to understand the history
VII. Subscription
VIII. Resource Group

2. Single VM instance view

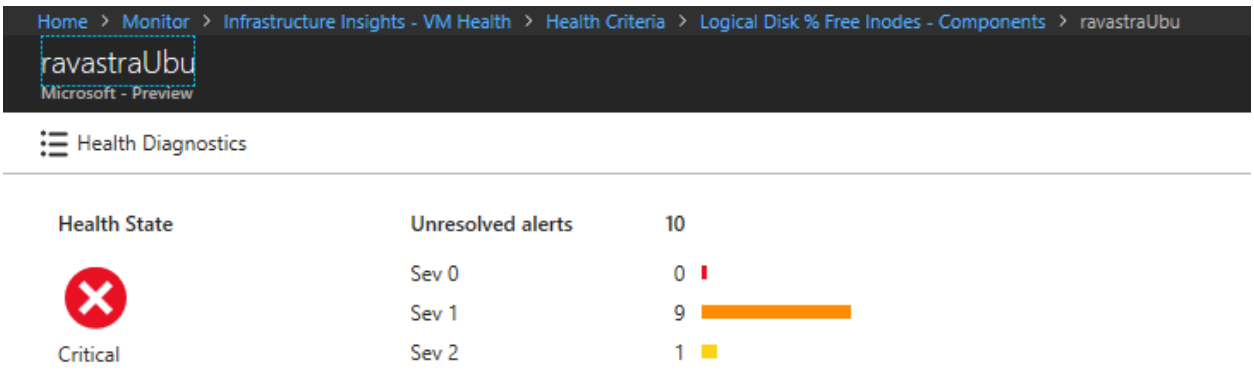
The user can navigate to single VM instance view by clicking on any of the VM links in the VM list view or from the health criteria list view. A single VM instance view has all monitoring data such as health

criterions, unresolved alerts etc. specific to that VM, so that it helps the user to find the root cause of any issues.

2.1 Insights Pane

The insights pane in the single VM view has the health icon indicating the state of the VM, which can be either critical, warning, unknown or healthy. The unresolved alerts section provides the alert distributed by a severity which is raised on this VM. Please refer Alerting and an alert management section for more details.

The insights pane has a taskbar with health diagnostics click option that leads the user to the health diagnostic view of the VM. Please refer to the Health Diagnostic section for more details.



The user can quickly browse through the most critical unresolved alerts in the Unresolved alerts grid. For more details refer to the Alerting and Alert Management section.

2.2 Top Health Issues

The user can get an overview of the top health issues on the VM by going through the health criteria listed in this grid. The top 5 health issues on this VM are listed in this grid, the user can see the entire list of health issues by clicking on the see more option. The different columns in this grid are

I. Health criteria state – state of this health criteria on this VM
II. Health criteria – the name of the health criteria
III. Component type – this indicates the type of component of the VM on which this health criterion is acting, for e.g. Logical disk, physical disk, Network adapter etc.
IV. Component name – the name of the component in this VM on which the health criteria is acting
V. The last state changed
VI. Category – can be Availability or Performance
VII. Type – Unit, Dependency or Aggregate

Unresolved alerts

SEVERITY	NAME	COMPONENT TYPE	COMPONENT NAME	REPEAT COUNT	FIRED DATE
Sev1	Available Megabytes Memory is too low		Ubuntu 16.04 (x86_64)	0	4/26/2018 1:12:49 AM
Sev1	Physical Disk is not online		sdb	0	4/26/2018 1:03:50 AM
Sev1	Physical Disk is not online		sda	0	4/26/2018 1:03:35 AM
Sev1	% Free Space is too low		/	0	4/26/2018 1:02:35 AM
Sev1	Logical Disk is not online		/	0	4/26/2018 1:04:14 AM

See more...

Top health issues

HEALTH CRITERIA STATE	HEALTH CRITERIA	COMPONENT TYPE	COMPONENT NAME	LAST STATE CHANGED	CATEGORY	TYPE
Critical	Logical Disk % Free Inodes	Logical Disk	/mnt	4/27/2018 12:56:29 AM	Availibility	Unit
Critical	Logical Disk % Free Inodes	Logical Disk	/	4/27/2018 12:56:50 AM	Availibility	Unit
Critical	Logical Disk Health	Logical Disk	/	4/27/2018 12:59:13 AM	Availibility	Unit
Critical	Logical Disk Health	Logical Disk	/mnt	4/27/2018 12:58:35 AM	Availibility	Unit
Critical	Logical Disk % Free Space	Logical Disk	/	4/27/2018 12:59:18 AM	Availibility	Unit

See more...

The see more option in this grid would open the list of health criteria that are running on this VM. The list view would look like below. The user can curate the list further by choosing the appropriate filters. The filters available here are health criteria type (unit is chosen by default) and category (availability and performance).

Home > WLMUI - VM Health > Virtual Machines > wlioubuntu17 > wlioubuntu17 - Health Criteria

wlioubuntu17 - Health Criteria

Microsoft - Preview

Refresh

Type : **1 selected** | Category : **All (4)** | Last updated : 3/27/2018 11:46:50 PM

29 items

HEALTH CRITERIA STATE	NAME	COMPONENT TYPE	COMPONENT NAME	LAST STATE CHANGED	CATEGORY	TYPE
Critical	Logical Disk Free Space	Logical Disk	/	3/25/2018 4:51:01 PM	Availibility	Unit
Critical	Logical Disk Free Space	Logical Disk	/mnt	3/25/2018 4:51:00 PM	Availibility	Unit
Critical	Logical Disk Free Space	Logical Disk	/boot/efi	3/16/2018 12:49:19 AM	Availibility	Unit
Critical	Logical Disk Health	Logical Disk	/boot/efi	3/25/2018 4:46:27 PM	Availibility	Unit
Critical	Logical Disk Health	Logical Disk	/	3/25/2018 4:46:29 PM	Availibility	Unit
Critical	Logical Disk % Free Inodes	Logical Disk	/mnt	3/25/2018 4:50:59 PM	Availibility	Unit
Critical	Logical Disk % Free Inodes	Logical Disk	/boot/efi	3/25/2018 4:50:51 PM	Availibility	Unit
Critical	Logical Disk % Free Inodes	Logical Disk	/	3/25/2018 4:50:58 PM	Availibility	Unit
Critical	Physical Disk Health	Physical Disk	sda	3/25/2018 4:48:28 PM	Availibility	Unit
Critical	Physical Disk Health	Physical Disk	sdb	3/25/2018 4:48:29 PM	Availibility	Unit
Critical	Logical Disk Health	Logical Disk	/mnt	3/25/2018 4:46:25 PM	Availibility	Unit
Critical	Logical Disk % Free Space	Logical Disk	/mnt	3/25/2018 4:49:27 PM	Availibility	Unit
Critical	Logical Disk % Free Space	Logical Disk	/boot/efi	3/25/2018 4:50:06 PM	Availibility	Unit
Critical	Logical Disk % Free Space	Logical Disk	/	3/25/2018 4:49:27 PM	Availibility	Unit
Critical	Operating System Availa...	Universal Linux Operating...	Ubuntu 17.04 (x86_64)	3/25/2018 4:59:50 PM	Performance	Unit

3. Alerting and Alert Management

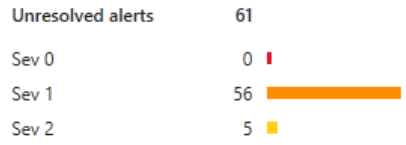
The solution provides predefined set of alerts based on health. The severity of alerts is indicated by Sev levels – Sev 0 through Sev 4, with Sev 0 indicating the highest severity.

You may approach alerts in the UX layer in two fashions:

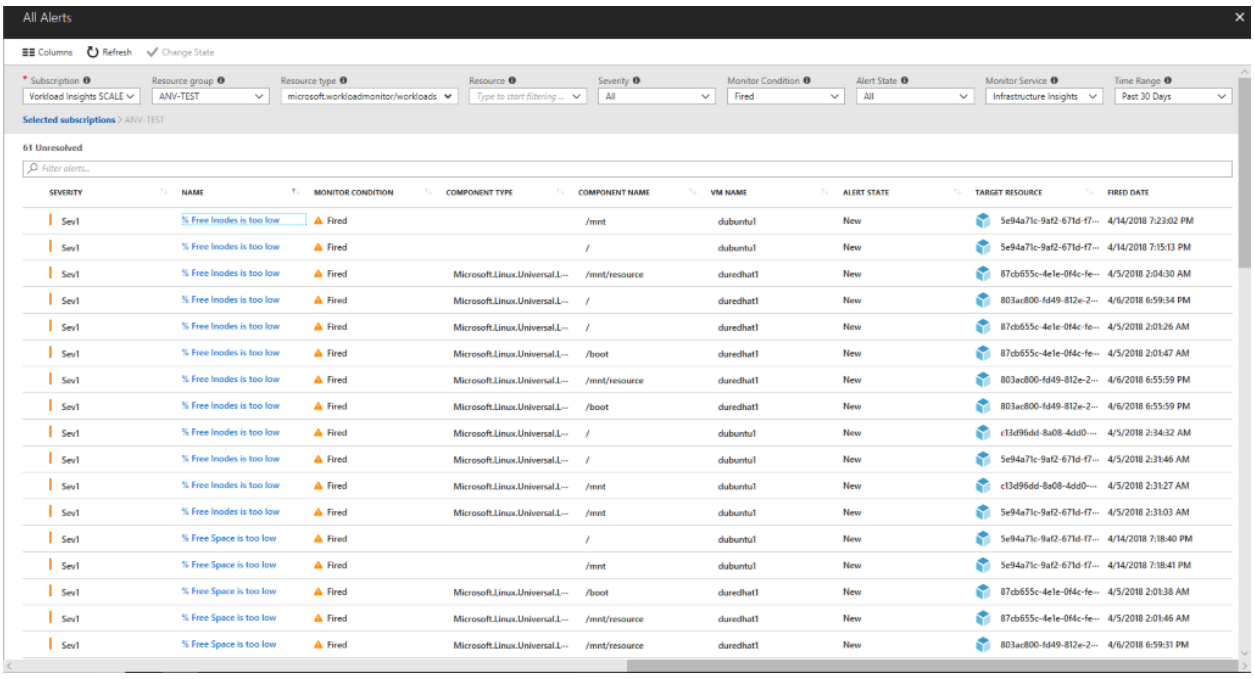
1. View all alerts fired on the monitored VMs
2. View all alerts fired on a monitored VM

3.1 Viewing all Alerts

The solution dashboard provides you with insights on the total number of alerts for the selected subscription and resource group that need your attention, and their split across top 3 severity levels:



You may select either the total number of alerts or the number corresponding to a Sev level to enter a view listing all our alerts, pre-filtered based on the selection. For example, if you selected the row corresponding to Sev level 2, then you will see the following view:



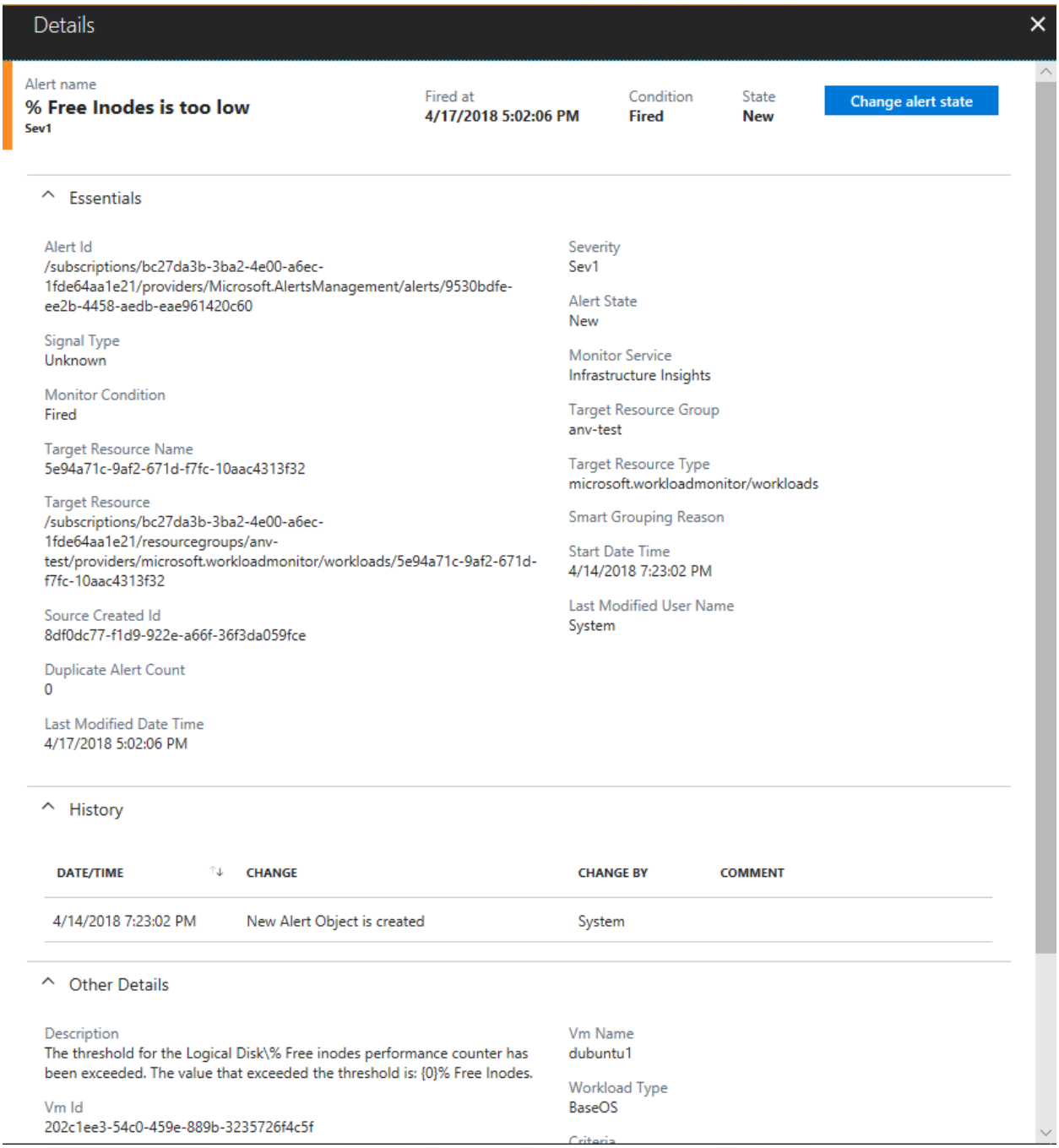
Things to notice: your previous filter selections are carried forward.

You can use this view as desired by changing the selected filter values. For example, you may view all unresolved alerts fired in the last 30 days (aside from the default 24 hours), by updating the time range filter. Following filters are available:

1. Subscription: Allows selection of the desired subscription

2. Resource Group: Allows selection of the desired resource group
3. Resource type: Allows selection of the desired resource type, in the case of Compute Insights the resource type is microsoft.workloadmonitor/workloads (this is different from the traditional resource type for the VM time being). We advise against changing this from the solution experience, you may choose to use it from the platform surface Azure Monitor -> Alerts
4. Resource: Allows selection of monitored resource, in the context of Compute Insights these would be workload resources which are hidden and are internally selectable. Hence, we advise against changing this from the solution flow; the solution surface will automatically handle this both from overall and single VM perspective, you may choose to use it from the platform surface Azure Monitor -> Alerts
5. Severity: Let's user filter alerts per Sev level from Sev 0 (highly critical/ important) to Sev 4 (informational)
6. Monitor Condition: Users can use this to filter alerts as per the system/ service state – Fired (by the system) or resolved (by the system, if condition is no longer active) Specifies whether the alert has been fired by the system/ service or resolved by it
7. Alert state: This filter can be used to filter alerts as per user managed state – New, Acknowledged, Closed or all
8. Monitor Service: Let's you select the desired service that is being used to monitor the Azure Asset. For Compute Insights it is Infrastructure Insights for the time being. You may not want to update this filter from the solution experience, as other services might have different fields to them which aren't available here. However, you may choose to use it from the platform surface Azure Monitor -> Alerts
9. Time Range: Lets users select the desired period/ time range

You can use this list view to select any alert and launch its details blade in context. For example, if in the list shown above alert – % Free Inodes is too low is selected, following context blade appears listing out details of the alert.



As can be seen above alert details view has 2 core sections:

1. Essentials: Provides core information about the alert required for its management
    a. Alert Id: GUID of the alert object, managed by Alert platform
    b. Severity level: Sev level of the alert object (Sev 0 indicates high criticality)
    c. Signal type: Signal type is set to unknown for alerts based on health as of now
    d. Alert state: described earlier
    e. Monitor Service: described earlier
    f. Monitor Condition: described earlier

g. Target Resource Name: ID of the resource on which the alert was created. For compute Insights alerts are created on a hidden resource name of the type workload (refer to the explanation of resource type provided earlier), which is different from the VM for the time being. The workload resource has one to one mapping with the VM being monitored. The VM on which the alert is on, is mentioned in the column by the same name, and as a property in the "Other details section described below.
h. Target Resource Group: described above as Resource Group
i. Target resource: Complete ID of the workload resource
j. Smart Grouping Reason: Reason for intelligently grouping alerts, so as to reduce noise. This attribute would be unavailable for the users during the initial stages of the preview
k. Start date time: Time when the alert was first set
l. Last modified user name: Name of the user who last modified the alert object
m. Source created id: Alert ID provided by the source of the alert in this case the monitor service. For all management purposed please leverage the ID provided by the platform
n. Duplicate alert count: Number of times the alert rule is fired for a particular resource
o. Last Modified Date Time: Time when the alert object was last modified

2. History: Indicates the changes with respect to the alert object overtime, and the source of the change
3. Other Details: Provides advanced information about the specific alert:
    a. Description: Specifies the meaning of the alert
    b. VM Name: Specifies the name of the VM (azure resource), on which the alert condition was detected
    c. Workload Type: Indicates the category of workload on which alert was fired. In case of Compute Insights the value is "BaseOS"
    d. VM ID: ARM ID of the VM, associated with the alert
    e. Signal Name: Indicates the name of the signal. In the private preview it will be the name of the Health Criteria on which the alert was triggered
    f. Criteria: Indicates the reason for the alert. For private preview it will be the name of the Health Criteria followed by the state because of which the alert was triggered
    g. Component Type: Indicates the type of component of the VM on which the alert was created, example Logical Disk, CPU etc.
    h. Component Name: Indicates the name of the component of the VM associated with the alert, example C:, CPU 1, etc.
    i. Properties: Specifies miscellaneous properties associated with component such disk space, compression type etc.
    j. Summary: Indicates the typical causes and remediation methodology of an issue. Additionally, provides insights into the execution logic of the alert. Not available in the initial part of the preview.

Additionally, you may use this experience to manage alerts as well. You may select the mark as resolved button shown at the top to resolve the alert.

3.2 Viewing Alerts fired on a VM

You can view insights around the total number of alerts fired on a VM when you are looking through the details of a VM within the monitoring experience.

The insights, the available actions, and the follow-up experiences are laid in a similar fashion, as from the solution overview screen. You will be able do everything that was listed in the previous section, but this time for alerts fired on a single VM.

Additionally, you will be able to view a list of top alerts fired on a single VM from the details view itself, through a widget, as shown below:

Like the alerts list view experience, described earlier, you may select the alert name from the list and launch the corresponding blade in context. You will also be able to perform the same tasks utilizing the alert blade, that were described earlier.

3.3 Viewing alerts raised by compute insights from Azure Monitor

From the Azure monitor surface, users can choose to focus on the alert raised by Compute Insights, by setting the filter. Monitor service to "Infrastructure Insights", however, doing do will not expose Compute Insights specific parameters such as "VM Name", "Component type" and "Component name", these parameters will only be exposed from the solution surface only.

4. Notifications

If you have chosen to onboard an action group for getting notified via the following either or both of the following channels:

1. Email
2. SMS

You would receive a communication whenever an alert is fired via the respective channel.

4.1 Email

With every alert fired, the intended recipients would receive an email whose subject would be synonymous to the alert name, while its contents would list out details of the alert including information around the typical causes of the alert, details of the resource on which alert was fired, and ways to resolve the issue, as can be seen in the snapshot as shown below:

Summary

The average time per write (for the physical disk) is high. System performance may be adversely affected.

The average physical disk time per write is measured in seconds. A disk that is developing a bottleneck might cause the entire system to slow.

The monitor threshold is analyzed against an average of values returned in polls to the agent, where the Number of Samples parameter controls the number of samples included in the calculation of t

Configuration

Monitoring of physical disks is disabled by default. Enable monitoring by enabling the object discovery named 'Discover Universal Linux Physical Disks.'

Default Configuration

Parameter	Default Value
Threshold	0.05
Interval (seconds)	300
Number of Samples	5

Overrides can be used to change the parameter values defined above for all instances or for specific instances or groups.

Causes

An unhealthy state indicates that the physical disk average time per write is currently high.

Circumstances that may cause this condition:

- High processor utilization can cause slowdowns when doing large data transfers.
- The hard drive interface speed can form a bottleneck to overall performance if it is too low for the hard disk's maximum sustained transfer rate.
- When available memory is low, the Virtual Memory Manager writes more pages to swap, resulting in increased disk activity.

Resolutions

- Upgrade to a faster processor or add processors.
- Confirm system has the maximum speed hard drive that it can support.
- Add physical memory.
- Be sure to set this threshold value appropriately for your specific storage hardware. The appropriate threshold value varies according to the disk's underlying storage subsystem. For example, which can be applied to specific computers or entire computer groups.

4.2 SMS

Those who have provided their mobile numbers to receive handy notifications via SMS channel would receive messages that would contain the alert name whenever an alert is fired.

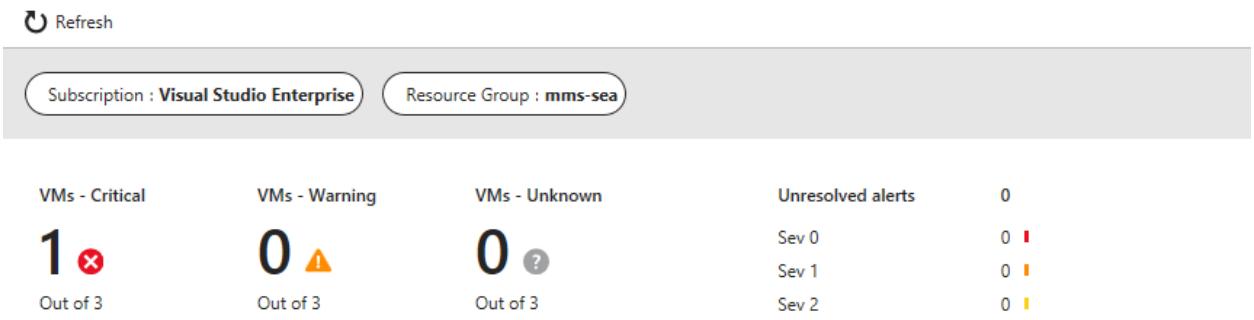
5. Health Diagnostics

Health Diagnostics view gives the user the ability to view all the components of the VM, associated health criteria, state changes and other significant issues encountered by monitoring objects related to the VM.

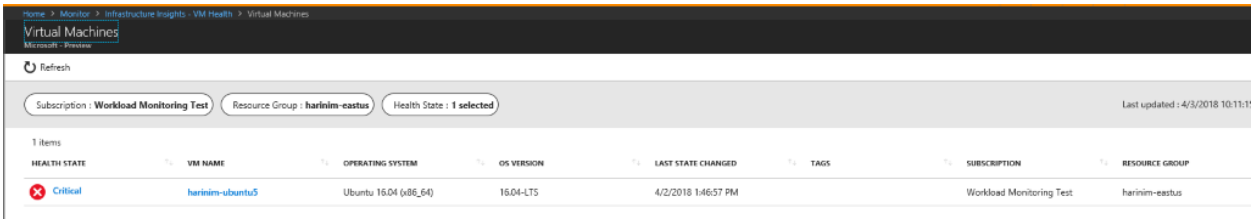
5.1 Health Diagnostics launch points

You can launch Health diagnostics from the following entry points.

1) Click on the number of Critical/Warning/Unknown state VMs in Insights Pane



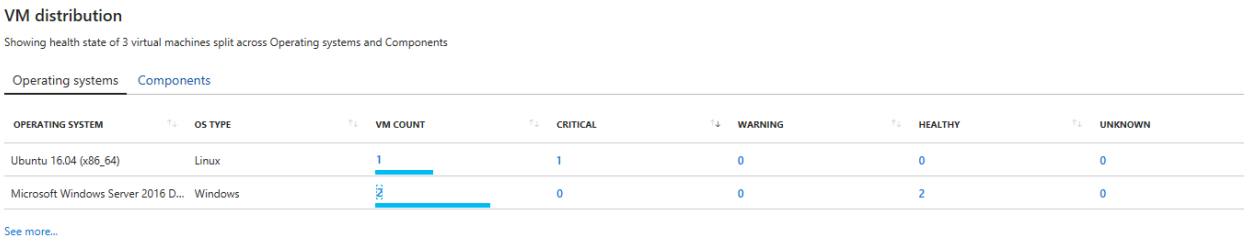
This will open a list view of all the VMs in that category (for example all critical VMs)



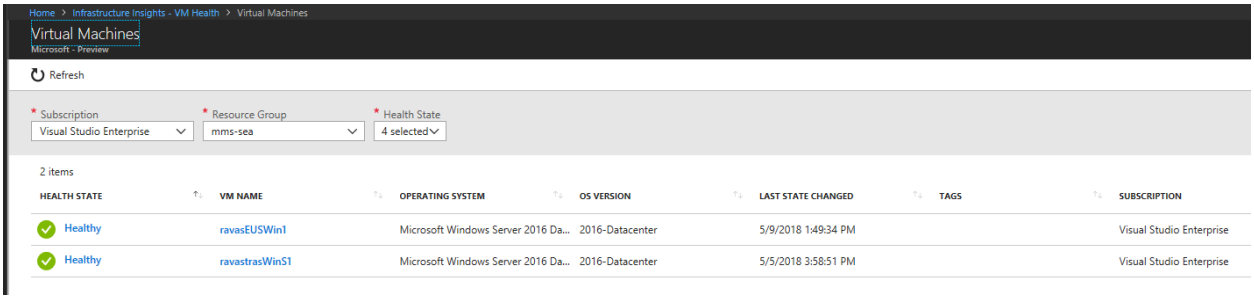
Click on Health State column's cell value to open Health Diagnostics of the selected VM.

2) Under VM distribution, Click on the VM count in any one of the columns (VM Count/Critical/Warning/Healthy/Unknown).

This is will open the list view of VMs in that category



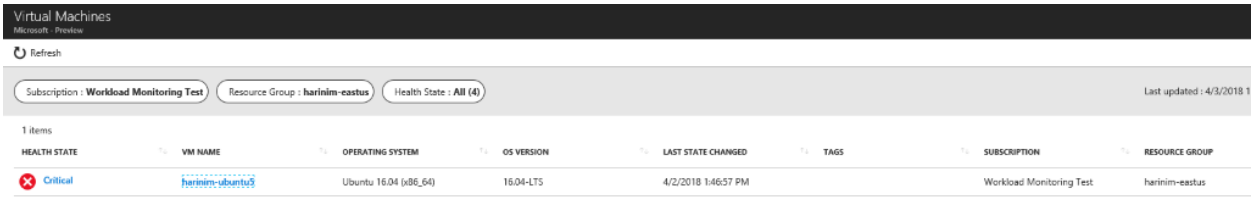
Click on Health State column's cell value to open the health diagnostics for the selected VM.



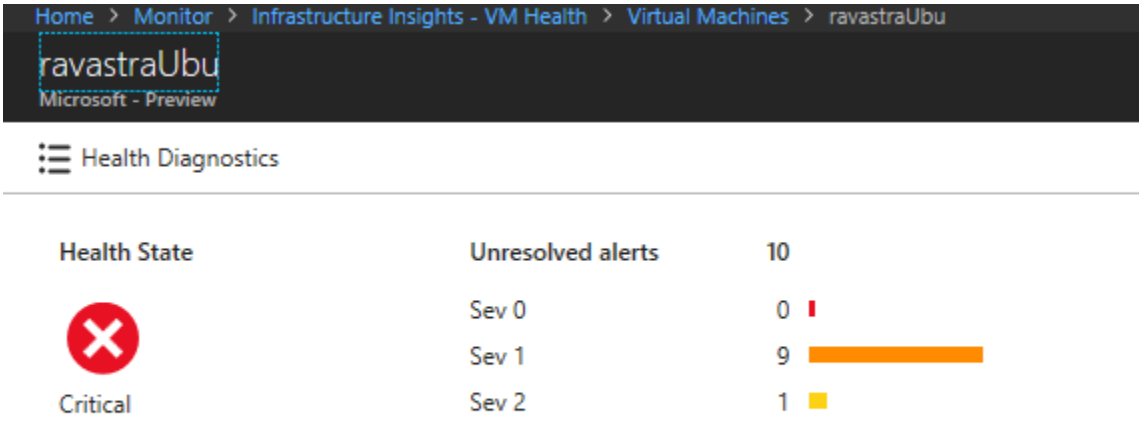
3) Click on the VM count in the VM health page either the VM count in insights pane (as in 1 above) or one under VM distribution (as in 2 above) or "*See more*" under VM distribution.

This will open a list view of VMs in that category. (In case of "*See more*" under VM distribution it will open a list view of OS distribution. Click on the number of VMs under a category to get a list view of VMs).

Click on the VM Name.

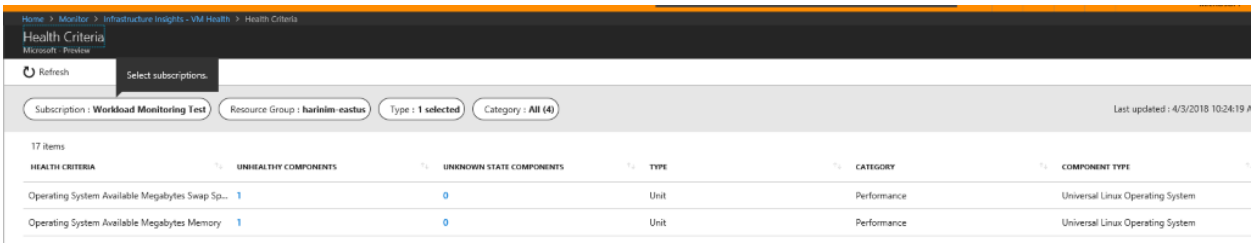


Click on the Health state icon or “Health diagnostics” in the task bar to launch “health diagnostics”.

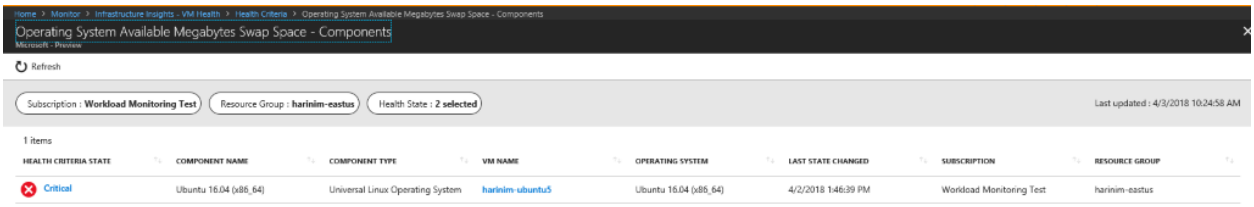


4) In VM Health page, click on the number of “unhealthy components” or “unknown state components” under “Top Health Issues” or “See all Health Criteria”.

Click on the count of unhealthy components. This will give a list view of VMs that are unhealthy due to this specific Health Criteria.

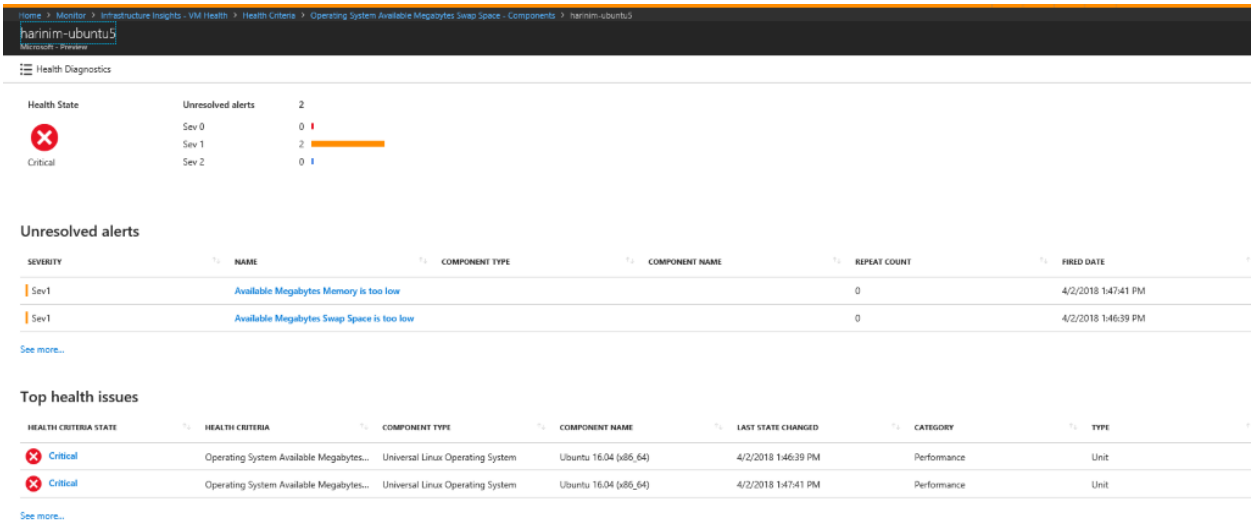


Click on the health state column's cell value to launch "Health Diagnostics", this would open the health diagnostics in context of the unhealthy component.



Click on the VM name column's cell value to open single instance VM page.

Click on either Health State icon or Health diagnostics in the task bar to launch "Health Diagnostics".

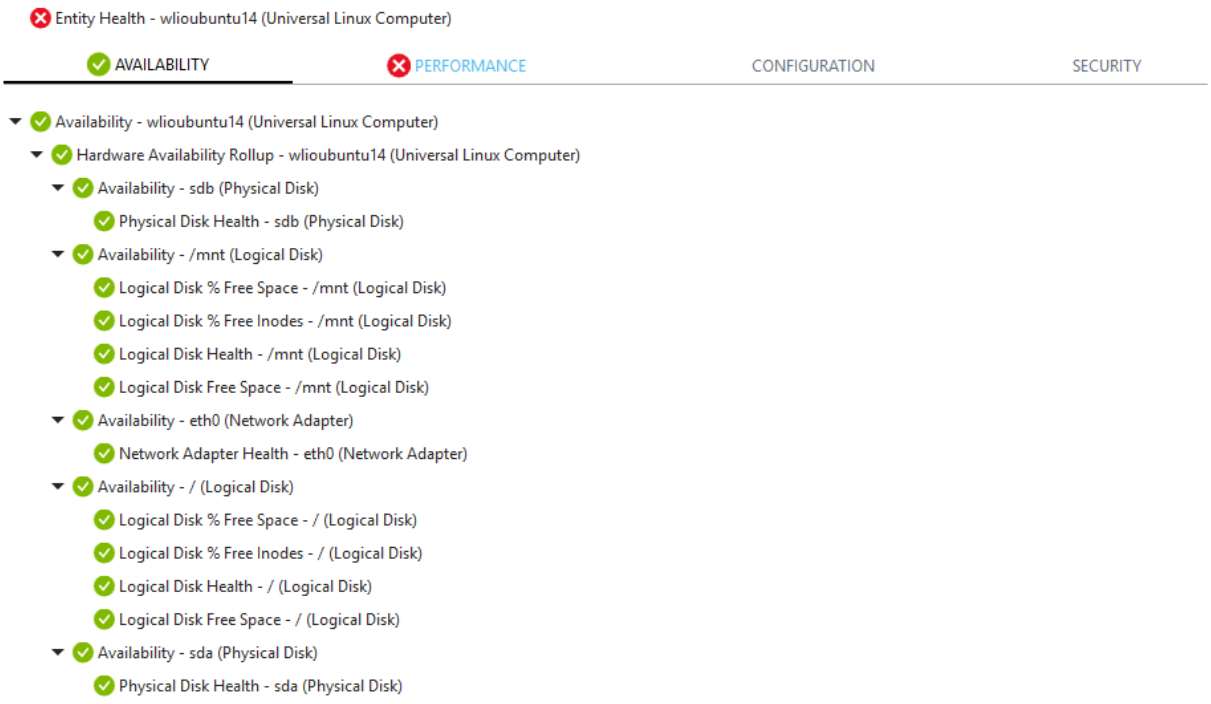


5.2 VM Health Diagnostics

Health Diagnostics organizes health information into the following categories

- Availability
- Performance
- Configuration and
- Security

All the health criteria defined for a selected target would display in the appropriate category.



Health state of a health criteria is defined by one of the three states – critical, warning and healthy. There is another state which is not associated with the health of a criterion but represents the monitoring status – Unknown

The following are the health states represented in Health Diagnostics

Icon	Health State	Description
	Healthy	The health criterion is healthy if it is with in the defined health conditions (example: if a metric is under a defined threshold value). In case of a Parent Node, all the health criteria that rolls-up to this parent health criteria are healthy as they meet the defined conditions.
	Critical	The health criterion is in critical state if it is not within the defined conditions (threshold values or service running status). In case of a Parent Node, if one or more of the health criteria that rolls-up to this parent health criteria are in critical state as they are not meeting the defined conditions, the Parent Node would be in “critical” state
	Warning	In case of a three-state, a health criterion can be defined as a warning if it is between two thresholds.

		In case of a Parent Node, if one or more of the child health criterion is in a warning state, then Parent Node would be in “warning” state. The health of a parent node depends on the health of the individual health criteria (child) in the health model. If there is a health criterion (child) that is critical and a health criterion (child) that is in a warning state, the Parent health criteria would be in a critical state.
?	Unknown	The health criterion is in Unknown state when the health state cannot be computed for several reasons such as not able to collect data, service uninitialized etc.

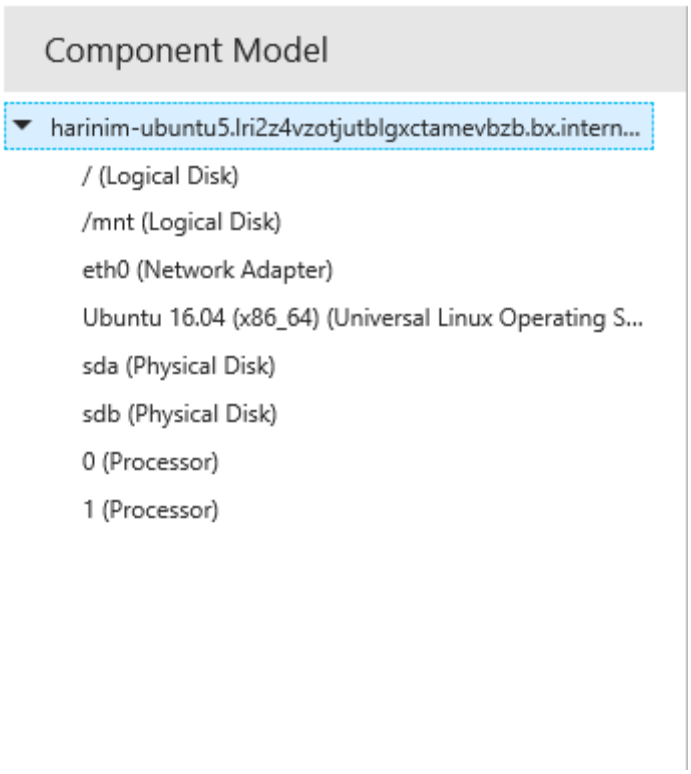
Health Diagnostics page has three main sections

1) Component Model
2) Health Criteria
3) State Changes

5.2.1 Component Model:

The left most column in a health diagnostics screen is the Component Model. All the components and its discovered instances, which are associated with the VM would be displayed in this column.

In the example below, the discovered components are disk, logical disk, processor, memory and Operating System. Multiple instances of these components are discovered and displayed in this column (there are two instances of logical disk (/ and /mnt), one instance of network adapter (eth0), two instances of disk (sda and sdb), two instances of processor (0 and 1) and an Ubuntu Operating System).



5.2.2 Health Criteria

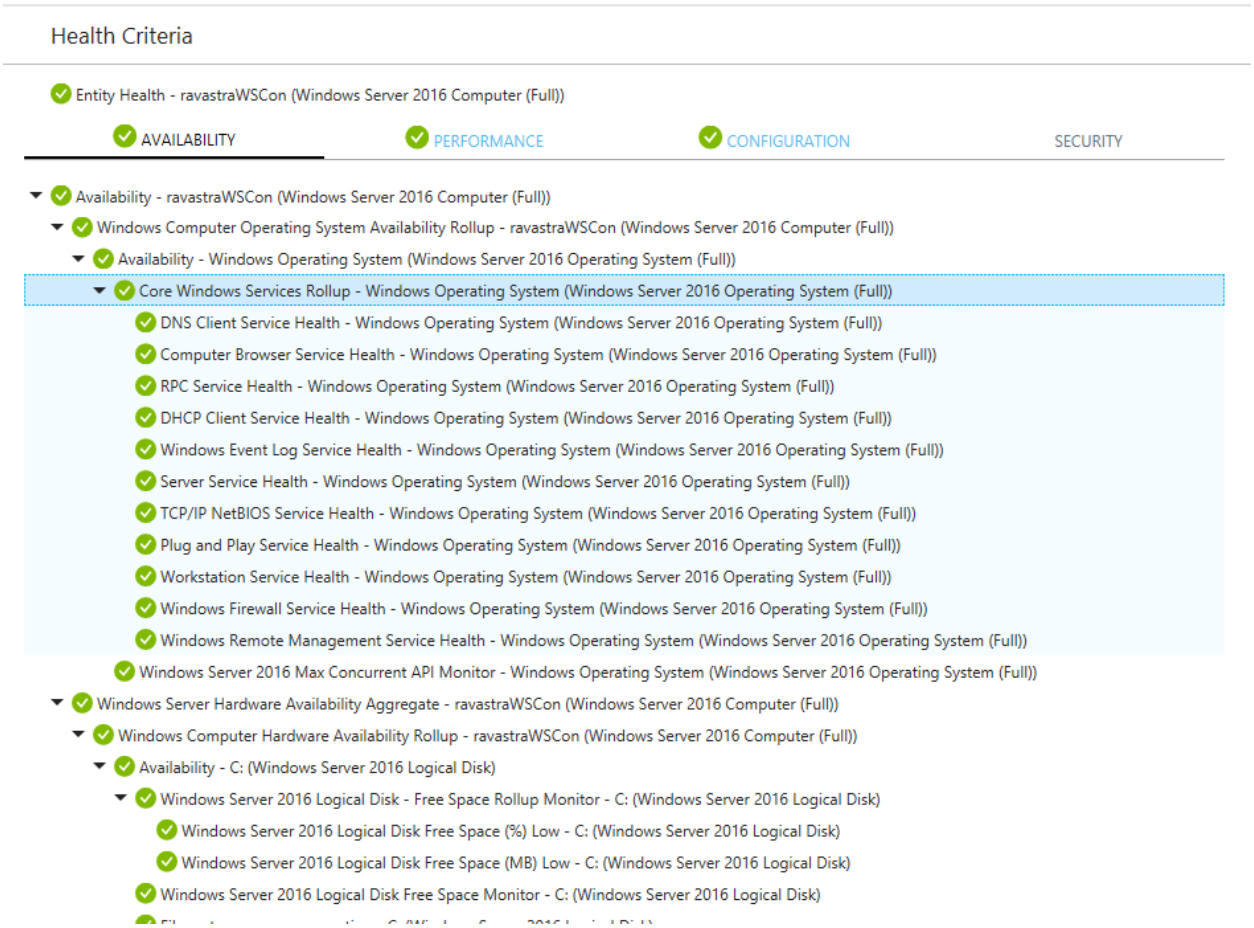
The center column in the Health Diagnostics page is the "Health Criteria" column. The health model defined for the VM structure in would be displayed in a tree this section. A health model for a VM would consist of unit, dependency and aggregate health criteria.

A health criterion measures the health of the monitored instance with some criteria which could be a threshold value or a state of an entity etc. A health criterion has either two or three health states as described in the above section. At any given point, the health criterion can be in only one of its potential states.

The overall health of a target is determined from the health of each of its health criteria defined in the health model. This will be a combination of health criteria targeted directly at the target, health criteria targeted at components rolling up to the target through a dependency health criterion. This hierarchy is illustrated in the Health Criteria section of the Health Diagnostics screen. The policy for how health is rolled up is part of the configuration of the aggregate and dependency health criteria.

You can find the list of default set of Health criteria running as part of this solution in *Health Criteria Details* document.

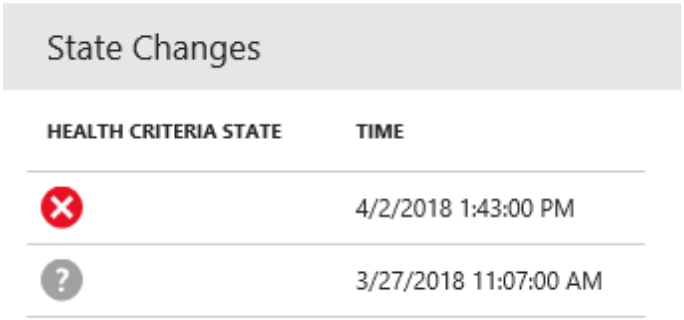
In the example below, the aggregate health criterion Core Windows Services Rollup assesses the health of the most critical Windows Services based on individual service health criteria. The status of each service such as DNS, DHCP etc., are evaluated and the health is rolled up to corresponding rollup health criterion (as shown below).



The health of the Core Windows Services Rollup rolls into the health of ***Operating System availability*** which eventually rolls up to the ***Availability*** of the VM.

5.2.3 State Changes

The right most column in health diagnostics screen is “State Changes”. This column lists all the state changes associated with the health criteria that is selected in the Health Criteria section or the state change of the VM if a VM is selected in the Component Model column or Health Criteria column.

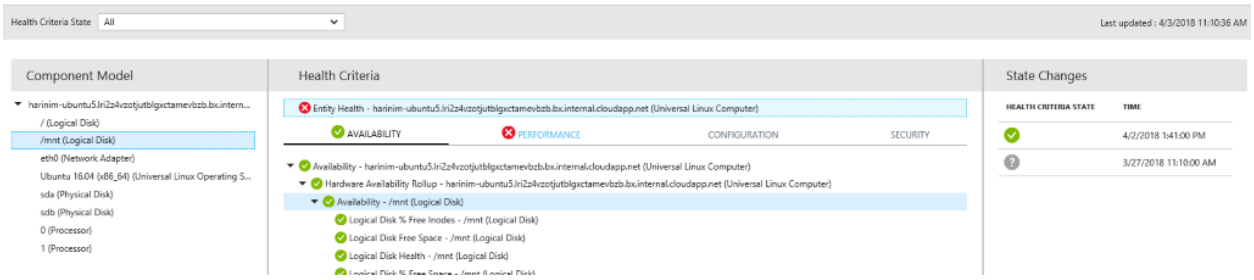


This section consists of the health criteria state and the associated time (with the latest state on the top).

5.2.4 Association of Component Model, Health Criteria and State change columns

The three columns are interlinked with each other.

When a user selects a discovered instance in the “Component Model”, the “Health Criteria” section will be filtered to that component view and correspondingly the “state changes” will be updated to the health criteria that is being selected.

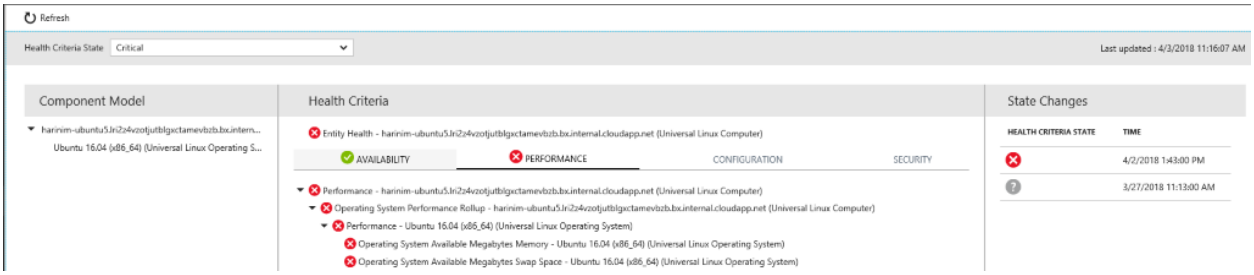


In the above example, when one selects /mnt (Logical Disk), the Health Criteria tree is filtered to /mnt(Logical Disk). The Availability/Performance/Configuration/Security tabs are filtered accordingly too. The State Change column shows the state change for the “availability” of /mnt(Logical Disk).

5.2.5 Health Diagnostics screen task options

Health Diagnostics screen has two task options –

1) Refresh – This refreshes the entire health diagnostics page. If there is an update to the health criterion’s health state based on the predefined polling interval, this task would update the health criteria to the latest.
2) Health Criteria State – This is a filter. User can filter the whole health diagnostics screen based on the health criteria state – Healthy, Warning, Critical, Unknown and All.



The **Last Updated time** to the top right corner, represents the latest time when the health diagnostic page was refreshed.

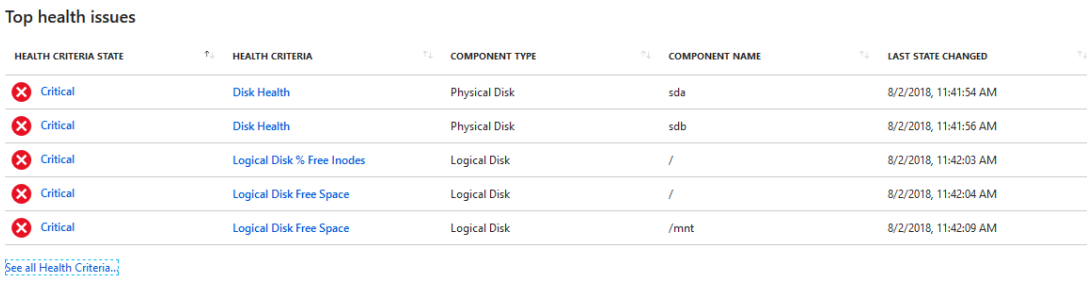
6. Viewing information about a health criteria

Health criteria are health conditions rules that assume a state – critical, warning, healthy or unknown, based on how an aspect associated with a VM is doing. For example, if there is less amount of disk place available in a Logical Disk, the health criteria associated with the metric signal "Free Megabytes", will turn unhealthy ie it will assume a Critical or Warning state.

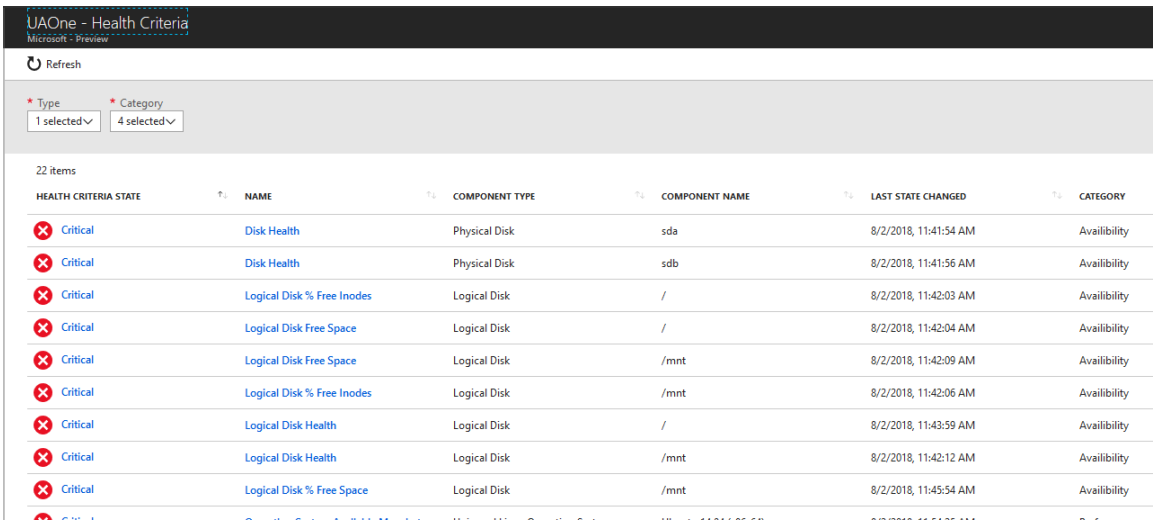
6.1 Launch points

You can explore the details of a health criteria by selecting the health criteria name from any of the following 2 places:

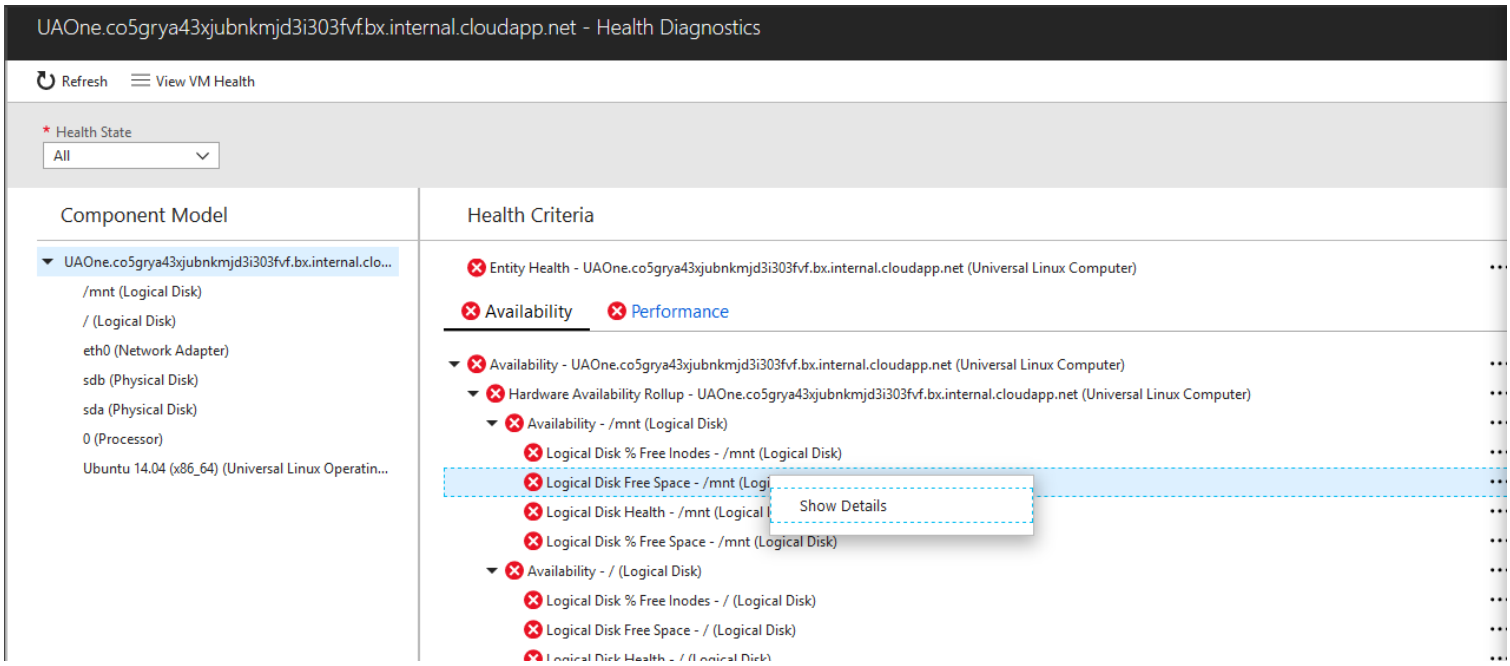
1. "Top Health issues" grid in the blade listing out health details of a particular VM (not at overview level)



2. You can also click "see all health criteria", visible in the widget shown above, to launch a blade enlisting all health criteria that are applicable to the VM as shown below

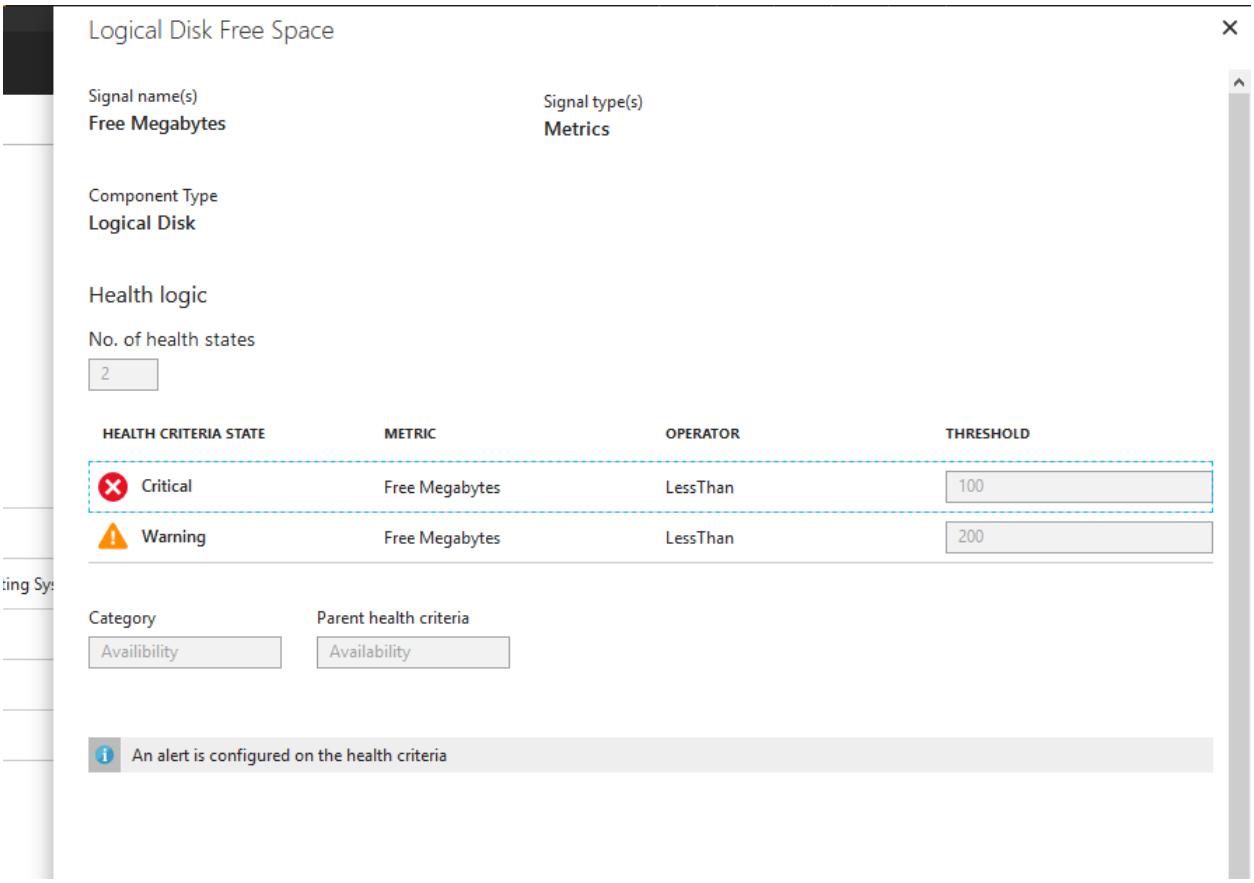


Additionally, from the health diagnostics experience you can select the “show details” from either the context option (clicking on the ellipses) or by right clicking a health criteria listed in health criteria column as shown below



6.2 Health criteria details blade

The details of a health criteria are available in a context blade, as shown below:



The blade provides following information with respect to a health criteria:

1. Name: The name of the health criteria is listed in its title, in the above example it is “Logical Disk Free Space”
2. Signal Type: The signal which the health criteria is based on, in the above example it is “Free Megabytes”
3. Signal Type(s): The type of signal which is given as an input to the health criteria, in the above example it is “Metrics”
4. Component Type: It provides information about the type of entity to which health criteria is associated with, the health criteria shown above targets “Logical Disks”
5. No. of health states: Indicates the number health states the monitor can take outside of healthy and unknown; since the health criteria shown above can assume 2 such states – critical and warning, hence the number is 2
6. Condition table: The condition table provides the logic used to evaluate health, in the example shown above the health criteria goes into critical state once “Free Megabytes” is “Less than” 100, and is in warning state if the same metric signal is less than 200 but greater than 100. It is implicit that if the value of the metric “Free Megabytes” is greater than 200, the health criteria is in healthy state

7. Category: Indicates the type of aspect this health criteria points towards, in the example shown above it is availability as if the logical disk is low on space, the availability of storage on the VM is poor
8. Parent Health Criteria: Indicates the health criteria whose state is impacted because of the current health criteria, in the above example it is “Availability” health criteria which targets the VM
9. Alert information: This indicates whether an alert will be fired if this health criteria is in poor state, in the example it is indicated that the health criteria, “Logical Disk Free Space”, fires an alert when it is unhealthy

Note: This experience is available only for Health Criteria that are of the type “unit”

7. API Surface

To use the API armclient must be in a working condition in user’s machine, additionally, the user must be logged in into his/ her account.

PS: In this section items written in red colored font are to be provided by the user

7.1 Overall Prerequisites

In order to use the WLI API surface user must have armclient installed, and most of the WLI will require you to know the Workload ID (which acts in lieu of the VM for now). Power-shell and CLI aren’t supported as of now. The examples here on will be given in reference to command prompt (user might have to modify if armclient is being used in powershell accordingly)

7.1.1 Getting ARM client

Before onboarding armclient users must install chocolatey:

https://chocolatey.org/

Armclient can be onboarded once chocolatey is installed (command prompt example is listed below):

choco install armclient

7.1.2 Logging into armclient

You must then login to the armclient using your credentials

Command Prompt example:

armclient login

7.1.3 Getting Workload Name

You can get the workload ID/ workload name using the get API shown below:

armclient GET /subscriptions/…/providers/Microsoft.WorkloadMonitor/components?api-version=2018-01-29-privatepreview&$select=WorkloadId&$filter=VmId eq 'VM_resource_ID'

Sample response:

subscriptions/…/resourceGroups/…/providers/Microsoft.WorkloadMonitor/workloadInsights/Workload_Name

The last field in the response would be the workload name, and the whole response field is the ID.

7.2 Editing a health criteria

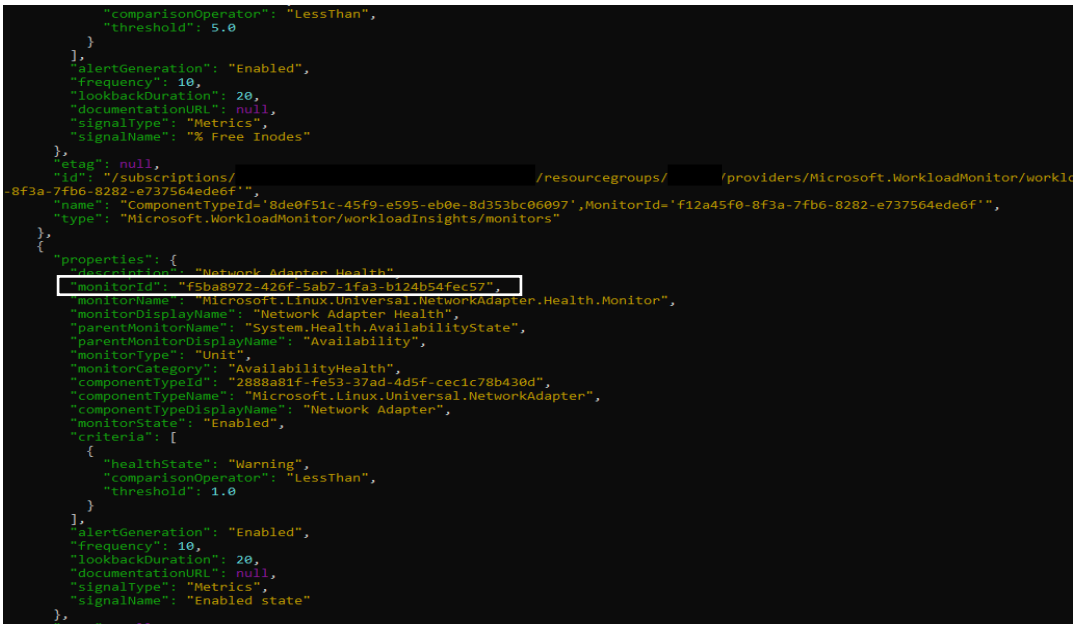
Note: The edit function take effect at a resource level (workload resource corresponding to a VM) ie if the threshold of a health criteria instance (health criteria operating on an entity) is modified, the modification will impact all the health criteria instances of the health criteria running associated with the resource. For example, if the thresholds of “Logical Disk Free Space” targeting C drive is modified, the threshold of the same health criteria targeting other logical disk drives, say D and E drives, will also get modified.

7.2.1 Prerequisites

Users must have the criteria ID (monitor ID)to perform edit operation on a health criteria. To obtain the same use the following API

armclient get
subscriptions/…./resourceGroups/…./providers/Microsoft.WorkloadMonitor/workloadInsights/workload_resource_name/monitors?api-version=2018-01-29-privatepreview

The response would enlist all the available health criteria, their states and their attributes, as shown below:



As can be seen above monitor id is the second field under properties section

7.2.2 Core Operation

You can edit the following attributes of a health criteria:

1. Threshold
2. Enable/ disable alert over health criteria

Use the following API to get information about the health criteria use the following get API:

armclient get
subscriptions/…./resourceGroups/…./providers/Microsoft.WorkloadMonitor/workloadInsights/workload_resource_name/monitors/monitor_id?api-version=2018-01-29-privatepreview

A sample response is given below:

As can be seen the threshold is 95% and alerting is enabled, if one wants to modify the same, you must use the patch API, example of which is provided below:

armclient patch
subscriptions/…/resourceGroups/…/providers/Microsoft.WorkloadMonitor/workloadInsights/workload_resource_name/monitors/monitor_id?api-version=2018-01-29-privatepreview
"{'properties':{'criteria':[{'healthState':'Error','comparisonOperator':'GreaterThan','threshold': threshold_value}],'alertGeneration':'Disabled'}}"

7.3 Associating action groups

You can associate action group with VMs that are being monitored using VM Health such that notifications are fired whenever a VM health alert is triggered over the VM

7.3.1 Prerequisites

You must have an action group resource that is configured over any or both of the following channels:

1. Email
2. SMS

Additionally, you must have the workload ID of the workload associated with the VM

7.3.2 Core Operation

You can use the following put API to associate action group resources with workload (in lieu of the VM). The example given below shows the usage of API in command prompt.

armclient put

subscriptions/…/resourceGroups/…/providers/Microsoft.WorkloadMonitor/workloadInsights/Workload_name/notificationSettings?api-version=2018-01-29-privatepreview @Payload.JSON

Payload.JSON in the above sample is a script which can have the following content

{"ActionGroupResourceIds": ["AG_ID_1", "AG_ID_2"]}

Additionally, you can query the IDs of action group(s) associated with a workload, by using the following get API

armclient get
subscriptions/…/resourceGroups/…/providers/Microsoft.WorkloadMonitor/workloadInsights/Workload_name/notificationSettings?api-version=2018-01-29-privatepreview

Appendix

Known Issues

1. The time period and frequency of health criteria are not editable, they will be made editable in future releases
2. Users can't disable health criteria
3. After onboarding quite, some time is expended before data is populated in Azure Monitor -> Virtual Machines -> VM Health UI or VM resource blade -> VM health UI
4. Health Diagnostics experience updates faster than any other view, so you may experience information log between blades
5. The health criteria knowledge articles are not integrated in the experience, please refer to the *Health Criteria Details* docs in case of any clarifications on health criteria running.
6. The fired alerts section in the single VM experience shows alerts whose monitor condition is set to "fired" in past 30 days, it is not configurable. Clicking on See more, you can change the filter of Time Range.
7. In the alerts list view page, we suggest not to change the Resource type, Resource and Monitor Service filters as they have been handled specific to the solution.
8. In Linux VMs, health diagnostics view has the entire domain name of the VM instead of the user given VM name
9. Alert History doesn't update adequately in the alert details blade.
10. Fired date is latched to the first time ever the alert was fired in a month. If the same alert becomes active on the same VM again in a month's window, only last updated date gets updated. Hence, we suggest during private preview filter using last updated date.

11. Unwanted context switches (automatic changes in tab selection) in health diagnostics experience may happen
12. Shutting down VMs, will turn some of its health criteria in critical and others in healthy state with net state of the VM being critical, instead of unknown state