ZuluDesk

ClearPass
ClearPass and ZuluDesk Integration Guide

Change Log

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<th>Comments</th>
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<td>2019-01</td>
<td>August 2019</td>
<td>Anish Pansare</td>
<td>Initial Release</td>
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Introduction and Overview

ZuluDesk is a powerful, cost effective Mobile Device Management system for today’s modern digital classroom. With ZuluDesk all your Apple devices can be managed. ZuluDesk has easy to use tools for the IT Department, teachers and parents.

In combination with Apple’s iOS, ZuluDesk is the very best MDM choice for education. Inventory, deploy and secure every Mac, iPad and iPhone in your schools – and integrate them into existing IT with an ease that has never been possible until now.

This integration guide covers the deployment and configuration of ClearPass Policy Manager to interface with ZuluDesk. The integration leverages ZuluDesk APIs to obtain attributes associated with an endpoint. It provides an ability to pull all device details from a customer tenant into ClearPass endpoints database. The contextual data inserted into ClearPass can then be leveraged to drive granular access policy.
Pictorial View of the Integration

The diagram below shows a pictorial overview of the components and how they interact with each other.

**Figure 1: Pictorial view of ClearPass Policy Manager integration with ZuluDesk**

Software Requirements

The minimum software version required for ClearPass is 6.7.2. At the time of writing, ClearPass 6.8.2 is the latest available and recommended release. Any subsequent ClearPass software release will support this integration. ClearPass runs on either hardware appliances with pre-installed software, or as a Virtual Machine under the following hypervisors. Hypervisors that run on a client computer such as VMware Player are not supported.

- VMware vSphere Hypervisor (ESXi) 6.0, 6.5, 6.5 U1, 6.5 U2, 6.7, and 6.7 U1
- Microsoft Hyper-V Server 2012 R2, Microsoft Hyper-V Server 2016, Windows Server 2012 R2 with Hyper-V, or Windows Server 2016 with Hyper-V
- KVM on CentOS 7.5

The ZuluDesk version used to verify interoperability for this guide was 7.5.0.
Installation and Deployment Guide

This document assumes your ClearPass environment is already configured and operational. If you require assistance with basic deployment, refer to the following deployment guide:


Access to the Extension Store

Access to the Extension Store to download extensions was simplified in ClearPass 6.7. The ability to download extensions from the store and to validate support entitlement for access to the Software Updates Portal (e.g. Posture & Profile Data Updates, Software Updates, & Skins) now uses the HPE Passport account credentials that are associated with the customers’ ClearPass licenses. This is configured where previously the subscription-id was defined, under Administration → Agents and Software Updates → Software Updates as shown below. Ensure you enter your HPE Passport credentials to enable Extension download capabilities.

Figure 2: Entering HP Passport credentials

New Extension Support in ClearPass 6.7+

With the release of 6.7, several new features have been added to enhance the functionality of the extension framework. Previously, all extension installation and operation tasks required use of the API Explorer to interoperate with the Extension and the underlying framework. Now this functionality has been exposed with a new GUI. The GUI is accessed from within the Guest UI and is shown below, Administration → Extensions.

Extensions and IP address configuration support

The other major additions in the 6.7 release are the ability to define the extension framework base IP network and statically define the IP address of the individual extensions. The latter being useful when deploying extensions in a cluster and the requirement for a fixed IP address for the same extension across a cluster regardless of which ClearPass node or nodes it is installed on.
Extensions and web proxy support

Prior to 6.7 support for web proxy was limited to the installation of the extensions. Starting in ClearPass 6.7, extensions now support communications with 3rd parties via a web proxy. This adds incremental web proxy functionality. If a web proxy is defined in ClearPass Policy Manager, then an extension will use that configuration.

The Policy Manager web proxy configuration is ONLY read by the extension at installation time. If the web proxy configuration is changed in Policy Manager, then the extension must be re-installed so the new settings are re-read and bonded to the extension.

Figure 3: Extension framework GUI

Configuring the base Extension IP subnet, this is defined within Policy Manager as shown below under Administration -> Server Manager -> Server Configuration [chose your node] Service Parameters [ClearPass system service]. The default is 172.17.0.1/16, this address is the non-routed address of the ClearPass node itself. The IP addresses range for the extensions are based upon the network prefix used.

Note that the subnet defined here for the extension framework must be one of the following 10.0.0.0/8, 172.16.0.0/12 or 192.168.0.0/16.
Figure 4: Defining the base IP SUBNET and LOCALHOST for the Extensions framework

Changing the extension base IP address will require the extension service to be restarted.

Changing the "Extensions Network Address" range is necessary if either the MGMT or DATA interface are also using an address in the extension default range of 172.17.x.x/16. Set the new network address range as needed and restart the extension service for this to take effect.
ZuluDesk Extension Installation and Configuration

Starting in ClearPass 6.7, a Graphical User Interface (GUI) was introduced to make the process of interacting with the extension framework easier. To access the extension GUI, from the Guest System, under Administration find the Extension User Interface as shown below.

**Figure 5: Extensions framework GUI**

From here, click on 'Install Extension', and the search box below appears. Enter the store ID and click on Search.

**Figure 6: GUI Extension search**

Starting 6.7, in a cluster environment an extension can be installed on the subscriber nodes directly.

---

**NOTE**

ClearPass and ZuluDesk – Integration Guide
Click on the Extension and then the **Install** option

**Figure 7: GUI Extension install**

Set a specific IP address for the Extension if required. It will automatically pick an IP address if not assigned. Also, it can be changed later if required.

**Figure 8: GUI Extension configuration at install time**
After the Extension has been installed, review the configuration and adjust as needed. There are options to Start, Delete, Reinstall or Show Logs and the option to edit and set the Extension configuration.

The default configuration used for Extension is below:

```
{
    "zuluDeskUrl": "api.zuludesk.com",
    "zuluDeskNetworkId": "ZuluDesk User",
    "zuluDeskApiKey": "ZuluDesk Password",
    "endpointCacheTimeMinutes": 240,
    "zuluDeskPullOnStart": false,
    "enableZuluDeskPull": false,
    "zuluDeskPullSchedule": "0 3 * * *",
    "asyncOperationLimit": 10,
    "cppmUserName": "ClearPass User",
    "cppmPassword": "ClearPass Password",
    "verifySSLCerts": true,
    "logLevel": "INFO"
}
```

Each of the attributes are explained in the table below in detail.

**Figure 9: Extension configuration parameters**

<table>
<thead>
<tr>
<th>Configuration attribute</th>
<th>Description</th>
<th>Example/Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>zuluDeskUrl</td>
<td>ZuluDesk API URL</td>
<td>Example: api.zuludesk.com</td>
</tr>
<tr>
<td>zuluDeskNetworkId</td>
<td>The Network ID for your ZuluDesk Instances. See, <a href="https://api.zuludesk.com/docs/#api-">https://api.zuludesk.com/docs/#api-</a>_ for more details.</td>
<td>000000</td>
</tr>
<tr>
<td>zuluDeskApiKey</td>
<td>The API Key to access the ZuluDesk API. See, <a href="https://api.zuludesk.com/docs/#api-">https://api.zuludesk.com/docs/#api-</a>_ for more details.</td>
<td>API created on ZuluDesk</td>
</tr>
<tr>
<td>endpointCacheTimeMinutes</td>
<td>The cache timeout in minutes; used to determine if we should attempt to update an endpoint that has been pulled from ZuluDesk. Only endpoints that have been pulled from ZuluDesk can be updated as the update process requires a ZuluDesk device ID.</td>
<td>240</td>
</tr>
<tr>
<td>zuluDeskPullOnStart</td>
<td>When starting the extension should an initial pull of devices from ZuluDesk be run.</td>
<td>true or false</td>
</tr>
<tr>
<td>enableZuluDeskPull</td>
<td>Enable the ZuluDesk scheduled pull process.</td>
<td>true or false</td>
</tr>
<tr>
<td>zuluDeskPullSchedule</td>
<td>The CRON based schedule for the pull processor to run.</td>
<td>0 3 * * *</td>
</tr>
<tr>
<td>asyncOperationLimit</td>
<td>The number of concurrent processes to run when processing devices. Must be a value greater than 0.</td>
<td>10</td>
</tr>
<tr>
<td>cppmUserName</td>
<td>The user name of an Admin user in ClearPass. This is used for device profiling.</td>
<td>Administrator username</td>
</tr>
</tbody>
</table>
When leveraging the pull capabilities of the Extension to get the device attributes from ZuluDesk, use the attribute `enableZuluDeskPull` and specify `zuluDeskPullSchedule`. These 2 attributes are leveraged for periodic poll of endpoints from ZuluDesk. The `zuluDeskPullOnStart` attribute can be leveraged as well to sync everything upon the start of the extension.

The `zuluDeskNetworkId` and `zuluDeskApiKey` are collected from inside the ZuluDesk system. For the username, you will have to use the Network ID for your account, which can be found at Devices > Enroll Device(s). For the password, you will have to use the API Key. For steps on creating this operator on ZuluDesk, refer Appendix B.

The `cppmUserName` and `cppmPassword` should be for a Network Administrator. The device profiling attributes obtained from ZuluDesk need to be written into the endpoint repository leveraging the REST APIs which requires a Network Administrator account.

A ClearPass Network Administrator account can be created under Administration > Users and Privileges > Admin Users. Click on Add. A user with the following Privilege Level needs to be created.

**Figure 10: Creating an Admin user on ClearPass**

A Network Administrator privilege level is sufficient for the action of adding device profiling information into the endpoint database of ClearPass.
A copy of the ZuluDesk Extension with the desired configuration is shown below, this has to be modified for your deployment. Include the `zuluDeskUrl`, `zuluDeskNetworkId`, `zuluDeskApikey`, `cppmUserName` and `cppmPassword` that will be specific to your environment.

Change or include any other values based on the description of each in the above table. Select Restart and click on Save Changes to restart the extension.

**Figure 11: GUI review and setting the Extension configuration**
After the configuration and the restart of the extension, click on Show Logs.

**Figure 12: Log validation**

The above log shows that the Extension has pulled the endpoint data from ZuluDesk. The above steps pull endpoint details at the time of starting the Extension and then regular updates are fetched at the interval specified by `zuluDeskPullSchedule`. Please note the IP address of the Extension. This will be used in the next section where we leverage the ZuluDesk attributes during enforcement. A sample of endpoint attributes fetched are shown below.

**Figure 13: Attributes fetched**
Multiple use-cases exist for how the data that is returned from ZuluDesk can be used in the Policy enforcement. In the example below, we are performing multiple checks:

1. Check if the device is managed by ZuluDesk. If it is not, redirect it to the captive Portal. Create a helpdesk ticket for remediation.
2. If the iCloud Backup is not enabled, create a helpdesk ticket.
3. If the device is not supervised by ZuluDesk, put it in the Quarantine VLAN.
4. Check if the device is passcode compliant. If it is not, flag it as a non-compliant device and redirect it to the Captive Portal.

Figure 14: Example of an Enforcement Policy utilizing attributes returned from ZuluDesk

Different companies will have different enforcement profiles and policies. The key takeaway here is to leverage the attributes received from ZuluDesk to drive the policy engine into making different enforcement actions for the device as they authenticate on the network.
Required Context Server Action can be defined under **Administration > Dictionaries > Context Server Actions.**

**Figure 15: Example Context Server Action**

Set the HTTP Method to **GET**. There is no additional configuration required in Header, Content and Attributes tab.
ZuluDesk configuration

It is assumed that a working ZuluDesk environment is leveraged for this extension. The configuration of ZuluDesk is beyond the scope of this guide.

To create an API key which is used as `zuluDeskApiKey` in the extension’s configuration, navigate to Organisation > Settings > API. Enter name and select access rights. Click Apply.

Figure 16: create API key on ZuluDesk

![Add API Key](image)
To retrieve the network ID, navigate to Devices > Enroll Device(s). Fetch the network ID from the MDM server URL as shown below:

Figure 17: retrieve network ID
Appendix A – Additional Diagnostics and Support

The Extensions Service

The ClearPass extension is supported by a new system service that was initially added in 6.6, but we recommend a minimum version of 6.7.2. This service should be running. Note that restarting this service will affect all deployed and running extensions.

To check on the state and to restart the service, go to Administration > Server Manager > Server Configuration [select a ClearPass node] > Service Control. From here start/stop the extension service. By default, this service is automatically started.

Figure 18: Checking on the extensions service and how to start/stop the service

Extension logs and debugging

Referencing the configuration previously used, adjust the logLevel to ‘DEBUG’. In the new 6.7, GUI change the configuration and restart the extension as shown below. Logs can then be viewed from the ‘Show Logs’.

Figure 19: Using the GUI to change the DEBUG level
Remember after changing the logging level, the extension will need to be restarted for this change to take effect.

**Accessing extension logs within ClearPass ‘Collect Logs’**

In addition to the logging of messages that be examined in the extension as shown above, it’s possible to configure the extension to log messages so that they can be collected and examined via the Policy Manager ‘Collect Logs’ system function. This is extremely useful for Aruba TAC. The logs are available under *Administration > Server Manager > Server Configuration > Collect Logs*.

If there is a requirement for Aruba TAC to investigate a system issue, one of the items they regularly ask for is the system logs to aid with their diagnostic investigation. The ClearPass extension can write its logs such that they are available and can be collected with all other system diagnostics information when the ‘Collect Logs’ function is run. Remember that by default, the logLevel is set to INFO but TRACE, DEBUG, INFO, WARN, ERROR, FATAL can also be set. Any of the levels will display the information for the selected state and lower. For example, if INFO is selected, it will show messages for INFO, WARN, ERROR, FATAL.

After the Logs have been collected and exported from the system, expand the GZ file and locate the extension logs in the following location ‘*PolicyManagerLogs* -> extension’ as shown below.

*Figure 20: Extension logs location in ‘Collect Logs’ diagnostic GZ file*