



KVM LIBVIRT POWER-PACK

*INSTALLATION AND CONFIGURATION OF THE
SCIENCELOGIC KVM LIBVIRT POWER-PACK*

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CHAPTER 1

INTRODUCTION

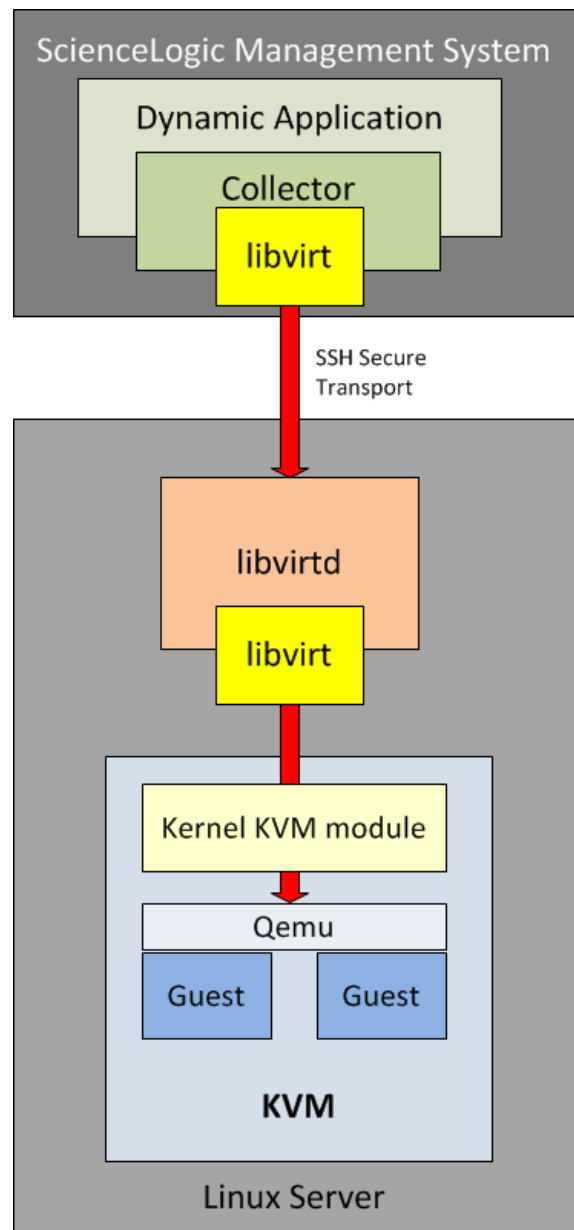
KVM, LIBVIRT AND SSH

KVM is a virtualization solution for Linux that consists of a loadable kernel modules which provides the core virtualization infrastructure and processor specific modules needed to operate virtualized machines. Using KVM, one can run multiple virtual machines running unmodified Linux or Windows images.

The underpinnings of KVM leverage a set of API's called libvirt, which is an open source toolset for managing platform virtualization of Linux and other operating systems. Libvirt provides functionality to provision, create, modify, monitor, control, and migrate elements of management under the KVM hypervisor. ScienceLogic leverages the libvirt API to collect, gather, monitor and correlate information about each KVM server.

Libvirt provides us the API to fetch information, but it relies on SSH for secure transportation over TCP networks. ScienceLogic opens a single SSH session to retrieve data from the libvirt daemon process, and once all data has been collected the SSH session is then closed.

Under normal circumstances, SSH requires a username and password in order to establish a secure connection between two devices. However, since the ScienceLogic libvirt collection process is



programmatically controlled, we must create a certificate based authentication method so that our collection programs can operate without being asked for a password.

CHAPTER 2

SSH KEY AND CREDENTIAL SETUP

CREATE SSH PRIVATE KEY

If you already have an SSH private key for the root user account, you may skip this step. First, let's create an SSH private key for the root user account. Login to your KVM server as root, and then enter the following statement:

```
ssh-keygen -t rsa -N "" -b 2048 -f ~/.ssh/id_rsa
```

Output will appear similar to the following:

```
Generating public/private rsa key pair.
Your identification has been saved in ~/.ssh/id_rsa.
Your public key has been saved in ~/.ssh/id_rsa.pub.
The key fingerprint is:
a2:cf:95:f9:d8:7d:e8:4b:ca:97:36:f9:1d:13:96:c6
root@Lab-KVM-005.mydomain.local
The key's randomart image is:
+--[ RSA 2048 ]-----+
|           |
|           |
|           |
|      . . |
|    . S   E |
|    . . o   o . |
|    . +   .+ o |
|    o . = +B ..o |
|    o . =++=. . |
+-----+
```

This will create a new file in root's home directory under `/root/.ssh/`. Next, we need to concatenate the newly created SSH private key so that we can copy and paste it into a ScienceLogic SSH credential.

```
cat /root/.ssh/id_rsa
```

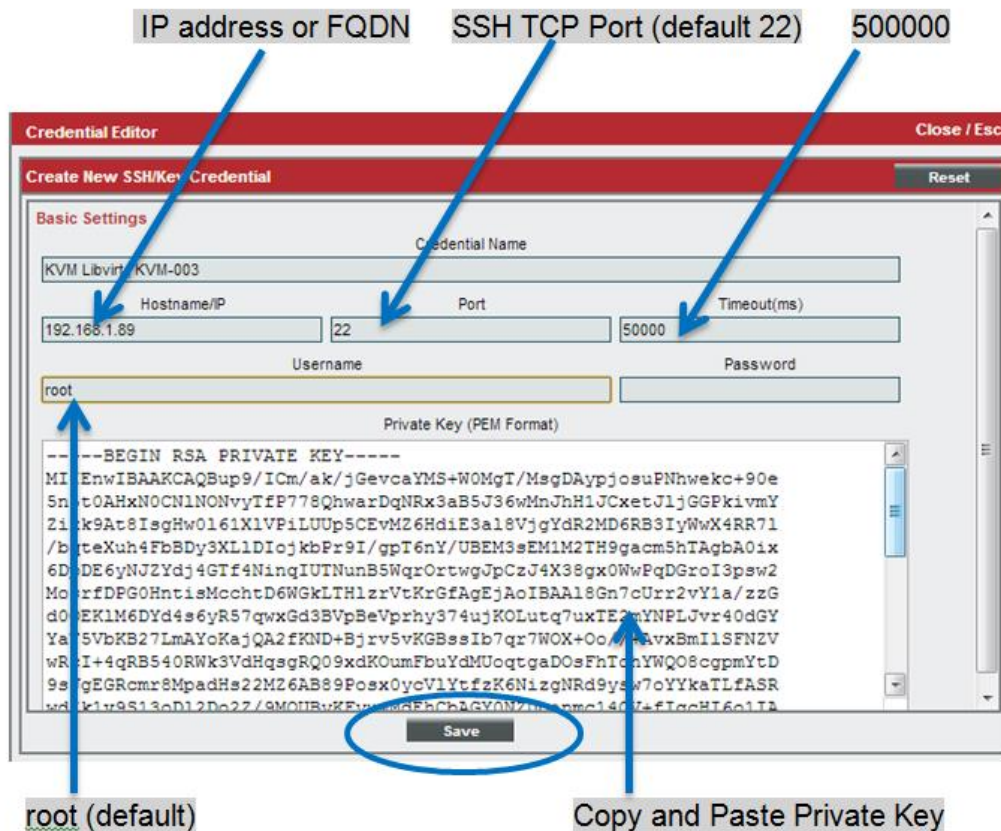
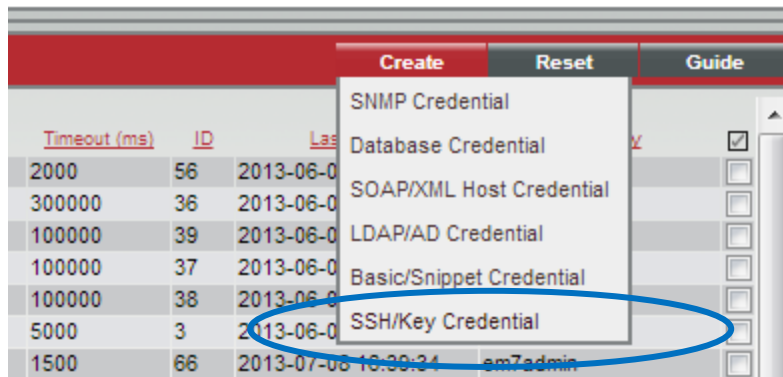
```
-----BEGIN RSA PRIVATE KEY-----
MIIEnwIBAAKCAQBup9/ICm/ak/jGevcaYMS+W0MgT/MsgDAypjosuPNhwkc+90e
5n5t0AHxN0CNlNONvyTfP778QhwarDqNRx3aB5J36wMnJhH1JCxetJljGGPkivmY
Zixk9At8IsgHw0l6lXlVPiLUUp5CEvMZ6HdiE3a18VjgYdR2MD6RB3IyWwX4RR7l
/bqteXuh4FbBDy3XLlDIOjkbPr9I/gpT6nY/UBEM3sEMlM2TH9gacm5hTAgbA0ix
6DpDE6yNJZYdj4GTf4NinqIUTNunB5WqrOrtwgJpCzJ4X38gx0WwPqDGroI3psw2
MosrfDPG0HntisMcchtD6WGkLTHlZrVtKrGfAgEjAoIBAA18Gn7cUrr2vY1a/zzG
d0OEKlM6DYd4s6yR57qwxGd3BVpBeVprhy374ujKOLutq7uxTE2mYNPLJvr40dGY
YaT5VbKB27LmAYoKajQA2fKND+Bjrv5vKGBssIb7qr7WOX+Oo//+AvxBmIlSFNZV
wRcI+4qRB540RWk3VdHqsgRQ09xdKoumFbuYdMUoqtgaDOsFhTohYWQO8cgpmYtD
9sJgEGRcmr8MpadHs22MZ6AB89Posx0ycVlYtFzK6NizgNRd9ysw7oYYkaTLfASR
wdZklv9S13oDl2Do2Z/9MQUByKFywmDEhCbAGY0NZ0qanmc14QV+fIgcHI6o1IA
DjMCgYEA34gzm0zZf95dD3qXpclRGOML7DqkE4TU5ZqGml7tVtClfCZ/SRw7aAYl
Nf3HMGhwK13ge6492P4zYSkagFrRmpsw32/qQQbFI+Iiczf5QkGMrHlJBGAOagnN
81qRhNegTjG+seXL49EaGUP3RslpiEo/NQb1SrSSjvTyxndJxBUCgYB+unlQ2+fn
7SnEgG49Ho4o6OH8584Ksbt/jzzF8Y7gkvSAU3xqkQXY7WDKHpqFA2/AFN1OBF3h
h9VViXZ5N+UH9VulPxmCRmkUl58mPWR95vI0TPuxiNHZrFy8tc3gCflkqlg/LBN/
Q1HAhSLBpTJgnLe+jUkIPCAtvC/S4+BH4wKBgDl6y3ETwuZdwCiNPPAd0wZmROT5
IuBynSUZG0xES6icDUvPYo8khE3y86ArUHope+3k8JTVcJbir7nl/4AXWng2iOj/
hWEtoGhQF3y2ny5LXrAB7jRTNugRJlSFANKEPyoMyqLGD9t+6XQ2DGKo0f55ffex
VQSUItq0A+nkKOlHAoGAU0dZqiocDW/24Dcj3wVzXLZLXQ1bg17aTIKy6HoqsNWZ
W6StlNyO0GF6Hmvh4mFYeIK9UIaG1gjOBQKPr5UrXVZhF8GtLHtSAvdnMlCCZfD
u/gTHOThrEyx+Fo2lQ3eZrkVald6htR3jSRKCjlbnpLfJXLJl7J7i8TO+EyasuUC
gYEAz7d98QWkuwrJBDKoL6l15T/5N8LXvJLSLyRBiIXR7XHm+a4wIwuHmcbhBjgB
DIky0+vKNC7TCzHx/3PDxFrZvcLE6cpMHjFc3UYErLQmiz78fKZPJ6H/ZfSnTMTc
04EKgqaqAdZsSttsvaBtabAcAl1vb+gIBou7S2axCHA+6Uo=
-----END RSA PRIVATE KEY-----
```

Copy everything in the file including the “begin” and “end” tags.

CREATE SSH CREDENTIAL

Login in to the ScienceLogic management system using an administrative account. Navigate to the credentials management page by Clicking on the System tab, and then Management > Credentials in the left navigation pane. Select the Create button on the top left of the page, then select SSH/Key Credential.

Edit the following fields, and then select "Save" to create the new credential.



When complete, select "Save" to create the new credential.

CHAPTER 3

DISCOVER KVM SERVERS

DISCOVERY

It is highly recommended that SNMP be installed on each KVM server within your enterprise, as libvirt does not provide the same types of data needed to monitor the core Linux operating system. In our example we will be using Net-SNMP to monitor the Linux operating system, and perform initial discovery. SNMP is not required to use the ScienceLogic KVM Power-Pack but is recommended.

Create a new discover session selecting the SNMP credential that matches your SNMP configuration. If SNMP is not installed, you must select "Discover Non-SNMP" in the basic settings section.

The screenshot displays the 'Discovery Session Editor | Editing Session [9]' window. The interface is divided into several sections:

- Identification Information:** Name is set to 'KVM Server'.
- IP and Credentials:** The 'IP Address Discovery List' contains '192.168.1.89'. Under 'SNMP Credentials', '[SNMP Public V2]' is selected.
- Detection and Scanning:** 'Initial Scan Level' is '[System Default (recommended)]'. 'Scan Throttle' is '[System Default (recommended)]'. 'Port Scan All IPs' is '[System Default (recommended)]'. 'Port Scan Timeout' is '[System Default (recommended)]'. 'Detection Method & Port' is set to '[Default Method]'.
- Basic Settings:** 'Discover Non-SNMP' is checked. 'Duplication Protection' is checked. 'Collection Server PID' is '[em7_a0]'. 'Organization' is '[System]'. 'Apply Device Template' is '[Choose a Template]'.

At the bottom, the 'Save' and 'Save As' buttons are highlighted. The 'Log All' checkbox is also visible.

Enter the IP address of the Linux KVM server, then select the “Save” button. Next, on the Discovery Control Panel, run the discovery session by clicking on the lightning bolt icon.

The screenshot displays the 'Properties' tab of the Discovery Control Panel. The interface includes a top navigation bar with tabs: Close, Properties (selected), Thresholds, Collections, Monitors, Schedule, Logs, Toolbox, Interfaces, Relationships, Tickets, Redirects, and Notes. Below this, a summary section shows device details: Device Name (Lab-KVM1.qa.ScienceLogic.local), IP Address / ID (10.0.10.100 | 1), Class (NET-SNMP), Organization (System), Collection Mode (Active), Description (KVMServer), Managed Type (Physical Device), Category (Servers), Sub-Class (Linux), Uptime (6 days, 22:34:59), Collection Time (2013-09-03 10:40:00), and Group / Collector (CUG | em7_a0). A penguin icon and the text 'Lab-KVM1.qa.ScienceLogicLo' are visible in the top right.

The main section is titled 'Device Properties' and includes a sub-section 'Identification' with fields for Device Name, IP Address, and Organization. Below this is the 'Monitoring & Management' section, which contains various configuration options. The 'SNMP Read/Write' field is circled in blue. The 'Save' button is located at the bottom center, with a blue arrow pointing to it.

The 'Monitoring & Management' section includes the following fields:

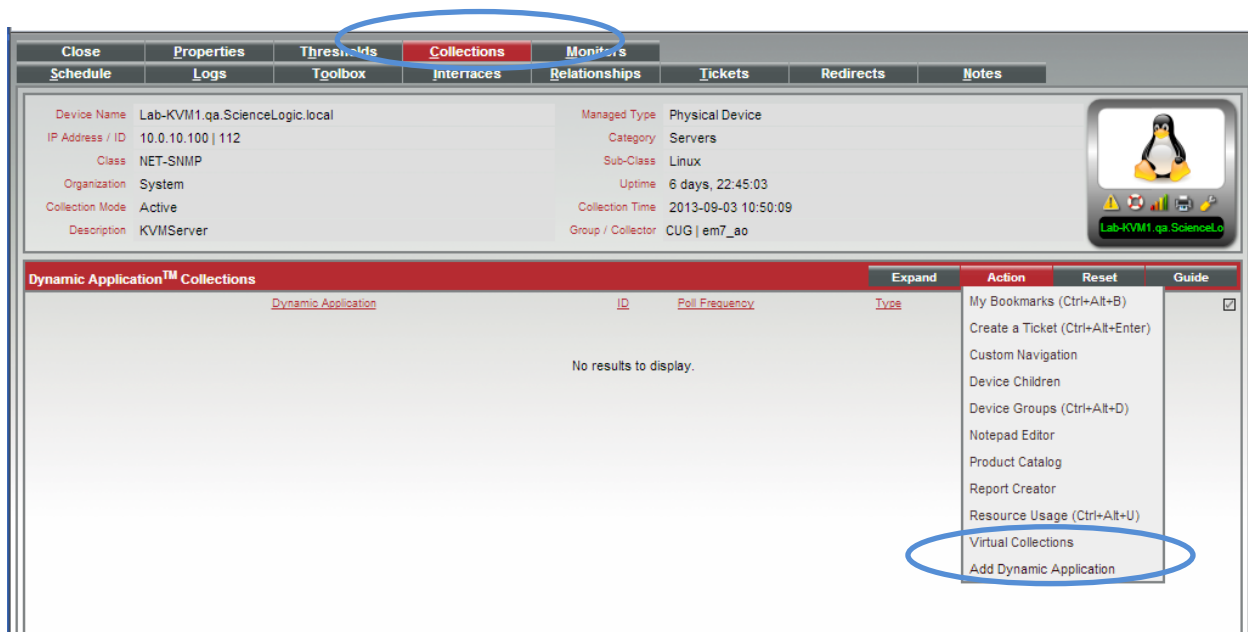
- Device Class: NET-SNMP Linux
- SNMP Read/Write: [SNMP Public V2] [None]
- Availability Port: [UDP] [161 - SNMP]
- Latency Port: [ICMP] [ICMP]
- Avail+Latency Alert: [Disable]
- Collection: [Enabled] [CUG]
- Coll. Type: [Standard]
- Critical Ping: [Disabled]
- Event Mask: [Group in blocks every 10 minutes]

The 'Preferences' section on the right includes the following options:

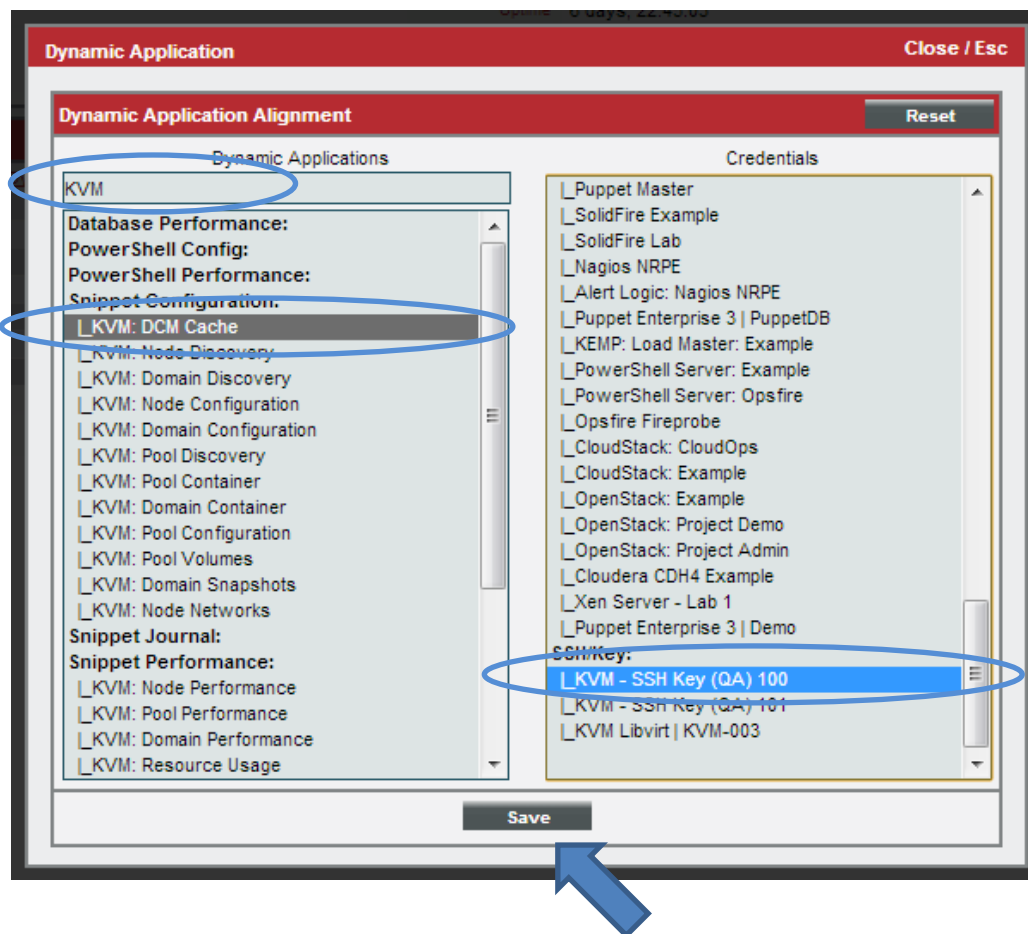
- Auto-Clear Events: ☒
- Accept All Logs: ☒
- Daily Port Scans: ☒
- Auto-Update: ☒
- Scan All IPs: ☐
- Dynamic Discovery: ☒
- Preserve Hostname: ☒
- Disable Asset Update: ☐

APPLICATION ALIGNMENT

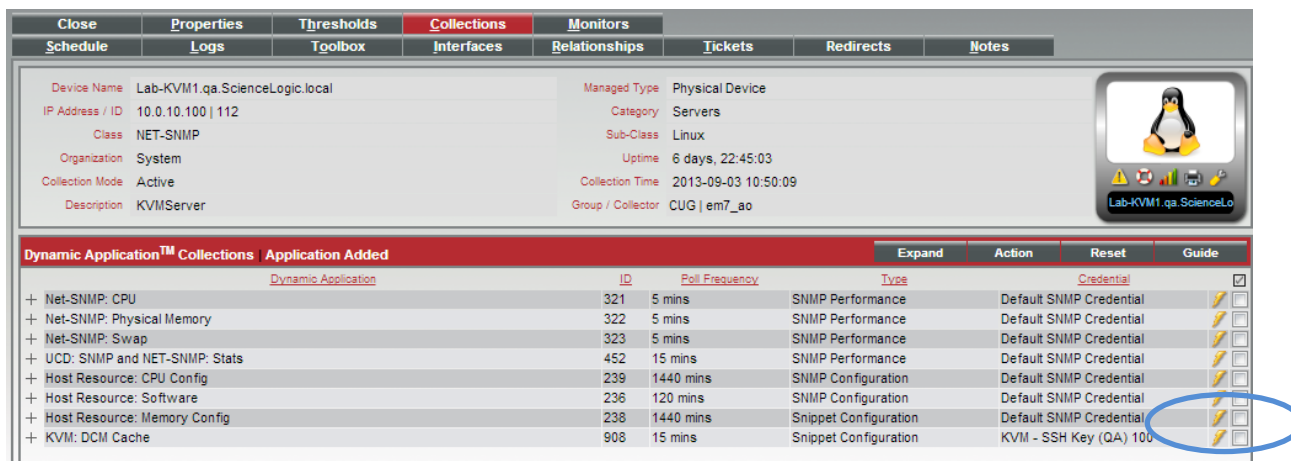
To app the KVM Dynamic Applications, click on the Collection tab. Select the Action button, and then chose “Add Dynamic Application”



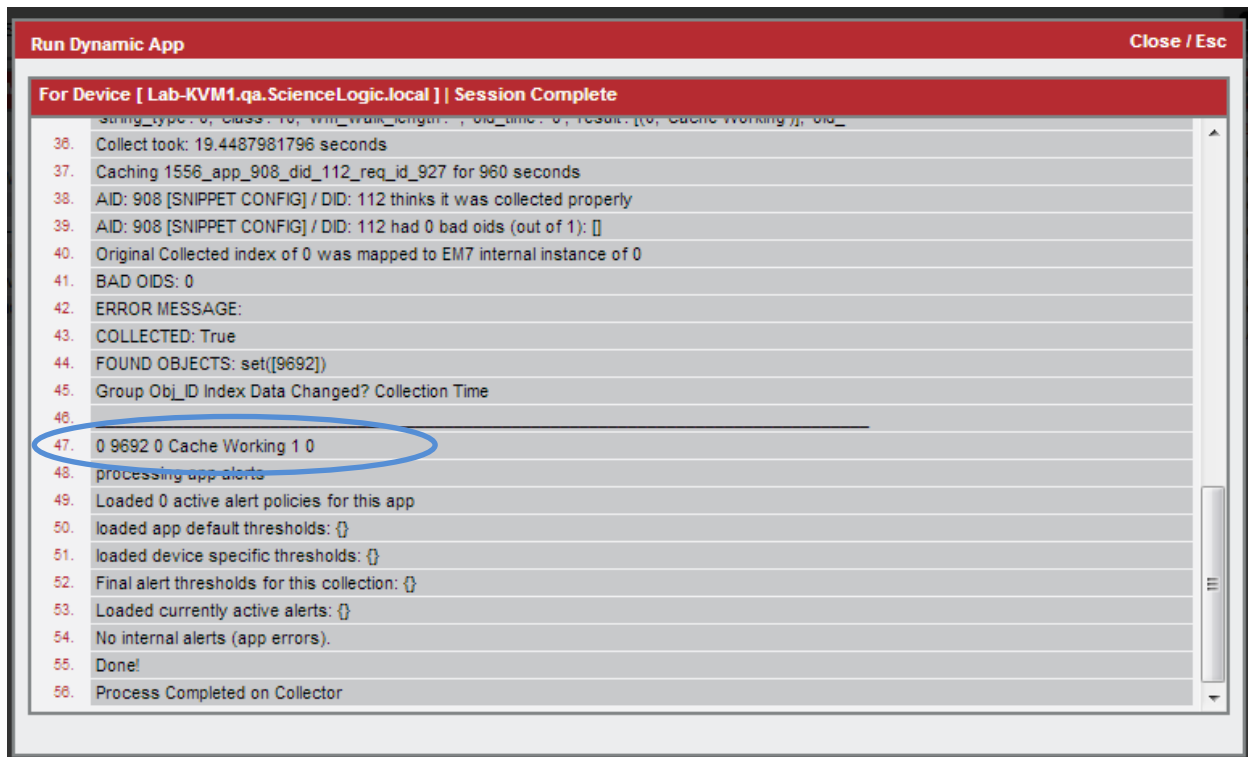
Next, type “KVM” in the Dynamic Application finder box, then click on “KVM: DCM Cache”. Select the credential you created earlier.



With the application aligned, click on the “lightning bolt” icon to run the application manually.

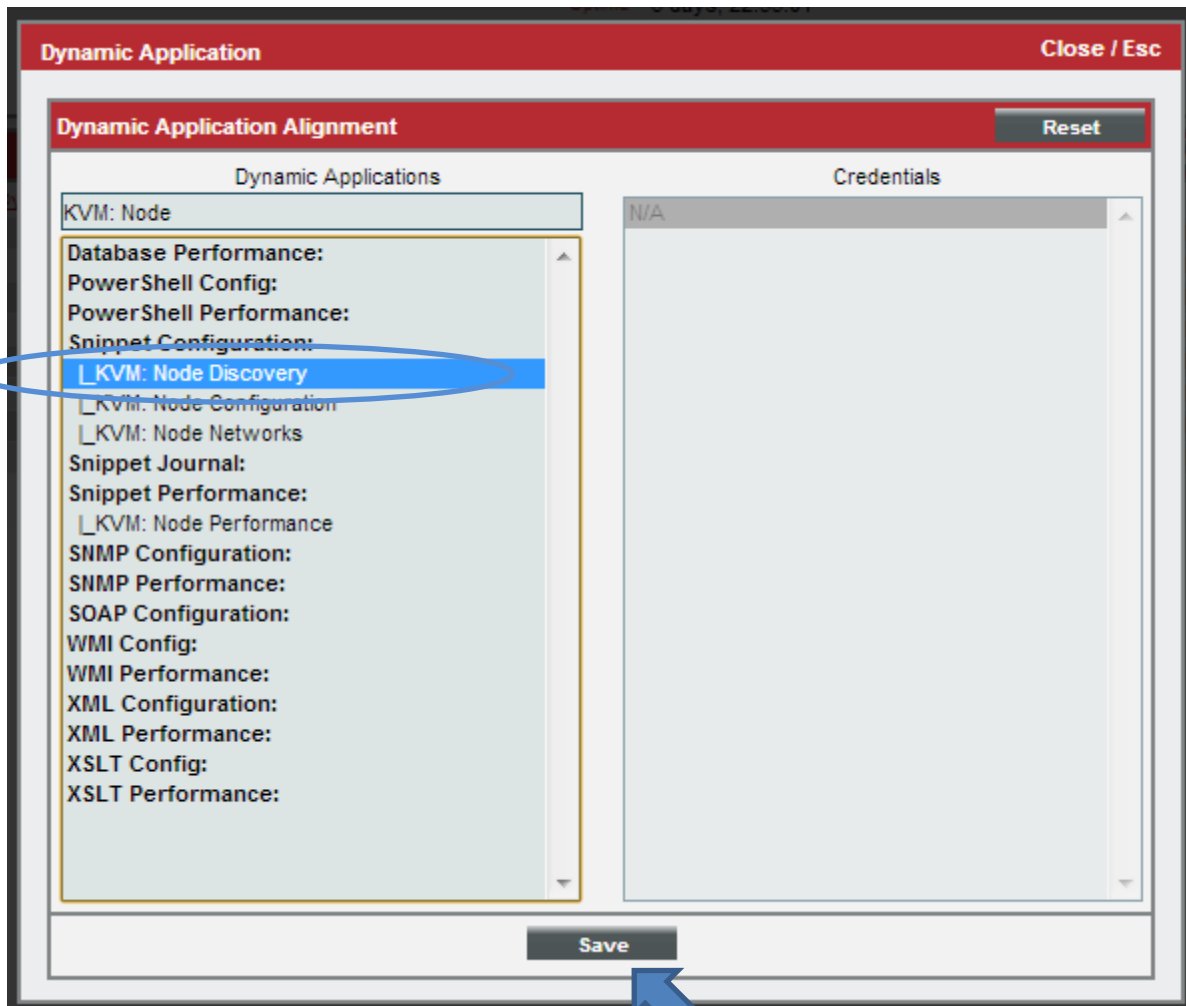


If the Dynamic Application ran successfully, you should see a message “Cache Working”, if you don’t see this message check the SSH connection and credentials/SSH key.



With the Dynamic Application aligned and working, we can now align our cache consuming DCM application.

Once again, select Action, the "Add Dynamic Application". Locate the Application "KVM: Node Discovery". This application does not require a credential because it consumes data from the previous application we already aligned. Once selected, click "Save" to add the application.



Note: Do not add ANY other KVM Dynamic Application to this device. All other applications will be automatically added by ScienceLogic as needed.

Wait a couple of minutes, refreshing the collection page. Click the “+” plush sign next to the “KVM Node Discovery” Application. Once collection runs, collection objects should be identified as “found”.

The screenshot shows the Nagios XI interface with the 'Collections' tab selected. The 'Dynamic Application™ Collections' table lists various system components. The 'KVM: Node Discovery' entry is circled in blue. Below it, the 'Collection Object' table shows details for Host Name, KVM UUID, Serial Number, and System UUID, with the 'Found' and 'Collecting' columns circled in blue.

Dynamic Application	ID	Poll Frequency	Type	Credential
+ Net-SNMP: CPU	321	5 mins	SNMP Performance	Default SNMP Credential
+ Net-SNMP: Physical Memory	322	5 mins	SNMP Performance	Default SNMP Credential
+ Net-SNMP: Swap	323	5 mins	SNMP Performance	Default SNMP Credential
+ UCD: SNMP and NET-SNMP: Stats	452	15 mins	SNMP Performance	Default SNMP Credential
+ Host Resource: CPU Config	239	1440 mins	SNMP Configuration	Default SNMP Credential
+ Host Resource: Software	236	120 mins	SNMP Configuration	Default SNMP Credential
+ Host Resource: Memory Config	238	1440 mins	Snippet Configuration	Default SNMP Credential
+ KVM: DCI Cache	908	15 mins	Snippet Configuration	KVM - SSH Key (QA) 100
- KVM: Node Discovery	909	1 mins	Snippet Configuration	NA

Collection Object	Cid	Found	Collecting	Edited By
Host Name	p_9693	yes	yes	--
KVM UUID	p_9694	yes	yes	--
Serial Number	p_9695	yes	yes	--
System UUID	p_9696	yes	yes	--

From here, go to the main Window, and select Registry > Devices > Device Components. Drill down on the newly discovered KVM root device. Nodes, Domains, and Pool should begin to appear within a few minutes.

The screenshot shows the Nagios XI interface with the 'Registry' tab selected. The 'Device Components' table lists various system components. The 'KVM Domains' and 'KVM Pools' entries are circled in blue.

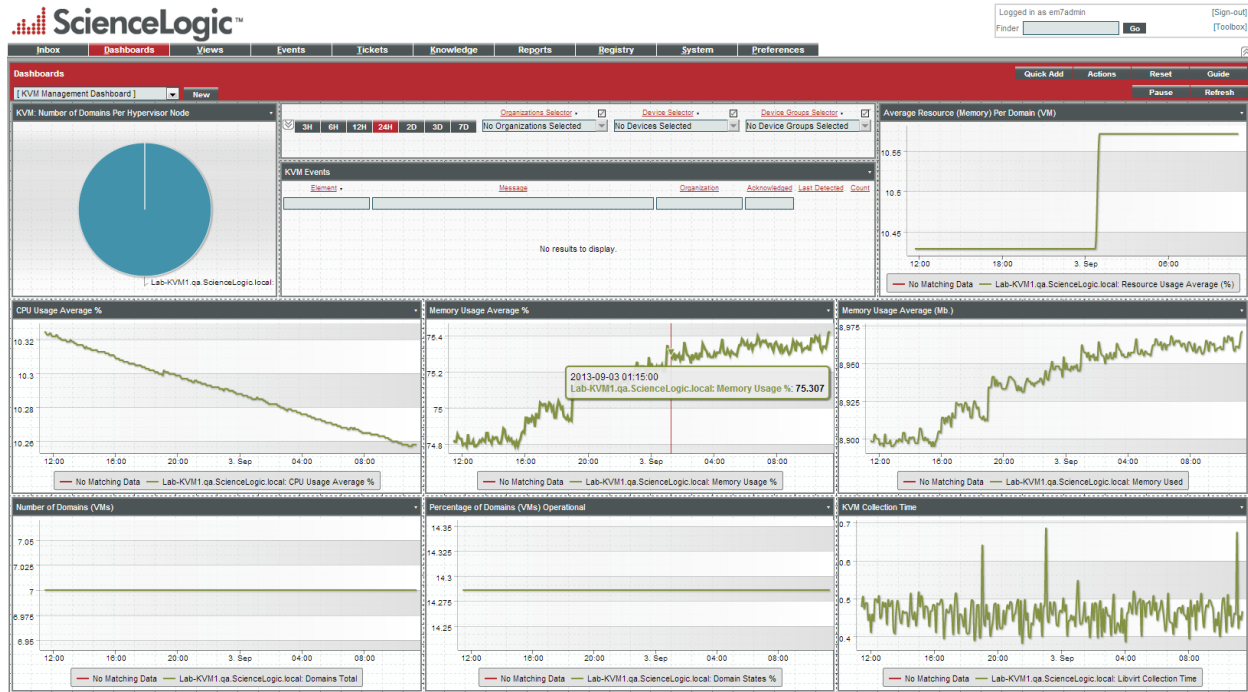
Device Name	IP Address	Device Category	Device Class / Sub-class	DID	System	Organization	Current State	Collection Group	Collection State
1. + CS4200K2000000	192.168.2.101	SAAN	Nimble Storage CS4200K2-01	2	System	Organization	Notice	CUG	Active
2. - Lab-KVM1.qa.ScienceLogic.local	10.0.10.100	Servers	NET-SNMP Linux	112	System	Organization	Notice	CUG	Active
1. - Lab-KVM1.qa.ScienceLogic.local	--	Hypervisor	Linux KVM Node - Hypervisor	113	System	Organization	Notice	CUG	Active
1. - KVM Domains	--	Servers	Linux KVM Domain Container	114	System	Organization	Notice	CUG	Active
1. em7-lab-002	--	Servers	Linux KVM Domain - Virtual Machine	119	System	Organization	Notice	CUG	Active
2. linux-mint-003	--	Servers	Linux KVM Domain - Virtual Machine	121	System	Organization	Notice	CUG	Active
3. linux-mint-004	--	Servers	Linux KVM Domain - Virtual Machine	117	System	Organization	Notice	CUG	Active
4. ubuntu-002	--	Servers	Linux KVM Domain - Virtual Machine	122	System	Organization	Notice	CUG	Active
5. ubuntu-004	--	Servers	Linux KVM Domain - Virtual Machine	116	System	Organization	Notice	CUG	Active
6. windows7-001	--	Servers	Linux KVM Domain - Virtual Machine	120	System	Organization	Notice	CUG	Active
7. windows7-002	--	Servers	Linux KVM Domain - Virtual Machine	116	System	Organization	Notice	CUG	Active
2. - KVM Pools	--	Servers	Linux KVM Pool Container	115	System	Organization	Notice	CUG	Active
1. default	--	Servers	Linux KVM Pool - Storage	123	System	Organization	Notice	CUG	Active
2. Disabled	--	Servers	Linux KVM Pool - Storage	124	System	Organization	Notice	CUG	Active
3. ISOs	--	Servers	Linux KVM Pool - Storage	125	System	Organization	Notice	CUG	Active

CHAPTER 4

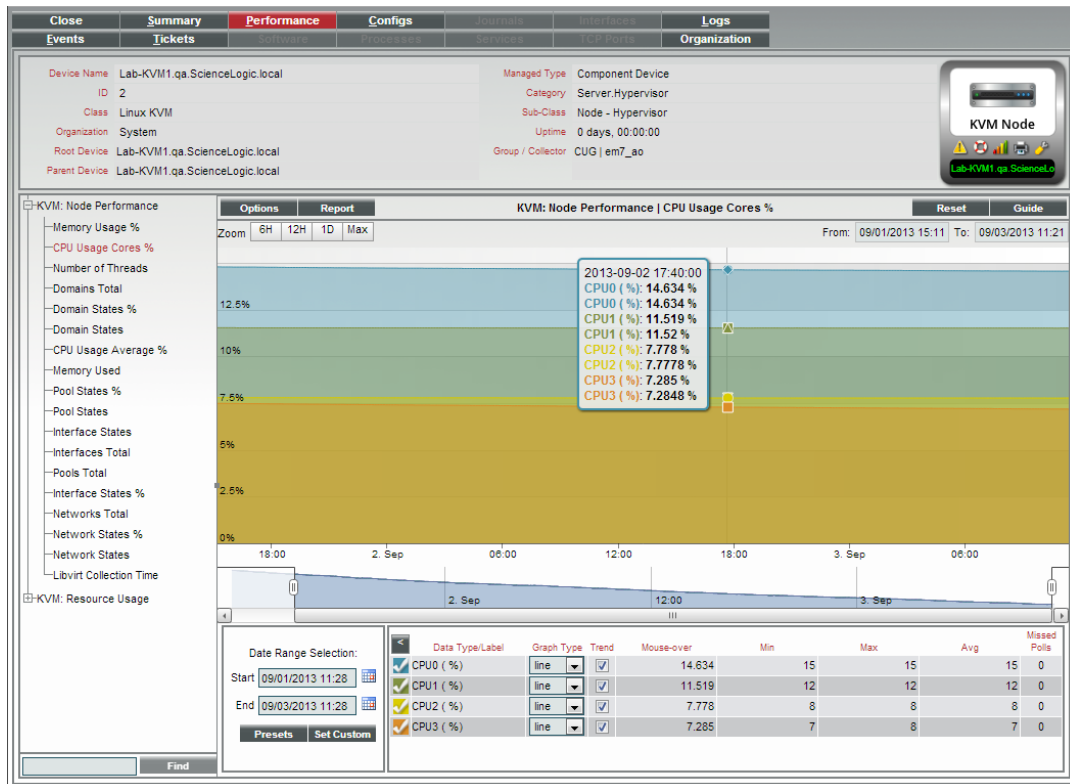
DASHBOARDS AND CHARTS

DASHBOARD

The “KVM Management Dashboard” which is embedded in the KVM Power-Pack provides a high-level overview of aggregated data for KVM hypervisors. Dashboards generally use data that has been normalized and may take upto several hours before the dashboard begins to show data. However, the more KVM servers that are under management to more extensive the dashboard reporting will become.



The majority of the performance metrics will be located on the KVM Node (Hypervisor), and the KVM Domain (virtual machine). The below show the CPU performance as a percentage for all Cores.



KVM Domains provide CPU, Disk, Memory, and other useful metrics.

