Configuring VMware® vRealize Automation High Availability Using an F5 Load Balancer

Deployment Guide for High-Availability Configurations

Version 6.1 and Later
## Contents

Introduction ........................................................................................................................................... 3

Overview .................................................................................................................................................. 3

Prerequisites ........................................................................................................................................... 3

High-Level Procedure ............................................................................................................................. 3

Environment ............................................................................................................................................ 4

Prerequisites ........................................................................................................................................... 4

Configure the F5 Load Balancer for Use with vRealize Automation in an HA Configuration ............ 7

Create Monitors ....................................................................................................................................... 7

Create and Configure Nodes .................................................................................................................. 9

Create and Configure Pools ................................................................................................................... 11

Create Persistence Profile ...................................................................................................................... 13

Create Virtual Servers (VIPs) for the vRealize Appliances ................................................................. 13

Install vRealize Automation ................................................................................................................... 15

Validate the vRealize Automation High Availability Environment .................................................... 16

Addendum 1 – Powering on all vRealize Appliances from a Cold State .............................................. 17

Start from Both Appliances Powered Off .............................................................................................. 17

Edit the vRealize Appliance /etc/hosts File ........................................................................................... 18

Acknowledgements ............................................................................................................................... 19
Introduction

This document outlines the procedures required to perform an end-to-end implementation of vRealize Automation (formally vCloud Automation Center) 6.1 and later in a high-availability (HA) configuration using the F5 load balancer.

The following software components are supported:

- vRealize Automation 6.1 and later (supported Windows servers are Windows 2012 R2 or Windows 2012)
- F5 load balancer version BIG-IP 11.5.1, Build 0.0.110 Final

Overview

The configuration of the F5 load balancer with vRealize Automation in a high-availability (HA) configuration requires that the various components are implemented in the correct sequence. Failure to follow the documented sequence can result in unpredictable consequences or unintended dependencies on other components.

The following list summarizes the steps for deploying vRealize Automation in a high-availability environment using the F5 load balancer.

Note: The examples used in this document refer to an environment with two vRealize Appliances, two IaaS Web Servers, an active IaaS Manager Service and a passive IaaS Manager Service. This document can be used to scale out the environment to include two or more vRealize Appliances and two or more IaaS Web Servers.

Prerequisites

The following components are required before you deploy vRealize Automation in a high-availability environment:

- An installed and licensed F5 load balancer for which the DNS server configuration is complete
- DNS entries created for all of the vRealize Automation components/servers and the F5-Virtual Servers

High-Level Procedure

1. Configure the F5 Load Balancer for use with vRealize Automation in an HA Configuration.
   a. Create and configure three monitors.
   b. Configure the default health monitor.
   c. Create and configure six nodes.
   d. Create and configure three pools.
   e. Create three virtual servers (VIPs).
2. Install vRealize Automation.
3. Validate the HA environment.
Environment

Before you begin the HA implementation of vRealize Automation using an F5 load balancer, you must ensure that certain elements of the environment are in place and fully functional.

Prerequisites

- The F5 load balancer must be installed and licensed.
- The DNS server configuration must be complete.

Figure 1 shows the HA deployment of the components described in this document and highlighted in yellow (load balancers, vRealize Appliances, IaaS Web Servers and Manager Service).

Figure 1. High Availability Deployment Components (highlighted in yellow)
Table 1 outlines the servers and DNS entries that are required for the redundant installation. It is required that DNS entries exist for each entry in the table. Supported Windows servers are Windows 2012 R2 or Windows 2012.

Table 1. Servers / DNS Entries – Redundant

<table>
<thead>
<tr>
<th>NAME</th>
<th>*FQDN</th>
<th>*IP ADDRESS</th>
<th>CONFIGURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNS Entry of F5-Virtual Server for vRealize Appliances</td>
<td>vcac.mydomain.com</td>
<td>192.168.1.101</td>
<td>Host (A)</td>
</tr>
</tbody>
</table>
| vRealize Appliance 1                                                 | uslbcv01a.mydomain.com | 192.168.1.105| 6.1 build 2077124
|                                                                     |                     |             | 6.2 build 2300183 |
| vRealize Appliance 2                                                 | uslbcv01b.mydomain.com | 192.168.1.106| 6.1 build 2077124
|                                                                     |                     |             | 6.2 build 2300183 |
| DNS Entry of F5-Virtual Server for vRealize Automation IaaS Web Servers | iaas.mydomain.com  | 192.168.1.102| Host (A)      |
| vRealize Automation IaaS Web Server 1                                | uslbcv01a.mydomain.com | 192.168.1.107| Windows 2012 |
| DNS Entry of F5 Virtual Server for IaaS Manager Service              | mgr.mydomain.com    | 192.168.1.103| Host (A)      |
| vRealize Automation IaaS Manager Service 1 (active)                 | uslbcvmgr01a.mydomain.com | 192.168.1.109| Windows 2012 |
| vRealize Automation IaaS Manager Service 2 (passive)                | uslbcvmgr01b.mydomain.com | 192.168.1.110| Windows 2012 |

*The actual FQDN and IP Addresses will be different based on your environment.

Note: vRealize Orchestrator configuration steps can be found in the vCO configuration guide and are not covered in this document.

Figure 2. Needs a caption.
Configuring VMware vRealize Automation High Availability Using an F5 Load Balancer

Diagram:

- **DNS: vcac.mydomain.com**
  - VIP: 192.168.1.101
  - USLBV6CA01A
    - vCAC Virtual Appliance 1

- **DNS: iaas.mydomain.com**
  - VIP: 192.168.1.102
  - USLBV6WEB01A
    - IaaS Web Server 1

- **DNS: mgr.mydomain.com**
  - VIP: 192.168.1.103
  - USLBV6MGR01A
    - IaaS Manager Server Active

- **USLBV6WEB01B**
  - IaaS Web Server 2

- **USLBV6WEB01B**
  - IaaS Manager Server Passive

- **F5 BIG-IP VE**
Configure the F5 Load Balancer for Use with vRealize Automation in an HA Configuration

You can use the procedures in this section to configure an F5 load balancer for use with vRealize Automation.

The examples in this section reference the values shown in Table 1. Procedures in this section are based on the following load balancer environment:

- F5 load balancer that is installed and licensed and for which DNS server configuration is complete
- F5 load balancer running version BIG-IP 11.5.1 Build 0.0.110

These steps may vary in a different F5 load balancer versions.

Create Monitors

More information about monitors can be found on the F5 Monitors documentation page.

1. Navigate to Local Traffic > Monitors.
2. Click the + button.
3. Create a monitor to monitor the status of the vRealize Automation virtual appliance nodes, and enter the following settings.
   - **Name**: https_vcac
   - **Type**: HTTPS
   - **Send String**: GET /vcac/services/api/status\r\n
   **Receive String**: CN=cafe

4. Create a second monitor to monitor the status of the IaaS Web Server node, and enter the following settings.
   - **Name**: https_web
   - **Type**: HTTPS
   - **Send String**: GET /\r\n
   **Receive String**: CN=cafe
Create a third monitor to monitor the status of the IaaS Manager Service nodes, and enter the following settings.

**Name:** https_mgr  
**Description:** vRA IaaS Manager Service Health Monitor  
**Type:** HTTPS  
**Send String:** GET /VMPSProvision

**Receive String:** name="ProvisionService"
Configuring VMware vRealize Automation High Availability Using an F5 Load Balancer

Create and Configure Nodes

For more information about nodes, see the F5 Configuring Nodes documentation.

1. Navigate to Local Traffic > Nodes > Node List.
2. Click the + button.
3. Using Table 1 as a reference, create a node named to represent the first vRealize Appliance.
   - Name: uslbv6ca01a
   - Address: 192.168.1.105

Note: You should now have three monitors: https_vcac, https_web, and https_mgr
Configuring VMware vRealize Automation High Availability Using an F5 Load Balancer
5. Repeat step 3 to create five additional nodes (use Table 1 as a reference for Name and IP Address).
   
   - uslbv6ca01b – second vRealize Appliance
   - uslbv6web01a – first IaaS Web Server
   - uslbv6web01b – second IaaS Web Server
   - uslbv6mgr01a – active IaaS Manager Service
   - uslbv6mgr01b – passive IaaS Manager Service

   ![Image of F5 Load Balancer interface]

   **Note:** Since the actual vRealize Appliances and IaaS servers have not yet been deployed, the status of these nodes will show a non-green color.

**Create and Configure Pools**

For more information about pools, see the F5 Load Balancing Pools documentation.

1. Navigate to **Local Traffic > Pools > Pool List**.
2. Click the + button.
3. Create a pool named vCAC_Servers.
   
   This pool corresponds to the health monitor for the vRealize Appliances (https_vcac) and the vRealize Appliance nodes, uslbv6ca01a and uslbv6ca01b.
4. Repeat step 3 to create a second pool named WEB_Servers to correspond to the health monitor for the IaaS Web Servers (https_web) and the IaaS Web Server nodes (uslbv6web01a, uslbv6web01b).

5. Repeat step 3 to create a third pool named MGR_Servers to correspond to the health monitor for the IaaS Manager Service (https_mgr) and the IaaS Manager Service nodes (uslbv6mgr01a, uslbv6mgr01b).

**Note:** Ensure that you enter unique values for Health Monitor and Members.

At this point you should now have three pools available.
**Create Persistence Profile**

1. Navigate to Local Traffic > Profiles > Persistence.
2. Click Create.
3. Enter the following settings.
   - **Name**: vCAC_SrcAddr
   - **Persistence Type**: Source Address Affinity
   - **Parent Profile**: source_addr
4. Select the Custom checkbox to the right of Timeout, and change the value to 1800.

![Persistence Profile Settings](image)

5. Click Finished

**Create Virtual Servers (VIPs) for the vRealize Appliances**

More information about nodes can be found on the F5 Virtual Servers documentation page.

1. Navigate to Local Traffic > Virtual Servers > Virtual Server List.
2. Click the + button.
3. Enter the following settings in the General Properties section.
   - **Name**: vCAC_VS
   - **Description**: Virtual Server for vRealize Automation Virtual Appliances
   - **Source**: 0.0.0.0/0
   - **Destination**: Select Host in the Type field
   - **Destination**: Refer to Table 1 and specify the IP address in the Address field
   - **Service Port**: HTTPS
4. In the **Configuration** section, select **Source Address Translation > Auto Map**.

5. In the **Resources** section, enter the following settings.

   **Default Pool**: Since this is the virtual server for the vRealize Appliances, select **vCAC_Servers**

   **Default Persistence Profile**: **vCAC_SrcAddr**
Configuring VMware vRealize Automation High Availability Using an F5 Load Balancer

6. Click Finished.

7. Repeat step 3 to create a second virtual server named mgr_VS for the IaaS Manager Service. Use the same settings as specified in step 3, with the following exceptions:
   - In the General Properties section, Destination field, enter 192.168.1.102 in the Address field.
   - In the Resources section, specify the Default Pool to be MGR_Servers.

8. Repeat step 3 to create a third virtual server named web_VS for the IaaS Web Servers. Use the same settings as specified in step 3, with the following exceptions:
   - In the General Properties section, Destination field, enter 192.168.1.103 in the Address field.
   - In the Resources section, specify WEB_Servers in the Default Pool field.

   Note: At this point, three virtual servers should have been created, vCAC_VS, web_VS, and mgr_VS.

Install vRealize Automation

1. Disable the three health monitors, https_vcac, https_web, and https_mg


3. Enable the three health monitors.

   Note: If you want to install additional nodes in a working vRealize Automation environment you must disable the health monitors before you install the new nodes, and enable the health monitors after installation of the nodes is completed.
Validate the vRealize Automation High Availability Environment

1. Navigate to Local Traffic > Network Map.
2. View the vRealize Automation environment build-out. At this point, all entries should show a green indicator, with the exception of the Passive IaaS Manager Service node.

This completes the configuration of vRealize Automation in a high-availability environment using an F5 load balancer.
Addendum 1 – Powering on all vRealize Appliances from a Cold State

If an event occurs where all vRealize Appliances are powered off, the steps defined in “Start from Both Appliances Powered Off” must be executed. To avoid having to modify the F5 configuration in the future, or if both appliances are powered on, see “Edit the vRealize Appliance /etc/hosts.”

Start from Both Appliances Powered Off

1. Navigate to Local Traffic > Pools > [vRealize Appliance Pool].
   Where [vRealize Appliance Pool] is vCAC_Servers, if the naming conventions in the previous procedures were followed.

2. Remove https_vcac from the Active Health Monitors.

3. Add gateway_icmp to the Active Health Monitors.

4. Click Update.

5. Power on Appliance 1 and wait for all services to start.
   Note: If you are using internal vPostgres clustering, you must first start the appliance that is acting as the primary vPostgres database server.

6. Power on Appliance 2 and wait for all services to start.

7. Navigate to Local Traffic > Pools > [vRealize Appliance Pool].
   Where [vRealize Appliance Pool] is vCAC_Servers, if the naming conventions in the previous procedures were followed exactly.

8. Add https_vcac from the Health Monitors Active box.

9. Remove gateway_icmp to the Health Monitors Active box.

10. Click Update.
Edit the vRealize Appliance /etc/hosts File

The benefits to editing the vRealize Appliance /etc/hosts file are as follows:

- No requirement to edit the Hosts file on reboot
- All service traffic is kept local to the appliance

For all vRealize Appliances perform the following steps prior to powering off.

1. SSH into the vRealize Appliance as root.

2. Type `echo [Local IP] [DNS Entry of F5-Virtual Server for vCAC virtual appliances] >> /etc/hosts`.

   Example: `echo 192.168.1.105 vcac.mydomain.com >> /etc/hosts`  

When both appliances are powered off, perform the following steps.

1. Power on Appliance 1 and wait for all services to start.
   
   **Note:** If using internal vPostgres clustering start the appliance acting as the primary vPostgres database server first.

2. Power on Appliance 2 and wait for all services to start.
Acknowledgements

VMware acknowledges the following individuals for their contributions to this paper and help with content review:

- vRealize Automation – Patricia O’Connor, David Kelley, Carl Prahl, Victor Dubinsky, Max Choly, Joseph Rinella, Jitender Uppal