Radware vDirect Plug-In User Guide

Software Version 1.0

Document ID: RDWR-vDIR-V1000_UG0111

January, 2011

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Item	Description	Description (French)	Beschreibung (German)
Example	An example scenario	Un scénario d'exemple	Ein Beispielszenarium
Caution:	Possible damage to equipment, software, or data	Endommagement possible de l'équipement, des données ou du logiciel	Mögliche Schäden an Gerät, Software oder Daten
Note:	Additional information	Informations complémentaires	Zusätzliche Informationen
To	A statement and instructions	Références et instructions	Eine Erklärung und Anweisungen
Tip:	A suggestion or workaround	Une suggestion ou solution	Ein Vorschlag oder eine Umgehung
Warning:	Possible physical harm to the operator	Blessure possible de l'opérateur	Verletzungsgefahr des Bedieners

Table of Contents

Chapter 1 – Preface

This guide describes how to configure and monitor workflows and actions using the vDirect Plug-in.

Who Should Use This Book

This guide is intended for virtual datacenter managers using the *VMware vCenter Orchestrator* working with automated services. It assumes that you are familiar with the VMware vCenter environment.

Related Documentation

The following documentation is related to the vDirect Plug-in:

* *vDirect Plug-in Quick Install Guide*
* *vDirect Plug-in Release Notes*
* *Alteon VA Quick Install Guide*
* *Alteon Application Switch Operating System Command Reference 26.x or later*
* *Alteon Application Switch Operating System Application Guide 26.x or later*

Introduction

Radware's vDirect Plug-in is a Radware ADC plug-in for the VMware vCenter Orchestrator. It is designed to both offer out-of-the-box tools to create and manage Virtual Data Center Services, while providing the tools to easily develop new services based on the specific needs of the organization. vDirect is a central component of the Radware VADI architecture, containing all the components for an Orchestration System to provision, decommission, configure and monitor vADCs and computing resources within a virtual data center.

vDirect Plug-in is fully integrated with the VMware vCenter and vCenter Orchestrator systems and provides automation and management benefits for VMware's virtualization infrastructure. Using the virtualization infrastructure, SMB customers can automate basic operations, such as on-demand virtual machine (VM) resources allocation through large enterprises and up to cloud services providers. vDirect Plug-in offers a complete set of out-of-the-box workflows to transparently integrate with the Radware product line and automatically create services of multiple layers, network and storage.

vDirect Plug-in allows for automatic alignment of the infrastructure changes and automatic adaptation by provisioning/decommissioning of vADC instances as part of end-to-end service creation and automatically adding/removing computing resources to hosted applications. vDirect Plug-in integrates and monitors availability and performance based Key Performance Indicators (KPIs) with the cloud orchestration.

Key Terms

The following is a list of commonly used terms in the vDirect Plug-in environment:

Term	Description
Action	A single operation applied on a single device. vDirect offers a library of pre-defined out-of-the-box operations for creating ADC instances, new services, collecting information, such as the name of objects, and more.
Workflow	The Workflow engine allows users to create business processes. The workflow engine uses the vDirect Plug-in to create an automated process that can be executed on demand by the administrator against any of the Radware ADC solutions. vDirect offers a number of out-of-the-box workflows for immediate service creation. Once the vDirect Plug-in is installed on the VMware's VCO system, a new library named *VADI* becomes available under *Radware vDirect*. The VADI workflow library contains all the pre-defined Radware workflows available for the integration of Radware products into datacenter services.
Container	An object that represents Radware solution form factors and defines the access method (address, protocol, credentials and, in some cases, location). vDirect supports three types of containers: • Dedicated ADC • ADC-VX • ADC-VA Containers serve as objects through which the individual ADCs are registered for service.
Dedicated ADC container	A Dedicated ADC is a container representing any Alteon system running a software version supported by the vDirect plug-in, allowing the system remote management access.
ADC-VX container	ADC-VX is a container representing Radware's ADC virtualization solution for virtual ADC. The ADC-VX container allows vDirect to create virtual ADC instances called vADC. For more information regarding ADC-VX, please refer to: http://www.radware.com/Products/ApplicationDelivery/adcvx.aspx
ADC-VA container	Unlike the other containers, the ADC-VA container represents VMware's ESX server. It defines all the elements of the environments required to create, clone and support the ADC Virtual Appliances as part of the VMware Virtual Infrastructure. For more information of ADC-VA, please refer to: http://www.radware.com/Products/ApplicationDelivery/alteon/alteonva.aspx

Term	Description
Instance	An object representing the actual ADC form factor on which actions and workflows are applied. While the container serves as the location where the ADC service is created (VMware ESX Server, ADC-VX, or a dedicated appliance), the instance is the ADC that offers the service. There are instances in three different form factors: • Dedicated ADC application switch • vADC instance running in an ADC-VX system • Alteon Virtual Appliance running on a VMware ESX server Actions that create a server farm or a service supporting an customer/application are applied on an instance. For additional terms used by VMware, please refer to: http://www.vmware.com/pdf/vco_40_install_config_guide.pdf
SDK	For SDK information please refer to the vDirect online help.
API	For API information please refer to the vDirect online help.

Prerequisites

To work with the vDirect Plug-in, you must meet the following prerequisites:

• Have a fully functioning VMware vSphere Orchestrator (VCO) versions vSphere 4.0.x or 4.1

• The *com.radware.adc* package must be installed. For more information on how to import and install it, see the *Radware vDirect Plug-In Quick Install Guide*.

Working with the vDirect Plug-in

vDirect Plug-in serves three types of users — operators, developers and administrators.

• **Operators** install, configure and run workflows provided by Radware. Operators usually work with the Web Application, in which out-of-the-box workflows externalized by the administrator are accessible for container configuration and management. Alternatively, operators can use the vCenter Orchestrator Client.

• **Developers** edit existing workflows and actions and create new workflows using the actions provided by Radware. Developers work with the vCenter Orchestrator Client, which enables them to use the out-of-the-box workflows and actions as is or for the creation of new workflows. The vCenter Orchestrator Client offers full access and usability of all functions provided by the vDirect Plug-in.

• **Administrators** manage users and externalize workflows. For more information on user management, see VMware Orchestrator related documentation.

Chapter 2 – Container Configuration and Management

This chapter describes how to configure and manage vDirect Plug-in containers via the *VMware vCenter Orchestrator Configuration* Web page.

Accessing the Configuration Web Page

To access the VMware vCenter Orchestrator Configuration Web page

1. In your Web browser, enter http://*vco_server*:8282, where *vco_server* is the name or IP address where the VCO is installed. The *VMware vCenter Orchestrator* login page is displayed.

2. Log into the *VMware vCenter Orchestrator Configuration* Web page. The username and password are provided by the administrator. The main Web page of the *VMware vCenter Orchestrator Configuration* Web application is displayed.

Configuring a Container

This section describes how to create and configure a vADC container for each of the form factors in your system via the *VMware vCenter Orchestrator Configuration* Web page. Radware offers three ADC form factors that can be managed via the vDirect Plug-in. The configuration differs depending on the type of form factors.

Configuration Prerequisite

The VMware vCenter Orchestrator Server Web Configuration service *vCOConfiguration* must be running before starting the Web configuration. This service is responsible for the vDirect Plug-in installation and container registration.

Configuring a Dedicated ADC Container

To configure a Dedicated ADC

1. Log into the *VMware vCenter Orchestrator Configuration* Web page.
2. Click **vDirect**. The *Container Summary* page is displayed.

3. From the *New* drop-down list, select **Dedicated ADC**. The *New Dedicated ADC* configuration page is displayed.
4. Set the following parameters:

Parameter Name	Description
Name	The display name of the dedicated ADC container.
IP Address	The IP address where the dedicated ADC container resides.
Read community	The read community authorized to access the dedicated ADC.
Write community	The write community authorized to access the dedicated ADC.

5. Click **Apply**.

For more information on managing and working with the vDirect Plug-in, see the vDirect Plug-in *User Guide.*

Configuring an ADC-VX Container

To configure an ADC-VX container

1. Log into the *VMware vCenter Orchestrator Configuration* Web page.

2. Click **vDirect**. The *Container Summary* page is displayed.

3. From the *New* drop-down list, select **ADC-VX**. The *New ADC-VX* configuration page is displayed.

4. Set the following parameters:

Parameter Name	Description
Name	The display name of the ADC-VX container.
IP Address	The IP address where the ADC-VX container resides. The IP address used for the ADC-VX is the IP address of the ADC-VX Administrator Context, through which all vADC provisioning is conducted.
Read community	The read community authorized to access the ADC-VX.
Write community	The write community authorized to access the ADC-VX.

5. Click **Apply**.

For more information on managing and working with the vDirect Plug-in, see the vDirect Plug-in *User Guide.*

Configuring an ADC-VA Container

To configure an ADC-VA container

1. Log into the *VMware vCenter Orchestrator Configuration* Web page.

2. Click **vDirect**. The *Container Summary* page is displayed.

3. From the *New* drop-down list, select **ADC-VA**. The *New ADC-VA* configuration page is displayed.

4. Set the following parameters:

Parameter Name	Description
Name	The display name of the ADC-VA container.
vCenter	The vCenter on which the ADC-VA container is created from the drop-down list.
Host	The ESX host on which the ADC-VA container is created from the drop-down list.
Datastore	The data store from the drop-down list. Assign one of the ESX connected data stores from the drop-down list to the respective container.
Resource Pool	The resource pool from the drop-down list. Assign one of the resource pools using the ESX host from the drop-down list to the respective container.

5. Click **Apply**.

For more information on managing and working with the vDirect Plug-in, see the vDirect Plug-in *User Guide.*

Filtering the Container List

The container list contains a large number of containers as part of the customer environment, making the solution ideal for Virtual Data Centers and cloud environments. You can filter the container list to display only a specific form factor.

To filter the container list

1. Log into the *VMware vCenter Orchestrator Configuration* Web page.

2. Click **vDirect**. The *Container Summary* page is displayed.

3. From the *Filter* drop-down list, select the desired form factor. Only the containers of the selected form factor type are displayed.

Updating an Existing Container

You can update the configuration of existing container.

To update a container

1. Log into the *VMware vCenter Orchestrator Configuration* Web page.

2. Click **vDirect**. The *Container Summary* page is displayed.

3. In the *Name* column, click the desired container. The *Update* page is displayed.

4. Update the desired parameters and click **Apply**.

Deleting a Container

You can delete existing containers. The deleted container and the contained ADC Instance is unregistered from the system and will not be accessible to further workflow executions.

To delete a container

1. Log into the *VMware vCenter Orchestrator Configuration* Web page.

2. Click **vDirect**. The *Container Summary* page is displayed.

3. Select the desired container and click **Delete**.
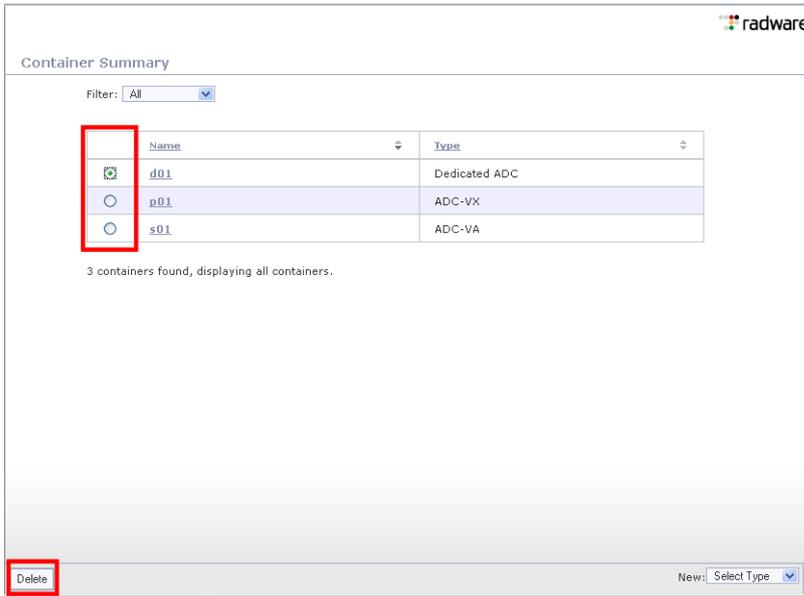
Chapter 3 – Running Out-of-the-box Workflows

This chapter describes how to run out-of-the-box workflows.

The user responsible for running and monitoring out-of-the-box workflows is the operator. The operator usually works with the vDirect Plug-in via the Web application, where all necessary out-of-the-box workflows are made accessible by the administrator.

Alternatively, the operator can install and access the *VMware vCenter Orchestrator* client. For more information how to use the *VMware vCenter Orchestrator* client, see Creating and Maintaining Workflows and Actions, page 31.

Accessing the vDirect Plug-in via the Web Application

To access the vDirect Plug-in, log into the *VMware vCenter Orchestrator* Web application with the username and password specified by your administrator.

To access the vDirect Plug-in via the Web application

1. In the Web browser, enter http://*vco_server*:8280/vmo/weboperator, where *vco_server* is the name or IP address where the VCO is installed. The *VMware vCenter Orchestrator* login page is displayed.

2. Log into the *VMware vCenter Orchestrator* Web application. The username and password are provided by the administrator. The main Web page of the *VMware vCenter Orchestrator* Web application is displayed.

3. Click **WebViewList** to display the list of workflows externalized by the administrator.

4. Select *Radware vDirect* to expand and view the list of workflows.
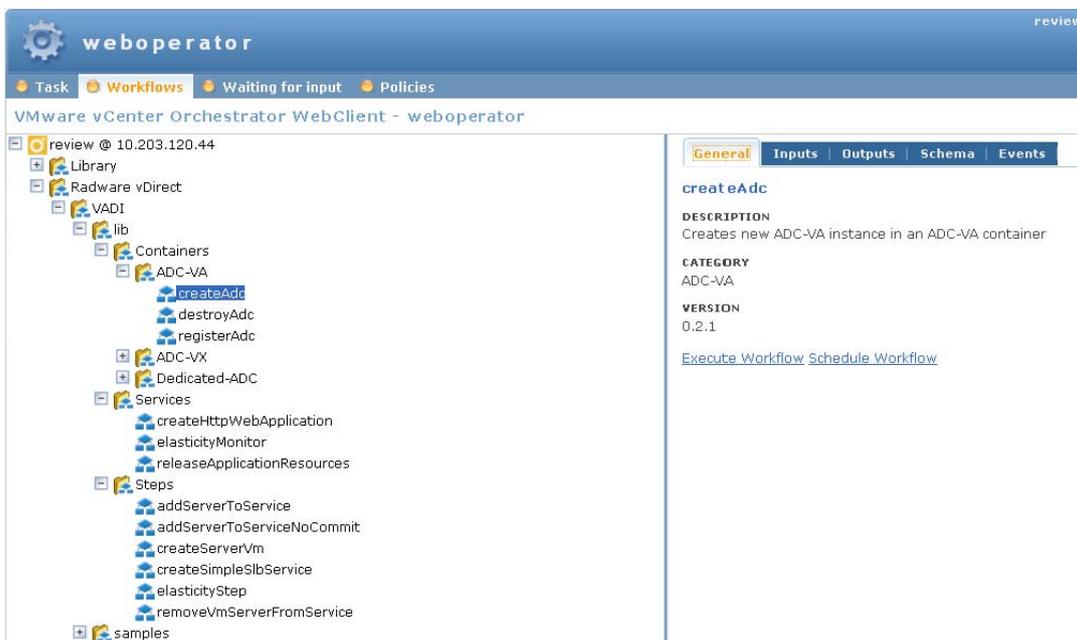
Working with Out-of-the-box Workflows

An out-of-the-box workflow is an automated process that can be executed on demand by the operator against any of the configured containers for immediate service creation.

All out-of-the-box Radware workflows available for the integration of Radware products into data center services appear under a library named *VADI* under *Radware vDirect.*

There are three different types of workflows that are accessed via three different libraries: Containers, Services and Steps.

- **Containers** — Workflows that enable the control of ADC Instance provisioning/deprovisioning
- **Services** — Workflows that can be used out-of-the-box by operators
- **Steps** — Workflows that are used as building blocks by workflow developers. Operators should not use these workflows.

Available Out-of-the-box Workflows

The following is the list of the available out-of-the-box workflows. For more information about each workflow and its parameters, click the workflow.

Workflow	Location	Description
createAdc	Dedicated-ADC ADC-VX ADC-VA	Creates a new ADC instance in one of the three available form factors. The ADC instance is automatically created based on parameters included in the workflow and immediately becomes active and available for service. The workflow is also available for integration as part of any service creation workflow available in the system.
destroyAdc	Dedicated-ADC ADC-VX ADC-VA	Removes ADC services from service. The workflow deletes an ADC instance and removes it from service.
registerAdcInstance	Dedicated-ADC ADC-VX ADC-VA	Registers an ADC instance. This workflow discovers all the ADC instances active in a target system that were not created by the VCO system.
createHttpWebApplication	Services	Creates a new Web Service. It creates a number of VMs as Web servers from a template, creates an ADC instance, and connects them to form a service.
elasticityMonitor	Services	Adapts server resources based on the monitored CPU utilization of the active service VMs.
releaseApplicationResources	Services	Deletes one or more service VMs based on customer input.
addServerToService	Steps	Calls the *addServerToServiceNoCommit* workflow and applies it to the system.
addServerToServiceNoCommit	Steps	Create a new Service VM and respectively assigns it to the proper ADC server group.
createServerVm	Steps	Clones an active service VM and adjusts it based on the new service VM parameters.

Workflow	Location	Description
createSimpleSlbService	Steps	Creates a Service with a Server VM and the proper ADC Server settings.
elasticityStep	Steps	Monitors the Service CPU usage and compares it to a set threshold. If the upper bound threshold is crossed, the workflow adds a service VM. If the lower bound threshold is crossed, the workflow removes a service VM.
removeVmServerFromService	Steps	Responsible for three operations on the service VM: 1. Removes the real server from the group. 2. Shuts down VM. 3. Removes the VM.

Running an Out-of-the-box Workflow

1. In your Web browser, expand *Radware vDirect* to view the list of workflows.
2. Click the desired workflow. The workflow is displayed in the right-hand pane.
3. Click **Execute workflow**. The workflow dialog box is displayed.
4. Set all necessary parameters.
5. Click **Submit**.

For more information on the workflow-specific parameters, see each workflow below.

createAdc

This workflow creates a new ADC instance in one of the three available form factors: Dedicated-ADC, ADC-VX, or ADC-VA. The ADC Instance is automatically created based on parameters included in the workflow and immediately becomes active and available for service. The workflow is also available for integration as part of any service creation workflow available in the system.

To access the workflow, expand the desired container: Dedicated ADC, ADC-VX, or ADC-VA.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

- createAdc Workflow Parameters for ADC-VA, page 23
- createAdc Workflow Parameters for ADC-VX, page 24
- createAdc Workflow Parameters for Dedicated-ADC, page 25

Table 4: createAdc Workflow Parameters for ADC-VA

Parameter	Description
ADC-VA Instance Parameters	
ADC-VA Container	The The ADC-VX appliance hosting the instance.
ADC-VA VM Template	The VM Template used for provisioning the new ADC-VA instance.
ADC Instance Name	The ADC-VA instance name.
Destination Folder	The target folder for the new ADC-VA instance.

Parameter	Description
Management Network	The management network.
External Network	The network used for client access.
Internal Network	The network used for server connectivity.
VLAN Definitions	
Note: The VLANs must be defined on the Host System	
External VLAN Number	The VLAN number for external connectivity.
Internal VLAN Number	The VLAN number for server connectivity.
External IP Interface Definitions	
External IP address	An IP address.
External IP Mask	An IP subnet mask.
Gateway Address	An IP Gateway address.
Internal IP Interface Definitions	
Internal IP address	An IP address.
Internal IP Mask	An IP subnet mask.

Table 5: createAdc Workflow Parameters for ADC-VX

Parameter	Description
vADC Instance Parameters	
ADC-VX Appliance	The ADC-VX appliance hosting the instance.
vADC Name	The ADC-VX appliance hosting the instance.
vADC Management IP	The management IP address.
vADC Management IP Mask	The management IP mask.
vADC Management IP Mask	The management gateway address.
Capacity Units	The vADC capacity units.
Throughput Limit	The vADC throughput limit.
VLAN Definitions	
Note: The VLANs must be defined on the ADC-VX appliance	
External VLAN Number	The VLAN number for external connectivity.
Internal VLAN Number	The VLAN number for server connectivity.
External IP Interface Definitions	
External IP address	An IP address.
External IP Mask	An IP subnet mask.
Gateway Address	An IP Gateway address.
Internal IP Interface Definitions	
Internal IP address	An IP address.
Internal IP Mask	An IP subnet mask.

Table 6: createAdc Workflow Parameters for Dedicated-ADC

Parameter	Description
VLAN Definitions	
Note: The VLANs must be defined on the Dedicated ADC	
External VLAN Number	The VLAN number for external connectivity.
Internal VLAN Number	The VLAN number for server connectivity.
External IP Interface Definitions	
External IP address	An IP address.
External IP Mask	An IP subnet mask.
Gateway Address	An IP Gateway address.
Internal IP Interface Definitions	
Internal IP address	An IP address.
Internal IP Mask	An IP subnet mask.

destroyAdc

This workflow removes ADC services from service. The workflow deletes the selected ADC instance (Dedicated ADC) or vADC instance (ADC-VA or ADC-VX) and removes it from service.

> **Note:** The deleted container and the contained ADC instance is unregistered from the system and will not be accessible to any further workflows executions.

registerAdcInstance

This workflow registers an ADC instance. It discovers all the ADC instances active in a target system that were not created by the VCO system. For example, when adding an ADC-VX with active vADCs to the orchestration system, this workflow detects and adds the already available vADCs to the ADC-VX.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 7: registerAdc Workflow Parameters

Parameter	Description
ADC Instance Parameters	
ADC Instance	The target ADC instance.
ADC Instance Name	The ADC instance name.
SNMP Settings	
Read community	The SNMP read community.
Read community	The SNMP write community.

---

createHttpWebApplication

This workflow creates a new Web Service. It creates a number of VMs as Web servers from a template, creates an ADC instance, and connects them to form a service.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 8: createHttpWebApplication Workflow Parameters

Parameter	Description
Connection Parameters	
vCenter	The vCenter where the Web servers are provisioned.
ADC Instance	The ADC instance that governs the traffic for the Web servers.
ADC Service Parameters	
VIP Address	The public IP address of the service.
Virtual Service Port	The TCP/IP port of the service.
Virtual Service Number	The ADC virtual service number.
Group Number	The ADC server group number.
ADC Instance External Port	The ADC port used to handle client traffic.
ADC Instance Internal Port	The ADC port used to handle server traffic.
Server Parameters	
vCenter Datacenter	The data center where the servers are created.
VM Template	The VM template from which the servers are cloned.
Destination Folder	The folder where the servers are created.
Server Base Name	The prefix used for the created server name.
Number of Web Servers to create	The number of servers created.
Destination Host System	The hypervisor where the servers are hosted.
Destination Resource Pool	The pool from where the servers allocate compute resources.
Destination Datastore	The storage device on which server VM images are stored.
Destination Network	The network that connects the servers.

elasticityMonitor

This workflow adapts server resources based on the monitored CPU utilization of the active service VMs.

The operator needs to cancel this workflow to stop it. The Web tier is composed of Web servers running on VMs with their incoming traffic distributed by an ADC instance. The new Web tier servers are cloned from a template and are based on the user defined parameters. The ADC instance is configured to automatically add and remove the Web servers to the ADC Instance group.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 9: elasticityMonitor Workflow Parameters

Parameter	Description
Connection Parameters	
vCenter	The vCenter where the Web servers are provisioned.
ADC Instance	The ADC instance that governs the traffic for the Web servers.
Server Parameters	
vCenter Datacenter	The data center where the servers are created.
VM Template	The virtual machine template from which the servers are cloned.
Destination Folder	The folder where the servers are created.
Server Base Name	The prefix used for the created server name.
Destination Host System	The hypervisor where the servers are hosted.
Destination Resource Pool	The pool from where the servers allocate compute resources.
Destination Datastore	The storage device on which server VM images are stored.
Destination Network	The network that connects the servers.
Service Parameters	
VM Servers	The servers to be included in this workflow.
ADC Service Parameters	
Group Number	The ADC server group number.
Elasticity Parameters	
%CPU Lower Bound	The average CPU percentage for which server VMs will be deprovisioned.
%CPU Upper Bound	The average CPU percentage for which new server VMs will be provisioned.
Min. Number of Service VMs	The minimum number of active service VMs.
Max. Number of Service VMs	The maximum number of active service VMs.

releaseApplicationResources

This workflow automatically adjusts the configuration of an ADC instance by deleting one or more service VMs based on customer input.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 10: releaseApplicationResources Workflow Parameters

Parameter	Description
VM Servers	The VM servers to be included in this workflow.
ADC Instance	The ADC instance that governs the traffic for the Web servers.

addServerToService

This workflow calls the *addServerToServiceNoCommit* workflow and applies it to the system.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 11: addServerToService Workflow Parameters

Parameter	Description
vCenter	The vCenter where the Web servers are provisioned.
ADC Instance	The ADC instance that governs the traffic for the Web servers.
Group Number	The ADC server group number.
VM Template	The VM template from which the servers are cloned.
Destination Folder	The folder where the servers are created.
Destination Host System	The hypervisor where the servers are hosted.
Destination VM Name	The name of the VM where the servers are created.
Destination Resource Pool	The pool from where the servers allocate compute resources.
Destination Datastore	The storage device on which server VM images are stored.
Destination Network	The network that connects the servers.

addServerToServiceNoCommit

This workflow creates a new Service VM and respectively assigns it to the proper ADC server group.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 12: addServerToServiceNoCommit Workflow Parameters

Parameter	Description
vCenter	The vCenter where the Web servers are provisioned.
ADC Instance	The ADC instance that governs the traffic for the Web servers.
Group Number	The ADC server group number.
VM Template	The virtual machine template from which the servers are cloned.
Destination Folder	The folder where the servers are created.
Destination Host System	The hypervisor where the servers are hosted.
Destination VM Name	The name of the VM where the servers are created.
Destination Resource Pool	The pool from where the servers allocate compute resources.
Destination Datastore	The storage device on which server VM images are stored.
Destination Network	The network that connects the servers.

createServerVm

This workflow clones an active service VM and adjusts it based on the new service VM parameters.

If the destination VM already exists, the workflow assumes the VM is already configured correctly and returns with the found VM.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 13: createServerVm Workflow Parameters

Parameter	Description
vCenter	The vCenter where the Web servers are provisioned.
VM Name	The name of the VM where the servers are created.
VM Template	The VM template from which the servers are cloned.
Destination Network	The network that connects the servers.
Destination Host System	The hypervisor where the servers are hosted.
Destination Resource Pool	The pool from where the servers allocate compute resources.
Destination Datastore	The storage device on which server VM images are stored.

createSimpleSlbService

This workflow creates a service with a Server VM and the proper ADC Server settings.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 14: createServerVm Workflow Parameters

Parameter	Description
vCenter	The vCenter where the Web servers are provisioned.
ADC Instance	The ADC instance that governs the traffic for the Web servers.
Group Number	The ADC server group number.
VM Template	The VM template from which the servers are cloned.
Destination Folder	The folder where the servers are created.
Destination Host System	The hypervisor where the servers are hosted.
Destination VM Name	The name of the VM where the servers are created.
Destination Resource Pool	The pool from where the servers allocate compute resources.
Destination Datastore	The storage device on which server VM images are stored.
Destination Network	The network that connects the servers.
External Port	The ADC port used to handle client traffic.
Internal Port	The ADC port used to handle server traffic.
VIP Address	The public IP address of the service.
Virtual Service Number	The ADC virtual service number.
Virtual Service Port	The TCP/IP port of the service.

elasticityStep

This workflow monitors the Service CPU usage and compares it to a set threshold. If the upper bound threshold is crossed, the workflow adds a service VM. If the lower bound threshold is crossed, the workflow removes a service VM.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 15: elasticityStep Workflow Parameters

Parameter	Description
VMs	The VM servers to be included in this workflow.
VM Base Name	The prefix used for the created VM name.
vCenter	The vCenter where the Web servers are provisioned.
VM Template	The VM template from which the servers are cloned.
Destination Folder	The folder where the servers are created.
Destination Host System	The hypervisor where the servers are hosted.
Destination Resource Pool	The pool from where the servers allocate compute resources.
Destination Datastore	The storage device on which server VM images are stored.
Destination Network	The network that connects the servers.
ADC Instance	The ADC instance that governs the traffic for the Web servers.
Group Number	The ADC server group number.
%CPU Lower Bound	The average CPU percentage for which server VMs will be deprovisioned.
%CPU Upper Bound	The average CPU percentage for which new server VMs will be provisioned.
Min. Number of Service VMs	The minimum number of active service VMs.
Max. Number of Service VMs	The maximum number of active service VMs.

removeVmServerFromService

This workflow is responsible for three operations on the service VM:

1. It removes the real server from the group.

2. It shuts down VM.

3. It removes the VM.

Workflow Parameters

The following are the parameters that you must configure before submitting this workflow.

Table 16: removeVmServerFromService Workflow Parameters

Parameter	Description
ADC Instance	The ADC instance that governs the traffic for the Web servers.
VM	The VM to be removed from the ADC instance group.
Group Number	The ADC server group number.

Chapter 4 – Creating and Maintaining Workflows and Actions

This chapter describes how to create and maintain actions and workflows.

The user responsible for creating and maintaining actions and workflows is the developer. The developer usually works with the vDirect Plug-in via the *VMware vCenter Orchestrator* client.

Prerequisites

Before starting to work with the vDirect Plug-in via the *VMware vCenter Orchestrator* client, the following prerequisites must be met.

Background Knowledge

This chapter is intended for developers experienced in working with the VMware environment. It assumes that you are familiar with the basic VMware concepts and actions.

The following documents must be consulted to get a full description on how to operate, create and modify workflows:

• *vCenter Orchestrator Developer Guide*

• *vCenter Orchestrator Administrator Guide*

Both documents can be downloaded from

http://www.vmware.com/support/pubs/orchestrator_pubs.html

Environment Prerequisites

In addition to installing the vDirect Plug-in on a vCenter Orchestration Server, the following prerequisites must be completed:

1. Using the vCenter Orchestration Configuration user interface, register at least one ADC container (ADC-VA, ADC-VX, or Dedicated ADC):

   — For the ADC-VA container to work, you must prepare an ADC-VA VM template.

   — ADC-VA can also operate as a dedicated ADC Container.

Note: The administrator is required to manually provision an ADC-VA and use the registerAdcInstance workflow for Dedicated ADCs.

2. Prepare a VM template to be used for provisioning a new service VM. Install and configure the VM with *VMware Tools* to get its IP address from a DHCP server.

3. Make sure you have a switch or network that the service VMs will be connected to and that you have a DHCP server active on this switch or network.

4. Install the *VMware vCenter Orchestrator* client.

5. Using the *VMware vCenter Orchestrator* client, do the following:

   a. In the *Actions* tab, create a new module (for example: "com.test.action").
   b. In the *Workflows* tab, create a new category (for example: "TestWFs").

Accessing the vDirect Plug-in via the Client

To log into the *VMware vCenter Orchestrator* client, use the username and password specified by your VMware Orchestrator administrator.

To access the vDirect Plug-in via the client

1. Open the *VMware vCenter Orchestrator* client. The *Login* dialog box is displayed.

2. Log into the *VMware vCenter Orchestrator* client. The username and password are provided by the administrator. The workspace of the vDirect Plug-in is displayed.

3. Click the desired work area:

    — To work with workflows, click the **Workflow** tab.

    — To work with actions, click the **Actions** tab.

Working with Actions

Actions are functions that are invoked by workflows or other actions. Actions usually define a reusable building block.

Creating a New Action

The following procedure describes how to create an action that defines a VLAN on an ADC instance using the API.

To create a new action

1. In the *VMware vCenter Orchestrator* client, click the *Actions* tab.

2. Expand the root tree to display all actions.

3. Right-click the *com.test.action* module and select **Add Action**. The *Action name* dialog box is displayed.

4. In the *Action name* field, enter **assignVlanToAdcInstance** and click **OK**. The newly created action is displayed in the list of actions.

5. Right-click *assignVlanToAdcInstance* and select **Edit**. The *assignVlanToAdcInstance* action interface is displayed.

6. Click the *Scripting* tab.

7. In the *Scripting* tab, add each of the three input parameters by clicking the **Add Parameter** icon.

8. Define the parameters as follows:

Parameter Name	Parameter Type	Description
adcInstance	AdcInstance	The instance that is configured
vlandId	Number	VLAN ID to configure
portNumber	Number	The switch port to configure that VLAN for

9. In the script's code pane, paste the following JavaScript code. The JavaScript implements the actual functionality of assigning a VLAN to an ADC Instance using the SDK.

```
//get the singleton instance of AdcVCOContainerManager
var myAdcVCOContainerManager = AdcVCOContainerManager.getInstance();
//get the factory object that enables working with the VADI API on the ADC
instance
var factory = myAdcVCOContainerManager.getConnection(adcInstance);
// log into the workflow console
System.log("configure vlan id " + vlanId + " to Adc Instance " +
adcInstance.name);


// instanciate a new empty API vlan object that can be used on the new
buffer
var myVlanNewCfgTableEntry = new VlanNewCfgTableEntry() ;
myVlanNewCfgTableEntry.vlanId = vlanId;
myVlanNewCfgTableEntry.addPort = portNumber;


//communicate with the instance and configure the vlan
factory.create(myVlanNewCfgTableEntry);
```

10. Click **Save and Close**.

In Creating a New Workflow, page 35, you will create a workflow that will invoke this action.

Modifying an Existing Action

To modify an existing action, you first must copy the desired action and then modify it.

The following procedure displays how to modify the *createSoftAdc* action to define different names for the ADC-VA VM name and display name.

To modify an existing action

1. In the *VMware vCenter Orchestrator* client, click the *Actions* tab.

2. Click the hierarchy tree to expand and display all actions.

3. Expand *com.radware.adc.container.soft*.

4. Right-click *createSoftAdc* and select **Duplicate Action**. The *Duplicate Action* dialog box is displayed.

5. In the *New action name* field, enter **createSoftAdc**.

6. From the *Action category* drop-down list, select the *com.test.action* module and click **Select**.

7. Click **Duplicate**. The **createSoftAdc** action is displayed in the *com.test.action* module.

8. Right-click *createSoftAdc* in the *com.test.action* module and select **Edit**. The action is displayed.

9. In the *Scripting* tab, add an input parameters by clicking **Add Parameter**. The parameters are displayed.

10. Edit the parameters as follows:

> — Name — adcVmName

> — Type — string

11. Move the *adcVmName* parameter up to place it below the *adcInstanceName* parameter.

12. Modify the existing action and add another parameter. The original actions use the *adcInstanceName* as the VM image name and the displayed name. The modified actions enable passing different parameters: one paramater is used for the VM image name (*adcVmName*) and a different parameter is used for the display name (*adcInstanceName*). After modifying it, the line passes *adcVmName* as the VM image name instead of *adcInstanceName* used in the original action.

    In the script's code pane, change the second line from

```
var fullTargetName =
System.getModule("com.radware.vclib").vcCalcFullVMFolderPath(adcTargetFold
er) + "/" + adcInstanceName;
```

    to

```
var fullTargetName =
System.getModule("com.radware.vclib").vcCalcFullVMFolderPath(adcTargetFold
er) + "/" + adcVmName;
```

13. Click **Save and Close**.

Viewing Descriptions of SDK and API Objects

You can view descriptions of SDK and API objects in the *Actions* workspace.

To view descriptions of SDK and API objects

1. In the *VMware vCenter Orchestrator* client, click the *Actions* tab.

2. Click the hierarchy tree to expand and display all actions.

3. Right-click the desired action and select **Edit**.

4. In the left-hand pane, click **Search API**. The *API Search* dialog box is displayed.

5. Click **AdcConnectionObjectFactory**.

6. Select the object in the search results and click **Go to selection**. The description of the object is displayed in the left-hand pane.

7. Click any of the methods of the selected object to display their descriptions.

Working with Workflows

A workflow defines an item that can be invoked by an operator or remotely through the VCO API. Workflows are activated to provision, de-provision or monitor an environment. For example, one of the workflows provided out-of-the-box with the vDirect Plug-in automates the process of instantiating Web servers from a template and then configuring an ADC instance to distribute the traffic between the newly created Web servers.

In addition to the out-of-the-box workflows provided by Radware's vDirect Plug-in, you can create new functionalities or extend the existing functionalities to the existing workflows. You can create new workflows that invoke existing ones, or modify a workflow by copying it to your defined directory and modify it there.

Note: Radware strongly advises not to modify the existing workflows.

Creating a New Workflow

The following procedure displays how to create a workflow that combines several existing workflows.

The new workflow combines the provisioning of a new Web application composed of multiple Web servers and the creation of a new ADC instance that will distribute traffic between the Web servers.

To create a new workflow by combining existing workflows

1. In the *VMware vCenter Orchestrator* client, click the *Workflow* tab.

2. Click the hierarchy tree to expand the workflows.

3. Right-click the *TestWFs* category, and select **New Workflow**. The *Workflow name* dialog box is displayed.

4. Enter **ProvisionAll** and click **OK**.

5. Right-click *ProvisionAll*, and select **Edit**. The newly created workflow is displayed.

6. Click the *Schema* tab.

7. Click **Actions & Workflows**. Action and workflow elements are displayed in the *Actions & Workflows* pane.

8. Drag a Workflow element to the workspace pane. The *Choose Workflow* dialog box is displayed.

9. Enter **createAdc** in the *Search* field.

10. Select one of the workflows from the list, based on the container form factor type that you have previously registered (see Environment Prerequisites, page 31): ADC-VA, ADC-VX, or Dedicated-ADC. The selected workflow is displayed in the workspace.

11. Place the selected workflow underneath the circle element.

12. Drag a second Workflow element to the workspace pane and place it underneath the first workflow. The *Choose Workflow* dialog box is displayed.

13. Enter **createHttp** in the *Search* field.

14. Select the **createHttpWebApplication** from the list.

15. Click **Generic**.

16. From the list of *Generic* elements, drag the **End Workflow** element to the workspace pane and place it underneath the second workflow.

17. Select the Connector tool from the workspace tools.

18. Select the circle and drag the connection to the first workflow.

19. Connect all other elements by selecting them and dragging the connection to the element below.

20. Click **Save**.

21. Click **Validate**. The *Validation* dialog box is displayed:
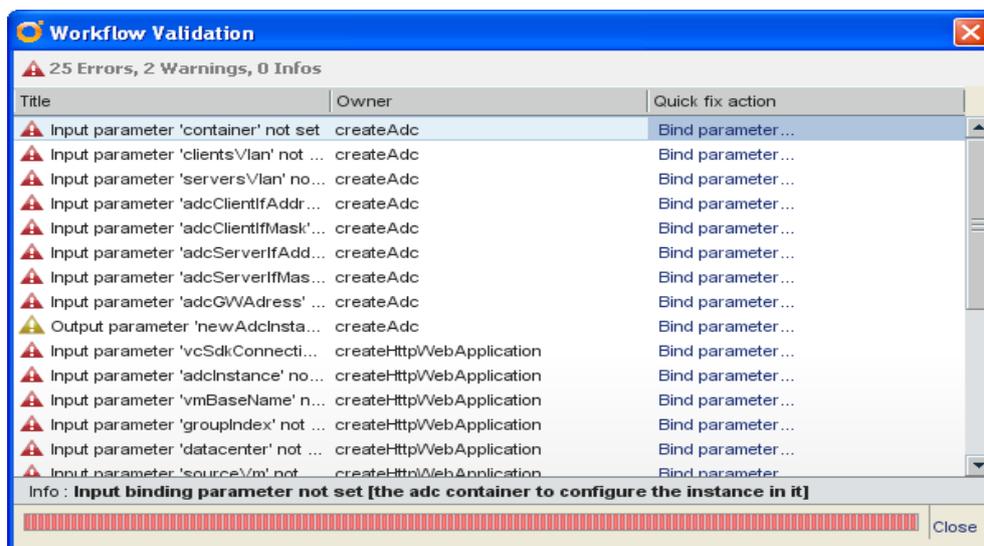
22. In the *Output parameter New AdcInstance not set* entry by the createAdc owner, select **Bind Parameter**. The *createAdc Output Parameter* dialog box is displayed.

23. Click **Create parameter/attribute in workflow**. The *Create parameter/attribute in workflow* dialog box is displayed.

24. Accept the default settings and click **OK**.

25. In the *Workflow Validation* dialog box, in the *Output parameter createVMs not set* entry by the createHttpWebApplication owner, select **Bind parameter**. The *createVMs Output Parameter* dialog box is displayed.

26. Click **Create parameter/attribute in workflow**. The *Create parameter/attribute in workflow* dialog box is displayed.

27. Accept the default settings and click **OK**.

28. In the *Workflow Validation* dialog box, in the *Intput parameter adcInstance not set* entry by the createHttpWebApplication owner, select **Bind parameter**. The *adcInstance Input Parameter* dialog box is displayed.

29. From the Parameters/Attributes list, select **newAdcInstance** and click **Select**.

30. Resolve all remaining errors in the *Workflow Validation* dialog box as follows:

    a. Select **Bind Parameter**. The *Input Parameter* dialog box is displayed.

    b. In the *Input Parameter* dialog box, select **NULL** from the Parameters/Attributes list.

    c. Click **Select**. The *Create parameter* dialog box is displayed.

    d. In the *Create parameter* dialog box, select **Create workflow INPUT PARAMETER with the same name**.

    e. Click **OK**.

31. After resolving all validation errors, click **Close**.

32. Click the *General* tab.

33. If there are any additional attributes, delete the redundant ones and repeat the validation process to add the remaining parameters as input parameters.

34. Click the *Input* tab. The following parameters are displayed:

#	Name	Type
⇨	container	AdcVCOPlugin:AdcContainer
⇨	clientsVlan	number
⇨	serversVlan	number
⇨	adcClientIfAddress	string
⇨	adcClientIfMask	string
⇨	adcServerIfAddress	string
⇨	adcServerIfMask	string
⇨	adcGWAdress	string
⇨	vcSdkConnection	VC:SdkConnection
⇨	vmBaseName	string
⇨	groupIndex	number
⇨	datacenter	VC:Datacenter
⇨	sourceVm	VC:VirtualMachine
⇨	destinationFolder	VC:VmFolder
⇨	destinationHostSystem	VC:HostSystem
⇨	destinationResourcePool	VC:ResourcePool
⇨	destinationDatastore	VC:Datastore
⇨	destinationNetwork	VC:Network
⇨	clientPort	number
⇨	serverPort	number
⇨	vipAddress	string
⇨	virtIndex	number
⇨	virtPortNum	number
⇨	numberOfWebServers	number

35. Click **Save and Close**.

36. Run the workflow to create a new ADC Instance and Web servers which are load balanced by the newly created ADC Instance.

To create a new workflow that invokes the assignVlanToAdcInstance action

1. In the *VMware vCenter Orchestrator* client, click the **Workflow** tab.

2. Click the hierarchy tree to expand the workflows.

3. Right-click the *TestWFs* category, and select **New Workflow**. The *Workflow name* dialog box is displayed.

4. Enter **AssignVlanToAdcInstance** and click **OK**.

5. Right-click *AssignVlanToAdcInstance*, and select **Edit**. The newly created workflow is displayed.

6. Click the *Schema* tab.

7. Click **Actions & Workflows**. Action and workflow elements are displayed in the *Actions & Workflows* pane.

8. Drag an Action element to the workspace pane. The *Choose Action* dialog box is displayed.

9. Enter **assignVlanToAdcInstance** in the *Search* field.

10. Select the **assignVlanToAdcInstance** action from the list. The selected action is displayed in the workspace.

11. Place the selected action underneath the circle element.

12. Click **Generic**.

13. From the list of *Generic* elements, drag the **End Workflow** element to the workspace pane and place it underneath the second workflow.

14. Select the Connector tool from the workspace tools.

15. Select the circle and drag the connection to the first workflow.

16. Connect all other elements by selecting them and dragging the connection to the element below.

17. Click **Save**.

18. Click **Validate**. The *Validation* dialog box is displayed.

19. Resolve each of the errors in the *Workflow Validation* dialog box as follows:

    a. Select **Bind Parameter**. The *Input Parameter* dialog box is displayed.

    b. In the *Input Parameter* dialog box, click **Create parameter/attribute in workflow**. The *Create parameter/attribute in workflow* dialog box is displayed.

    c. In the *Create parameter* dialog box, select **Create workflow INPUT PARAMETER with the same name**.

    d. Click **OK**.

20. After resolving all validation errors, click **Close**.

21. Click the *General* tab.

22. If there are any additional parameters or attributes, delete the redundant ones and repeat the validation process to add the remaining parameters as input parameters.

23. Click the *Input* tab. The following parameters are displayed:

| General | Inputs | Outputs | Schema | Presentation | Parameters References | Executions | Events | Permissions |

Parameters

↑ ↓ ➡ ✖ | 👁 Show in presentation
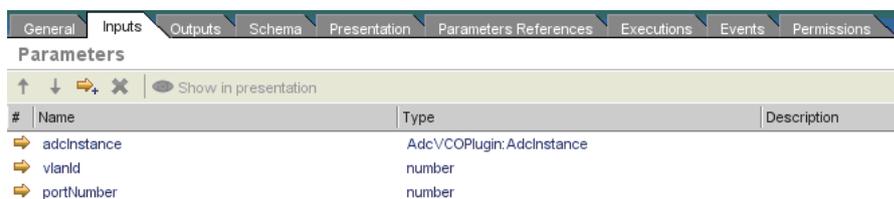
#	Name	Type	Description
➡	adcInstance	AdcVCOPlugin:AdcInstance	
➡	vlanId	number	
➡	portNumber	number	

24. Click **Save and Close**.

25. Run the workflow to configure VLANs for an ADC instance.

Modifying an Existing Workflow

In this procedure, change the *createAdc* workflow for ADC-VA. The original workflow gets a single instance name parameter that is used both for defining the virtual machine name and the display name of the instance. This procedure uses ADC-VA as an example to show how to use the modified *createSoftAdc* action and add the proper parameter in the modified workflow.

Note: Radware advises not to change the existing workflow, but instead to create a new workflow by cloning an existing workflow and then modifying the cloned workflow.

To modify an existing workflow

1. In the *VMware vCenter Orchestrator* client, click the **Workflow** tab.

2. Click the hierarchy tree to expand the workflows.

3. Expand **Radware vDirect >Containers>ADC-VA**.

4. Right-click *createAdc* and select **Duplicate workflow**. The *Duplicate workflow* dialog box is displayed.

5. In the *New workflow name* field, enter **createAdc**.

6. From the *Workflow category* drop-down list, select the **TestWFs** module and click **Select**.

7. Click **Duplicate**. The **createAdc** workflow is displayed in the *TestWFs* module.

8. Right-click the *createAdc* workflow and select **Edit**.

9. Click the *Schema* tab.

10. In the workspace pane, select **createSoftAdc** and delete it.

11. Click **Actions & Workflows**. Action and workflow elements are displayed in the *Actions & Workflows* pane.

12. Drag an Action element to the workspace pane. The *Choose Action* dialog box is displayed.

13. Enter **createSoft** in the *Search* field.

14. Select the **createSoft** action from the com.test.action module from the list. The selected action is displayed in the workspace.

15. Place the selected action underneath the circle element.

16. Click **Generic**.

17. From the list of *Generic* elements, drag the **End Workflow** element to the workspace pane and place it underneath the second workflow.

18. Select the Connector tool from the workspace tools.

19. Select the circle and drag the connection to the first workflow.

20. Connect all other elements by selecting them and dragging the connection to the element below.

21. Click **Save**.

22. Click **Validate**. The *Validation* dialog box is displayed.
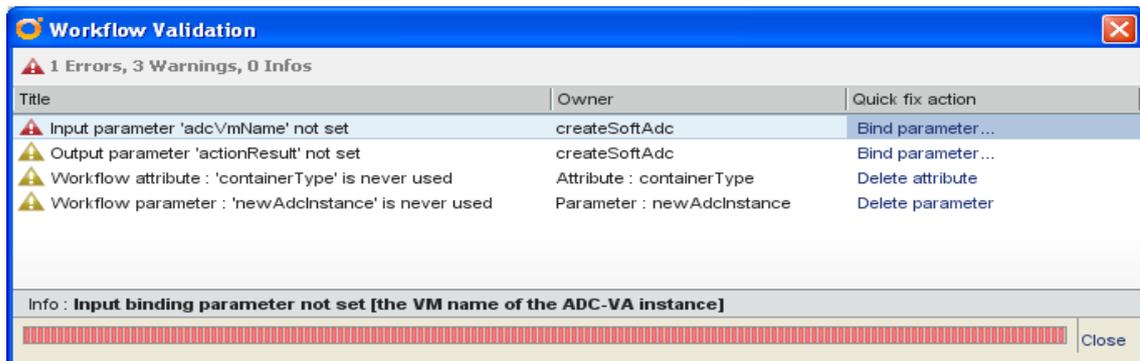
23. In the *Input parameter adcVmName not set* entry by the createSoftAdc owner, select **Bind Parameter**. The *createSoftAdc Input Parameter* dialog box is displayed.

24. Click **Create parameter/attribute in workflow**. The *Create parameter/attribute in workflow* dialog box is displayed.

25. In the *Create parameter* dialog box, select **Create workflow ATTRIBUTE with the same name**.

26. Click **OK**.

27. In the *Create parameter* dialog box, select **Create workflow INPUT PARAMETER with the same name**.

28. Click **OK**.

29. In the *Workflow Validation* dialog box, in the *Output parameter actionResult not set* entry by the createSoftAdc owner, select **Bind Parameter**. The *createSoftAdc Output Parameter* dialog box is displayed.

30. Click **Create parameter/attribute in workflow**. The *Create parameter/attribute in workflow* dialog box is displayed.

31. Select **newAdcInstance** from the list and click **Select**.

32. In the *Workflow Validation* dialog box, disregard the remaining warning and click **Close**.

33. Click the *Input* tab. The following parameters are displayed:

34. Move the *adcVmName* parameter up to place it below the *adcInstanceName* parameter.

35. Click the *Presentation* tab.

36. Expand the *create a new ADC-VA Instance* workflow.

37. Move the *adcVmName* parameter under the *ADC-VA Instance Parameters* and place it below the *adcInstanceName* parameter.

38. Click **Save and Close**.

39. Run the workflow to create new ADC-VA Instances that can have different VM names and instance names.